Housing, Husbandry, and Welfare of Poultry

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JOURNAL ARTICLE:

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Article title.
Author. Place of publication: Publisher. Journal Title. Date. Volume (Issue). Pages. (NAL Call Number).

Example:
1 NAL Call No.: DNAL 389.8.SCH6
Morrison, S.B. Denver, Colo.: American School Food Service Association. School foodservice journal. Sept 1987. v. 41 (8). p.48-50. ill.

BOOK:

Citation # NAL Call Number
Title.
Author. Place of publication: Publisher, date. Information on pagination, indices, or bibliographies.

Example:
1 NAL Call No.: DNAL RM218.K36 1987
Exploring careers in dietetics and nutrition.
Kane, June Kozak. New York: Rosen Pub. Group, 1987.
Includes index. xii, 133 p.: ill.; 22 cm. Bibliography: p. 126.

AUDIOVISUAL:

Citation # NAL Call Number
Title.
Author. Place of publication: Publisher, date.
Supplemental information such as funding. Media format (i.e., videocassette): Description (sound, color, size).

Example:
1 NAL Call No.: DNAL FNCTX364.A425 F&N AV
All aboard the nutri-train.
Mayo, Cynthia. Richmond, Va.: Richmond Public Schools,
1981. NET funded. Activity packet prepared by Cynthia Mayo. 1 videocassette (30 min.): sd., col.; 3/4 in. + activity packet.Housing, Husbandry, and Welfare of Poultry January 1991 - January 1994

SEARCH STRATEGY

Line Command

1. (HEN OR HENS OR FOWL OR POULTRY OR CHICK? OR COCK? OR ROOSTER? OR FRYER? OR BROILER? OR GALLIFORM? OR TURKEY? OR DUCK? OR GOOSE OR GANDER OR GEESE OR DRAKE?)/TI,DE

2. HOUS? OR FACILIT? OR CAGE? OR COOP OR PERCH? OR CONFINE? OR PEN OR PENS

3. WELFARE OR WELL(N)BEING OR WELLBEING OR HUMANE OR HANDL? OR CARE OR STRESS? OR HUSBANDRY

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6. S4 OR S5

7. S6 AND LA=ENGLISH

8. RD S7

Housing, Husbandry, and Welfare of Poultry

1 NAL Call. No.: 41.8 AV5
Acute toxicity of boric acid and boron tissue residues after chronic exposure in broiler chickens.
Sander, J.E.; Dufour, L.; Wyatt, R.D.; Bush, P.B.; Page, R.K. Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Oct. Avian diseases v. 35 (4): p. 745-749; 1991 Oct. Includes references.

Language: English

Descriptors: Chicks; Broilers; Boric acid; Boron; Toxicity; Insecticide residues; Animal tissues; Symptoms; Oral administration; Litter; Feeds; Lethal dose

Abstract: The acute oral mean lethal dose of boric acid in 1-day-old chickens was found to be 2.95 +/- 0.35 g/kg of body weight, which classifies this product as only slightly toxic to chickens. One-day-old broiler chicks were housed in floor pens in which litter had been treated with 0, 0.9, 3.6, or 7.2 kg of boric acid per 9.9 m2 of floor space. Boron residue levels in brain, kidney, liver, and white muscle were not statistically elevated following a 15-day exposure period. Boron residue levels in the same types of tissue were not significantly elevated in chicks fed 500 ppm or 1250 ppm boric acid in feed ad libitum for 3 weeks; however, residues were significantly higher in chicks fed 2500 ppm or 5000 ppm boric acid. These data indicate that broilers grown on boric acid-treated litter do not consume enough boric acid to cause elevated boron levels in tissues.

2 NAL Call. No.: 47.8 Am33P
Age-related changes in egg production, fertility, embryonic mortality, and hatchability in commercial turkey flocks.
Lerner, S.P.; French, N.; Mcintyre, D.; Baxter-Jones, C. Champaign, IL : Poultry Science Association, 1921-; 1993 Jun. Poultry science v. 72 (6): p. 1025-1039; 1993 Jun. Includes references.

Language: English

Descriptors: Turkeys; Turkey egg production; Laying performance; Turkey egg hatchability; Egg quality; Embryo mortality; Egg clutches; Rhinotracheitis; Incubation; Weight losses

Abstract: Factors affecting production of Large White turkey hens were examined. Six flocks (n = 136 to 149 hens per flock) were housed at commercial facilities in the United States and two flocks (n = 40 hens per flock) were housed at commercial facilities in the United Kingdom (UK). Effects of time-in-lay on egg production and duration of clutches and pauses were determined using all flocks. Also, effects of time-in-lay, molt, and characteristics of individual eggs (size, sequence position, grade, and incubational weight loss) on fertility, hatchability, and embryonic mortality were determined using the UK flocks. Each flock showed a distinctive pattern of production; it increased initially to a peak and decreased thereafter. Average duration of clutches and of pauses were correlated positively and negatively, respectively, with hen-day egg production. As production declined toward the latter half of lay, a greater proportion of short clutches and, therefore, of first-of-clutch eggs were laid. During the course of the first cycle of lay, eggs became larger and a greater proportion were of low grade. Fertility and hatchability increased initially then decreased. Effects of time-in-lay differed after a forced molt. Egg size changed only slightly with time in the second cycle, and fertility and hatchability were greater in the second cycle than in the first cycle. In both cycles, sequence position affected grade (first-of-sequence eggs were of lower grade compared with eggs laid subsequently), and grade influenced percentage weight loss, fertility, hatchability, and embryonic mortality. The results of this study support selection of hens based on duration of clutches. In addition, the single most significant preincubational variable for predicting hatchability was grade of the egg.

3 NAL Call. No.: 290.9 AM32T
Air contaminant distributions in a commercial laying house. Maghirang, R.G.; Manbeck, H.B.; Roush, W.B.; Muir, F.V. St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Sep. Transactions of the ASAE v. 34 (5): p. 2171-2180; 1991 Sep. Includes references.

Language: English

Descriptors: Pennsylvania; Poultry housing; Air pollution; Air quality; Air temperature; Ammonia; Carbon dioxide; Contaminants; Dust; Lighting; Spatial distribution; Ventilation

Abstract: Total particle counts (TPC), carbon dioxide (CO2) levels, ammonia (NH3) levels, and room air temperature were monitored in a commercial cage laying house in Pennsylvania. The inlet and the exhaust were monitored for 24-h periods once a week from July 1989 to February 1990 while six other sampling locations in the house were monitored for 24-h periods once each six weeks. At each sampling location, air contaminant

levels were measured at the alley and at each of the four cage decks. Results showed that more than 99% and 97% of total particles were smaller than 10.0 and 5.0 micromole in diameter, respectively. TPC, CO2 levels, NH3 levels, and air temperature exhibited day-to-day variations but bird age effect was not significant. Mean daily TPC, CO2 levels, NH3 levels, and temperature ranged from 18 to 103 particles/mL, 553 to 4424 ppm, 9 to 54 ppm, and 17 degrees to 30 degrees C, respectively. Overall air quality was observed to be poorer at locations most distant from the exhaust fans. There were significant differences among locations in NH3 levels and temperature but there were no significant differences in TPCs and CO2 levels. Ventilation rate appeared to be the most important factor influencing indoor air quality. Mean TPCs were significantly higher while mean CO2 and NH3 levels were significantly lower in hot weather than in cold weather. CO2 levels and NH3 levels were highly correlated but there was little correlation between TPCs and the levels of CO2, NH3, or air temperature.

4 NAL Call. No.: 47.8 B77
Air hygiene in a pullet house: effects of air filtration on aerial pollutants measured in vivo and in vitro.
Wathes, C.M.; Johnson, H.E.; Carpenter, G.A.
Oxfordshire : Carfax Publishing Company; 1991 Mar.
British poultry science v. 32 (1): p. 31-46; 1991 Mar. Includes references.

Language: English

Descriptors: Pullets; Chicken housing; Air pollution; Air filters; Hygiene; Airborne infection; Fungi; Bacteria; Lungs; Sampling

5 NAL Call. No.: 290.9 AM32T
Algorithms for microcomputer control of the environment of a production broiler house.
Allison, J.M.; White, J.M.; Worley, J.W.; Kay, F.W.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jan. Transactions of the ASAE v. 34 (1): p. 313-320; 1991 Jan. Includes references.

Language: English

Descriptors: Poultry housing; Environmental control; Algorithms; Computer software; Mathematical models; Relative humidity; Temperature

Abstract: A microcomputer-based system to control the environment of a commercial broiler house was developed and tested. The system was installed in an existing, totally enclosed, commercial production broiler house. Environmental control was provided by a microcomputer for the 51 day grow-out period. This article describes the algorithms used to control the environment. The environmental conditions produced are compared to those in an adjacent house with conventional controls.

6 NAL Call. No.: 47.8 B77
Alleviation of acute heat stress by food withdrawal or darkness. Francis, C.A.; Macleod, M.G.; Anderson, J.E.M.
Oxfordshire : Carfax Publishing Company; 1991 Mar.
British poultry science v. 32 (1): p. 219-225; 1991 Mar. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Light regime; Dark; Fasting; Dietary protein; Body temperature; Feed intake; Heat production

7 NAL Call. No.: HV4761.A5
Alternative systems for laying hens FAWC majority and minority reports. Harrison, R.
Washington, D.C. : The Institute; 1992.
The Animal Welfare Institute quarterly v. 41 (2): p. 14; 1992. Includes references.

Language: English

Descriptors: Hens; Animal welfare; Chicken housing

8 NAL Call. No.: 41.8 AU72
Analgesic therapy of beak-trimmed chickens.
Glatz, P.C.; Murphy, L.B.; Preston, A.P.
Brunswick, Victoria : Australian Veterinary Association; 1992 Jan. Australian veterinary journal v. 69 (1): p. 18; 1992 Jan. Includes references.

Language: English

Descriptors: Fowls; Debeaking; Analgesics; Animal welfare; Feed intake

9 NAL Call. No.: KF27.A33277 1990f
Animal research facilities protection joint hearing before the Subcommittee on Department Operations, Research, and Foreign Agriculture and the Subcommittee on Livestock, Dairy, and Poultry of the Committee on Agriculture, House of Representatives, One Hundred First Congress, second session, February 28, 1990.
United States. Congress. House. Committee on Agriculture. Subcommittee on Department Operations, Research, and Foreign Agriculture; United States, Congress, House, Committee on Agriculture, Subcommittee on Livestock, Dairy, and Poultry
Washington [D.C.] : U.S. G.P.O. : For sale by the Supt. of Docs., Congressional Sales Office, U.S. G.P.O.,; 1991; Y 4.Ag 8/1:101-52. iv, 176 p. : ill. ; 24 cm. Distributed to some depository libraries in microfiche. Serial no. 101-52.

Language: English

Descriptors: Criminal procedure; Laboratories; Animal welfare; Laboratory animals

10 NAL Call. No.: 47.8 AM33P
Anticoccidial efficacy and chicken toleration of potent new polyether ionophores. 2. The portmicin relative CP-84,657.
Ricketts, A.P.; Dirlam, J.P.; Shively, J.E.
Champaign, Ill. : Poultry Science Association; 1992 Oct.
Poultry science v. 71 (10): p. 1631-1636; 1992 Oct. Includes references.

Language: English

Descriptors: Broilers; Eimeria; Coccidiostats; Coccidiosis; Ionophores; Lesions; Liveweight gain; Dosage effects; Feed conversion

Abstract: The current study investigated the anticoccidial activity of the ionophore CP-84,657 against laboratory strains of the five major pathogenic species of Eimeria that infect poultry. Based on lesion scores and weight gain, the ionophore CP-84,657 achieved broad-spectrum anticoccidial efficacy in battery trials at doses of 4 and 5 ppm that was equivalent to reference commercial ionophores. In uninfected chickens, 4 ppm of CP-84,657 was the highest dose that gave growth rate and feed efficiency equivalent to commercial agents over 21 days in batteries and 49 days in floor pens. Ionophore CP-84,657 is an efficacious, well-tolerated anticoccidial in chickens, with potency comparable to that of the most potent known ionophores.

11 NAL Call. No.: 47.8 AM33P
Anticoccidial efficacy and chicken toleration of potent new polyether lonophores. 1. The septamycin relative CP-82,009.
Ricketts, A.P.; Dirlam, J.P.; Shively, J.E.
Champaign, Ill. : Poultry Science Association; 1992 Oct.
Poultry science v. 71 (10): p. 1626-1630; 1992 Oct. Includes references.

Language: English

Descriptors: Broilers; Coccidiosis; Coccidiostats; Ionophores; Eimeria; Liveweight gain; Feed conversion; Dosage effects; Lesions

Abstract: The anticoccidial activity of the ionophore CP-82,009 against laboratory isolates of four major species of poultry Eimeria was investigated. Parameters of anticoccidial efficacy that were evaluated were control of lesions and weight suppression. At 4 and 5 ppm, CP-82,009 demonstrated broad-spectrum anticoccidial efficacy in battery trials that was equivalent to reference commercial ionophores. When CP-82,009 was fed to uninfected broiler chickens at efficacious dose levels, growth rate and feed efficiency were found to be equivalent to commercial agents over a 21-day period in batteries and over a 49-day period in floor pens. From the present studies, it appears that CP-82,009 is an efficacious anticoccidial that is well tolerated by chickens, and that it ranks among the most potent anticoccidial ionophores described to date.

12 NAL Call. No.: 47.8 AM33P
Applications of behavior to poultry management.
Mauldin, J.M.
Champaign, Ill. : Poultry Science Association; 1992 Apr.
Poultry science v. 71 (4): p. 634-642; 1992 Apr. Paper contributed to the Symposium on Quantifying the Behavior of Poultry. Literature review. Includes references.

Language: English

Descriptors: Fowls; Social dominance; Territoriality; Agonistic behavior; Debeaking; Sexual behavior; Feeding behavior; Broodiness; Turkeys; Poultry housing; Animal welfare; Literature reviews

Abstract: The application of poultry behavior to management is discussed with examples of behavior-management interactions relating to commercial poultry husbandry practices. Behaviors that are important for the adaptation of poultry to husbandry include social behavior, aggression, sexual behavior, feeding, broodiness, cannibalism, nest site selection, and comfort behaviors.

13 NAL Call. No.: 47.8 B77
Artificial lighting in poultry houses: are photometric units appropriate for describing illumination intensities?.
Nuboer, J.F.W.; Coemans, M.A.J.M.; Vos, J.J.
Oxfordshire : Carfax Publishing Company; 1992 Mar.
British poultry science v. 33 (1): p. 135-140; 1992 Mar. Includes references.

Language: English

Descriptors: Poultry housing; Light intensity; Spectral data

14 NAL Call. No.: 47.8 B77
Artificial lighting in poultry houses: do hens perceive the modulation of fluorescent lamps as flicker?.
Nuboer, J.F.W.; Coemans, M.A.J.M.; Vos, J.J.
Oxfordshire : Carfax Publishing Company; 1992 Mar.
British poultry science v. 33 (1): p. 123-133; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Fluorescent lamps; Vision

15 NAL Call. No.: QL750.A6
Attenuation of the domestic chick's fear of human beings via regular handling: in search of a sensitive period.
Jones, R.B.; Waddington, D.

Amsterdam : Elsevier Science Publishers, B.V.; 1993 Apr.
Applied animal behaviour science v. 36 (2/3): p. 185-195; 1993 Apr. Includes references.

Language: English

Descriptors: Chicks; Fearfulness; Man

16 NAL Call. No.: 47.8 AM33P
Barley inclusion and avoparcin supplementation in broiler diets. 2. Clinical, pathological, and bacteriological findings in a mild form of necrotic enteritis.
Kaldhusdal, M.; Hofshagen, M.
Champaign, Ill. : Poultry Science Association; 1992 Jul.
Poultry science v. 71 (7): p. 1145-1153; 1992 Jul. Includes references.

Language: English

Descriptors: Broilers; Clostridium perfringens; Coliform bacteria; Intestinal mucosa; Lesions; Small intestine; Bacterial count; Enteritis; Avoparcin; Barley

Abstract: The clinical, pathological, and bacteriological findings of a mild form of necrotic enteritis (NE) in broiler chickens are presented. The term subclinical NE (SNE) is proposed for this condition. A diagnosis of SNE was based on the detection of macroscopically visible, focal necrotic lesions in the small intestinal mucosa. The ileal gut contents from SNE birds yielded increased numbers of Clostridium perfringens and reduced numbers of coliform bacteria. Reduced numbers of lactobacilli and streptococci were detected in birds from SNE pens and coccidial oocysts were not found in the rectal contents of SNE birds. Statistical analyses showed strong correlations between SNE and increased feed conversion ratio and retarded growth rate. An increased occurrence of SNE was observed in birds on a diet containing a large amount of barley.

17 NAL Call. No.: 47.8 AM33P
Beak trimming and sex effects on behavior and performance traits of Large White turkeys.
Cunningham, D.L.; Buhr, R.J.; Mamputu, M.
Champaign, Ill. : Poultry Science Association; 1992 Oct.
Poultry science v. 71 (10): p. 1606-1614; 1992 Oct. Includes references.

Language: English

Descriptors: Turkeys; Debeaking; Sex differences; Feeding behavior; Feed intake; Feed conversion; Body weight; Social behavior

Abstract: The effects of beak trimming at day old on performance and behavioral activities of male and female Large White turkeys were evaluated. One hundred and twenty poults of each sex were evenly assigned to 20 treatment pens and evaluated for body weight, feed usage, and livability characteristics to 18 wk of age. Behavioral observations were conducted for feeding, drinking, sleeping, huddling, resting, and agonistic activities. Beak trimming affected body weight and feed usage levels for the sexes differently. From 6 wk, trimmed males were significantly heavier than untrimmed males, whereas untrimmed females were heavier than trimmed females from 12 wk. Similar to body weights, feed usage levels from 13 to 18 wk were higher for trimmed males compared with untrimmed males and lower for trimmed females compared with untrimmed females. Feed conversion ratios after 12 wk and survival to 18 wk were not affected by trimming treatment. Livability rates, however, were lowest for untrimmed males and highest for untrimmed females. Effects on behavioral activities were confined primarily to the brooding and early rearing phases. Beak trimming reduced feeding activity of females and drinking activity of both males and females during the first 2 wk. Sleeping, huddling, and resting activities were increased by beak trimming for both sexes during brooding, Agonistic acts were reduced by beak trimming main effect at 3 and 6 wk. Trimmed males committed fewer agonistic acts at 6 wk than untrimmed males.

18 NAL Call. No.: 47.8 AM33P
Beak trimming effects on behavior patterns, fearfulness, feathering, and mortality, among three stocks of white Leghorn pullets in cages or floor pens. Lee, H.Y.; Craig, J.V.
Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 211-221; 1991 Feb. Includes references.

Language: English

Descriptors: Pullets; Aggressive behavior; Battery cages; Debeaking; Beak; Strain differences; Body weight; Liveweight gain; Fearfulness; Poultry housing; Mortality; Feeding behavior

Abstract: White Leghorn pullets of the Y1, Y2, and North Central Randombred (NCR) experimental stocks were used. Half of the birds of each stock had half of the upper and less of the lower mandible removed at 4 wk of age by making a V-shaped cut as viewed from the side (BT), whereas the other half retained their beaks intact (IN). Pullets were moved from growing pens to a layer house at 18 wk of age. Seventy-two cages and 30 floor pens were filled with 6 and 20 birds per unit, respectively. Pullets within a cage or floor pen were all of the same genetic stock and beak treatment. All measurements were performed within 10 wk after housing, except for mortality in cages. When kept in cages, genetic stocks did not show behavioral differences. However, in floor pens, stock differences were detected in feeding, crouching, and nonaggressive pecking. When kept in cages, the stocks also differed in 24-wk body weight, weight gain from 18 to 24 wk, and certain measures of fearfulness in both cages and pens, and in feather condition at 21 and 22 wk. Mortality from cannibalism and hen-days survival of caged IN pullets differed among genetic stocks. Mortality from cannibalism was absent among pullets kept in experimental floor pens. In cages, BT pullets were less active, gained less weight, and had lower incidence of cannibalism than IN pullets. Also, BT pullets were less nervous and had better feather condition than IN pullets. However, trimming beaks to prevent cannibalism was less effective in NCR pullets than in Y1 or Y2 pullets. In floor pens, BT pullets showed less activity and reduce feeding frequency and less fearfulness as indicated by duration of induced tonic immobility. Agonistic behaviors were not different between BT and IN pullets. From these results, beak trimming could be interpreted as having either stressful or stress-alleviating effects, depending on the criteria used. However, proper beak trimming appears beneficial when cannibalistic pecking is likely to be a proble

19 NAL Call. No.: SF481.J68
Beak trimming effects on performance, behavior and welfare of chickens: A review.
Cunningham, D.L.
Athens, Ga. : Applied Poultry Science, Inc; 1992 Mar.
Journal of applied poultry research v. 1 (1): p. 129-134; 1992 Mar. Literature review. Includes references.

Language: English

Descriptors: Fowls; Debeaking; Animal welfare; Animal behavior; Literature reviews

20 NAL Call. No.: 47.8 AM33P
Behavior, production, and well-being of the laying hen. 2. Individual variation and relationships of behavior to production and physical condition. Webster, A.B.; Hurnik, J.F.
Champaign, Ill. : Poultry Science Association; 1991 Mar. Poultry science v. 70 (3): p. 421-428; 1991 Mar. Includes references.

Language: English

Descriptors: Hens; Egg production; Animal behavior; Battery cages; Body condition; Activity; Plumage; Heritability

Abstract: Variation of behavior among hens and the relationships of behavior to measures of production and physical condition were investigated. The birds were 384 pullets from the mating of two stocks of males, obtained from a commercial breeder, to females from a third flock. The birds were housed as pairs in laying

cages at 22 and 20 wk of age (Hatches 1 and 2, respectively). The laying phase was divided into 28-day periods. In Periods 1, 3, 5, 7, 9, and 11, samples of hens were video recorded for 8 h. In Period 13, direct visual observations were made of the behavior of individually identified hens. Eleven production-related variables were recorded throughout the laying phase. Feather scores were assessed in Periods 3, 6, 9, and 12. Body weight, lesions to the feet, and claw length were recorded in Periods 6 and 13. Spearman rank correlations were calculated between video-recorded behavioral variables and measures of production and physical condition. The data from direct visual observations were used for heritability estimates of behavioral traits. Eating and standing were positively correlated with egg production, whereas sitting and, for hens derived from male parental Stock 1, resting were negatively correlated with production. Inactivity also coincided with poorer plumage condition and higher body weight. For the offspring of male parental Stock 2, behavioral actions frequently performed in stereotyped manner, e.g., cage pecking and toe pecking, were positively associated with egg production. No significant additive genetic variation for behavior was evident among sires; however, for dams, fairly large heritability estimates occurred for a number of behavioral states. The apparent absence of additive genetic variability among sires for behavior may have been due to genetic fixation at gene loci which control behavior in the stocks acquired from the commercial breeder.

21 NAL Call. No.: 47.8 AM33P
Behavioral correlates of male mating success in a multisire flock as determined by DNA fingerprinting.
Jones, M.E.J.; Mench, J.A.
Champaign, Ill. : Poultry Science Association; 1991 Jul.
Poultry science v. 70 (7): p. 1493-1498; 1991 Jul. Includes references.

Language: English

Descriptors: Cocks; Male fertility; Social dominance; Dna fingerprinting; Paternity; Breed differences; Mating frequency

Abstract: The fertility of an individual rooster within a multi-sire flock may be influenced by a number of behavioral considerations, including frequency and timing of matings and the male's position in the social dominance hierarchy. The relationship between behavior and fertility has proven difficult to assess, however, because there are a limited number of heritable morphological traits that can be used to determine paternity. The objectives of the present study were to use DNA fingerprinting to determine paternity in domestic fowl and to assess some behavioral and physiological correlates of mating success. Sixty day-old chicks from each of two commercial breeds, DeKalb White Leghorn (L) and Warren Color-Sexed (W), were reared in either same-breed or mixed-breed groups. At 43 wk of age, all females and six randomly selected males were mixed into one large pen. Male aggressive and mating behaviors were recorded over a 4-mo period. Fertility of individual sires was determined by DNA fingerprinting and pedigree analysis of chicks. Dominance rank and the frequencies of both completed matings and mating attempts were positively correlated with fertility ($P<.01$). In addition, wing flapping was correlated with both dominance ($P<.001$) and fertility ($P<.05$). There was no correlation between fertility and plasma testosterone. There were breed effects on dominance status, with W dominating L. Multiple paternity was demonstrated in 4 out of 10 families by DNA fingerprinting. The present study is the first one to demonstrate a correlation between dominance and fertility in a flock containing several males of the same breed and morphology.

22 NAL Call. No.: 47.8 Am33P
Behavioral responses of broiler chickens to handling: effects of dietary tryptophan and two lighting regimens.
Newberry, R.C.; Blair, R.
Champaign, IL : Poultry Science Association, 1921-; 1993 Jul.
Poultry science v. 72 (7): p. 1237-1244; 1993 Jul. Includes references.

Language: English

Descriptors: Broilers; Diet; Tryptophan; Light regime; Fearfulness; Animal welfare; Carcass quality; Dosage effects

Abstract: In three 2 X 2 factorial experiments, effects of added dietary Trp (0 or .2%, Experiments 1 and 2; 0 or .4%, Experiment 3) and two lighting regimens [1) constant 23-h photoperiod (23H); or 2) increasing photoperiod (INC)] on behavioral responses of broilers to handling were assessed. In Week 6 of Experiment 1, and Weeks 3 and 6 of Experiments 2 and 3, 32 chickens from each treatment were picked up and held by both legs for 30 s, carried for 60 s, and induced into tonic immobility (TI). In aU experiments, chickens reared under INC were more likely to flap when carried, and flapped longer, than chickens reared under 23H ($P < .01$). In Experiments 2 and 3, INC chickens were more likely to curl the body ventrally when handled and were more susceptible to TI induction than 23H chickens ($P < .05$). The duration of TI was shorter on INC than 23H in Experiment 2 ($P < .05$), and longer in Experiment 3 ($P < .001$). Dietary Trp supplementation resulted in a lower flapping duration and higher incidence of body curling in Experiment 2 ($P < .05$), and a shorter TI duration in Experiment 3 ($P < .05$). Flapping, body curling, and TI responses of chickens varied between handlers ($P < .05$). Vocalization and flapping rates were lower, and flapping incidence and duration of flapping and TI higher, in Week 6 than in Week 3 ($P < .05$). Chickens reared under INC may be at greater risk of injury during reslaughter handling than chickens reared under 23H. Addition of .4% Trp to the diet may have a mild fear-reducing effect.

23 NAL Call. No.: 47.8 AM33P
Behavioral responses of hens to simulated dawn and dusk periods. Tanaka, T.; Hurnik, J.F.
Champaign, Ill. : Poultry Science Association; 1991 Mar. Poultry science v. 70 (3): p. 483-488. ill; 1991 Mar. Includes references.

Language: English

Descriptors: Hens; Light regime; Activity; Battery cages; Aviaries; Animal behavior; Animal welfare

Abstract: Behavioral responses to caged (3 birds by 6 cages) and aviary (437 birds) hens to sudden (S) and gradual (G) changes in illumination were recorded using an infrared camera. They were observed from 2 days before the change from S to G, to 7 days after the change. Each observation period commenced 30 min before the start or the end of the light period and ended 30 min after. In the battery cages, the number of birds standing increased gradually before the light period in both conditions. The number of birds eating peaked during the simulated dawn and dusk periods. Almost all birds (94%) were still standing during the 1st min of complete darkness under the S condition, but half of them (47%) were already sitting at the same time under the G condition. In the aviary, just after the S change from dark to light, the number of birds changing positions (between floors, etc.) increased sharply, but under the G condition the number increased gradually during the dawn period. The number of birds changing positions decreased immediately after the S change from light to dark, but some birds (2 to 3%) were active shortly before the end of the observation period. However, most of the birds moved toward the resting site during the dusk period, and only a few birds (<1%) were active 10 min after complete darkness. These differences were statistically significant ($P<.05$). The results of the present study indicate that a gradual change in illumination could be more comfortable for the birds.

24 NAL Call. No.: 47.8 AM33P
Behavior-genetic analysis and poultry husbandry.
Siegel, P.B.
Champaign, Ill. : Poultry Science Association; 1993 Jan.
Poultry science v. 72 (1): p. 1-6; 1993 Jan. Includes references.

Language: English

Descriptors: Fowls; Domestication; Animal welfare; Genetic improvement; Adaptability; Animal behavior; Vocalization; Genetic variation

Abstract: Domestication, one of the great innovations in human history, has had a profound effect on agriculture and the development of urban societies. Domestication is a continuing genetic process through which anatomy, behavior, and physiology are modified to suit specific needs. In poultry, the process has accelerated during the past several decades because of increased selection pressure and development of specialized male and female lines in breeding programs. Large changes have also occurred in the intensification of environments in which

poultry are maintained. Such intensification is a function of escalation of land, energy, and labor costs. Whether the rate of change of these nongenetic factors is faster than biological change is an important issue in the consideration of behavior-genetic analyses and poultry husbandry. Complex behavioral, genetic, and physiological responses are involved in the buffering necessary for animals to cope with changes in their physical and social environments. Knowledge of behavioral range and genetic variation of short- and long-term responses is essential to understanding how poultry adapt. Although innate behaviors and habituation can prevent some stimuli from causing manifestations that detract from well-being, husbandry conditions should optimize behavioral responses with biological advantages to individuals and populations.

25 NAL Call. No.: QL750.A6
Behaviour and production of laying hens in three prototypes of cages incorporating nests.
Sherwin, C.M.; Nicol, C.J.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Oct.
Applied animal behaviour science v. 35 (1): p. 41-54; 1992 Oct. Includes references.

Language: English

Descriptors: Hens; Nesting; Cages

26 NAL Call. No.: 47.8 B77
Bone strength of caged layers as affected by dietary calcium and phosphorus concentrations, reconditioning, and ash content.
Wilson, J.H.
Oxfordshire : Carfax Publishing Company; 1991 Jul.
British poultry science v. 32 (3): p. 501-508; 1991 Jul. Includes references.

Language: English

Descriptors: Hens; Bone strength; Radius; Bone ash; Shear strength; Body weight; Stress; Bone density

27 NAL Call. No.: 286.81 F322
Breeder flock study shows salmonella-causing factors.
Jones, F.T.
Minnetonka, Minn. : Miller Publishing Co; 1992 Mar16.
Feedstuffs v. 64 (11): p. 1, 22-23; 1992 Mar16. Includes references.

Language: English

Descriptors: Salmonella; Broilers; Contamination; Flocks; Disease control; Animal health; Stress

28 NAL Call. No.: 275.29 AL13P
Broiler production.
Purser, J.
Fairbanks, Alaska : The Service; 1991 Dec.
Publication - University of Alaska, Cooperative Extension Service v.): 2 p.; 1991 Dec. Includes references.

Language: English

Descriptors: Alaska; Broiler production; Chicks; Breeds; Chicken housing; Equipment; Cost benefit analysis

29 NAL Call. No.: 47.8 AM33P
Broiler production under varying population densities. Cravener, T.L.; Roush, W.B.; Mashally, M.M.
Champaign, Ill. : Poultry Science Association; 1992 Mar. Poultry science v. 71 (3): p. 427-433; 1992 Mar. Includes references.

Language: English

Descriptors: Broilers; Stocking density; Body weight; Carcass quality; Feed conversion; Carcass weight; Stress; Profitability

Abstract: The influence of population density on the growth performance and sum level of Hubbard X Hubbard chicks of equally mixed sex was studied. Six hundred and sixteen birds were housed under .05,.07,.09, or.11 m2 per bird (four replicates per density) from 0 to 7 wk. There were no treatment effects on feed conversion at 6 or 7 wk. Birds housed at .07, .09, and .11 m2 per bird had similar 7 wk BW and carcass weights, all significantly higher than birds housed at .05 m2 per bird. Under .05 m2 per bird, a higher percentage of breast blisters and ammonia burns (30%) was observed than at other densities. The 7-wk heterophil to lymphocyte ratios of birds raised at .09 and .11 m2 per bird (.42 and .45) were significantly higher than those at .05 and .07 m2 per bird (.28 and .30). Lowered BW and decreased carcass quality of birds raised it .05 m2 per bird suggested that these birds were stressed. However, decision analysis of economic potential indicated that the optimum profit potential per square meter was .05 m2 per bird for Maximax and Equally Likely decisions and .07 m2 per bird for the Maximin decision.

30 NAL Call. No.: 47.8 AM33P
Calcium and phosphorus metabolism and eggshell formation of hens fed different amounts of calcium.
Clunies, M.; Parks, D.; Leeson, S.
Champaign, Ill. : Poultry Science Association; 1992 Mar.
Poultry science v. 71 (3): p. 482-489; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Calcium; Mineral metabolism; Phosphorus; Bone mineralization; Egg shell formation; Feed intake; Retention; Egg production; Egg shell quality; Mineral nutrition

Abstract: Twenty-seven 42-wk-old Single Comb White Leghorn hens housed in separate cages were fed either 2.5, 3.5, or 4.5% Ca diets, each providing .45% available P. Birds were allowed a 7-day adaption period followed by an 8-day collection period. Feed and water were available for ad libitum consumption with feed intake recorded daily. Eggs and excreta were collected daily for mineral analysis. Feed, Ca, and P intake of hens increased significantly ($P < .05$) on shell-forming (SF) days compared with days on which shell formation did not take place (NSF). Dietary Ca level had a significant ($P < .05$) effect on feed and Ca intake of hens. On SF days, hens retained more dietary Ca, both as a percentage and per gram Ca basis, compared with NSF days. As dietary Ca increased, the percentage Ca retained decreased ($P < .05$) and per gram Ca retained increased ($P < .05$). Dietary Ca had no effect ($P > .05$) on egg weight or egg production. Increasing dietary Ca significantly ($P < .05$) decreased shell deformation and increased ($P < .05$) shell weight and grams of shell Ca, although there was no significant ($P > .05$) effect on percentage shell Ca. Calcium retention increased linearly ($P < .05$) as Ca intake increased, and shell weight increased quadratically ($P < .05$). There was a diminishing response of shell weight to Ca intake at higher levels.

31 NAL Call. No.: 389.8 J82
Calcium deficiency and food deprivation improve the response of chickens to acute heat stress.
Ait-Boulahsen, A.; Garlich, J.D.; Edens, F.W.
Bethesda, Md. : American Institute of Nutrition; 1993 Jan.
The Journal of nutrition v. 123 (1): p. 98-105; 1993 Jan. Includes references.

Language: English

Descriptors: Fowls; Diet; Mineral deficiencies; Calcium; Food restriction; Heat stress; Acid base equilibrium

Abstract: The tolerance of chickens to acute heat stress may be modified by diet. Broiler chickens fed calcium-adequate (0.90% Ca) or -deficient (0.45% or 0.15% Ca) diets were either fed or not fed for 24 h and exposed to increasing temperatures (from 24 to 41 degrees C). Diets were fed for 7 d before heat stress in Experiment 1 and for 14 d before heat stress in Experiment 2. Body temperature, blood ionized Ca, pH, pCO_2, plasma inorganic phosphate and total Ca were determined. During heat stress, Ca^{+2} and inorganic phosphate were depressed in all

treatments. Feeding the 0.45% Ca diet for 7 d reduced hyperthermic body temperature of fed chickens but had no effect on body temperature of unfed chickens relative to the groups fed 0.90% Ca. No further improvement in body temperature response to heat stress was obtained by lowering the dietary Ca level to 0.15% or extending the feeding period to 14 d. Food deprivation was more effective in counteracting the heat-induced rise in body temperature than a dietary Ca deficiency. Heat-induced changes in body temperature, Ca+2, inorganic phosphate and blood pH were highly correlated ($P < 0.001$). The change in Ca+2 followed a pattern similar to that of changes in body temperature, but changes in inorganic phosphate seemed to be more indicative of changes in pH. Control birds fed 0.90% Ca exhibited the highest changes in Ca+2 and body temperature values. Feeding Ca-deficient diets reduced changes in both Ca+2 and body temperature. Unfed birds, regardless of dietary Ca level, showed the lowest changes in Ca+2 and body temperature. The results suggest that during heat stress, the increase in body temperature is inversely related to the chickens' ability to maintain blood Ca+2.

32 NAL Call. No.: QL750.A6
Can domestic fowl (Gallus gallus domesticus) anticipate a period of food deprivation?.
Petherick, J.C.; Waddington, D.
Amsterdam : Elsevier Science Publishers, B.V.; 1991 Nov.
Applied animal behaviour science v. 32 (2/3): p. 219-226; 1991 Nov. Includes references.

Language: English

Descriptors: Fowls; Learning ability; Animal welfare; Circadian rhythm; Food deprivation; Food intake

33 NAL Call. No.: 41.8 V643
Changes in the somatosensory evoked potentials and spontaneous electroencephalogram of hens during stunning with a carbon dioxide and argon mixture.
Mohan Raj, A.B.; Wotton, S.B.; Gregory, N.G.
London : Bailliere Tindall; 1992 Mar.
British veterinary journal v. 148 (2): p. 147-156; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Stunning; Carbon dioxide; Argon; Oxygen; Bioelectric potential; Electroencephalograms; Hypercapnia; Anoxia; Animal welfare

Abstract: A previous investigation indicated that when hens were exposed to 2% oxygen in argon (anoxia) EEG suppression and loss of SEPs occurred at 17 and 29 s after exposure. In this study, hens were exposed to 49% carbon dioxide in air (hypercapnic hypoxia) or 31% carbon dioxide with 2% oxygen in argon (hypercapnic anoxia) and their spontaneous electroence-phalogram (EEG) and somatosensory evoked potentials (SEPs) were investigated. The results indicated that EEG suppression and loss of SEPs occurred in 11 and 26 s, respectively, in hypercapnic hypoxia. These events occurred at 11 and 19 s, respectively, after exposure to hypercapnic anoxia. These results indicated that, with regard to preslaughter stunning/killing of chickens, a mixture of 31% carbon dioxide with 2% oxygen in argon resulted in a more rapid loss of evoked responses in the brain when compared with 49% carbon dioxide in air or with 2% oxygen in argon. It is concluded that stunning chickens with low concentrations of carbon dioxide in argon would result in a more rapid loss of consciousness.

34 NAL Call. No.: 290.9 AM32T
Characterizing efficiency of misting systems for poultry. Bottcher, R.W.; Baughman, G.R.; Gates, R.S.; Timmons, M.B. St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Mar. Transactions of the ASAE v. 34 (2): p. 586-590; 1991 Mar. Includes references.

Language: English

Descriptors: Poultry housing; Evaporative cooling; Fowls; Mist application; Mathematical models; Theory

Abstract: Misting systems for poultry housing have traditionally been characterized using evaporative cooling efficiency. This works well for evaporative pad systems, but poorly for misting systems since they are strongly affected by water pressure and ventilation rates. The fraction of the misting rate which evaporates (designated as beta) was analyzed for two previous studies and data obtained for this study using theoretical relationships. A theoretical analysis relating individual droplet evaporation to evaporation rates showed that evaporation efficiency is strongly affected by initial droplet sizes, which are affected by water pressure in conventional misting systems. Analysis of test data for poultry houses showed that beta increases with system water pressure; beta ranged from 0.09 at a pressure of 280 kPa (40 psi) to 0.57 at a pressure of 3400 kPa (500 psi).

35 NAL Call. No.: RA639.M44
Chemical control of Ornithonyssus sylviarum on caged layer hens. Levot, G.W.
Oxford : Blackwell Scientific Publications; 1992 Apr.
Medical and veterinary entomology v. 6 (2): p. 131-134; 1992 Apr. Includes references.

Language: English

Descriptors: New South Wales; Hens; Ornithonyssus sylviarum; Insect control; Malathion; Carbaryl; Permethrin; Azamethiphos; Cages

36 NAL Call. No.: QL750.A6
Chickens show socially facilitated feeding behaviour in response to a video image of a conspecific.
Keeling, L.J.; Hurnik, J.F.
Amsterdam : Elsevier Science Publishers, B.V.; 1993 Apr.
Applied animal behaviour science v. 36 (2/3): p. 223-231; 1993 Apr. Includes references.

Language: English

Descriptors: Chickens; Feeding behavior; Video recordings

37 NAL Call. No.: QL750.A6
Choice between artificial turf and wire floor as nest sites in individually caged laying hens.
Hughes, B.O.
Amsterdam : Elsevier Science Publishers, B.V.; 1993 May.
Applied animal behaviour science v. 36 (4): p. 327-335; 1993 May. Includes references.

Language: English

Descriptors: Hens; Nesting

38 NAL Call. No.: 1.98 AG84
The cleanest little chicken house in America.
Mazzola, V.
Washington, D.C. : The Service; 1993 Sep.
Agricultural research - U.S. Department of Agriculture, Agricultural Research Service v. 41 (9): p. 18; 1993 Sep.

Language: English

Descriptors: Poultry housing; Environmental control

39 NAL Call. No.: 448.3 AP5
Colonization of broiler chickens by waterborne Campylobacter jejuni. Pearson, A.D.; Greenwood, M.; Healing, T.D.; Rollins, D.; Shahamat, M.; Donaldson, J.; Colwell, R.R.
Washington, D.C. : American Society for Microbiology; 1993 Apr. Applied and environmental microbiology v. 59 (4): p. 987-996; 1993 Apr. Includes references.

Language: English

Descriptors: Broilers; Campylobacter jejuni; Colonization; Poultry diseases; Waterborne diseases; Disinfection

Abstract: Chickens on a broiler farm in southern England were found to be colonized with Campylobacter jejuni of a single serotype, Lior 1 Penner 4. The farm was the sole supplier of a local slaughterhouse associated with a campylobacter outbreak in 1984 caused by this serotype. The serotype persisted on the farm for at least 18 months after the outbreak; its prevalence in the human population served by the farm remained high until it disappeared from the farm in 1986. The possible sources and routes of transmission of C. jejuni to the broilers on the farm were investigated. The results showed that vertical transmission, feed, litter, small mammals, and environmental or airborne cross-contamination between sheds or successive crops could be excluded as persistent sources of C. jejuni. The predominant source of C. jejuni on the farm was shown to be the water supply. Direct microscopy and fluorescent antibody methods revealed presumptive campylobacters throughout the farm's water system. Campylobacter-free chickens raised in an animal house and given water from the farm supply became colonized with the serotype of C. jejuni endemic on the farm (Lior 1 Penner 4). An intervention program based on water chlorination, shed drinking system cleaning and disinfection, and withdrawal of furazolidone from feed reduced the proportion of birds colonized with campylobacter from 81 to 7% and was associated with a 1,000- to 10,000-fold reduction in campylobacters recoverable from the carcasses. Two months after the end of the intervention program colonization of the birds returned to high levels (84%), indicating that there was a temporal association between intervention and reduced colonization with C. jejuni. Investigations continue to establish the general applicability of these findings.

40 NAL Call. No.: 41.8 AV5
Colonization of Escherichia coli in young turkeys and chickens. Leitner, G.; Heller, E.D.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Apr. Avian diseases v. 36 (2): p. 211-220; 1992 Apr. Includes references.

Language: English

Descriptors: Turkeys; Fowls; Poultry; Escherichia coli; Intestinal diseases; Intestinal mucosa; Experiments; Animal experiments; Experimental design

Abstract: In order to investigate the possibility of pathogenic Escherichia coli penetrating the bloodstream via the intestinal mucosa in normal and stressed turkeys and chickens, birds were inoculated orally with the bacteria or exposed environmentally to it. Immediately after hatch, intestines contained a substantial number of coliform bacteria that increased with time. In orally infected turkeys, the pathogenic bacteria (nalidixic-acid-resistant O78) replaced 10%-50% of the native coliform flora but could not be isolated from the trachea or blood. Environmentally exposed groups exhibited pathogenic bacteria in intestines but not in blood. Stressing of exposed turkeys resulted in isolation of the pathogenic bacteria from blood and even spleen. In orally infected broiler chickens, stress resulted in bacteremia and mortality. Chickens that were exposed to pathogenic bacteria at a young age and showed no mortality or morbidity demonstrated no detrimental effects due to challenge with the same pathogenic bacteria later in life. Stress seems to cause penetration of the pathogenic bacteria into the bloodstream, which in turn can cause severe disease and mortality.

41 NAL Call. No.: 47.8 AM33P
Comparison of behavior and performance of laying hens housed in battery cages and an aviary.
Tanaka, T.; Hurnik, J.F.
Champaign, Ill. : Poultry Science Association; 1992 Feb.
Poultry science v. 71 (2): p. 235-243; 1992 Feb. Includes references.

Language: English

Descriptors: Hens; Animal welfare; Battery cages; Aviaries; Animal behavior; Egg production; Feeding habits

Abstract: Experiments were carried out to study the behavior and production performance of hens housed in battery cages (3 birds X 112 cages) and an aviary (437 birds). Direct visual observations and videotapings of hen behavior were collected at 24 to 25, 36 to 37, 49 to 50, and 61 to 62 wk of age. Production data were collected

daily. Stereotyped behaviors were much more frequent (P < .01) in the battery cages (7.0 to 24.7%) than in the aviary (1.0 to 2.7%). Comfort behaviors were performed by aviary birds (3.9 to 5.5%) much more frequently (P < .01) than by the caged birds (.7 to .9%). The birds were more active during a few hours before dark and just after light in both cages and the aviary. In both groups, the production performance of hens was similar and relatively high. The results of the current study indicate that aviaries provide a more comfortable environment for birds and almost the same productivity per bird as battery cages.

42 NAL Call. No.: 47.8 AM33P
Comparison of procedures for collecting semen from ganders and inseminating geese.
Grunder, A.A.; Pawluczuk, B.
Champaign, Ill. : Poultry Science Association; 1991 Sep.
Poultry science v. 70 (9): p. 1975-1980; 1991 Sep. Includes references.

Language: English

Descriptors: Geese; Artificial insemination; Semen production; Artificial vagina; Semen characters; Poultry housing; Female fertility; Timing

Abstract: Experiments were conducted to compare management of ganders and semen collection procedures with respect to semen and sperm yield, and two frequencies of artificial insemination were tested with respect to fertility. Housing ganders in groups, singly, or singly with the introduction of a female just before collection was the rank order of housing system from least to most successful collection of ejaculates. There were no significant differences among types of housing with respect to semen volume, but ejaculates from ganders housed singly had the greatest (P < .05) spermatozoal concentrations. Ejaculates collected with an artificial vagina were of greater (P < .05) volume and total spermatozoal yield but not spermatozoal concentration than those collected by aspiration. Interactions between collector and method were observed for spermatozoal traits. Geese inseminated on 2 consecutive days/wk showed greater (P < .01) fertility than those inseminated once per week. Therefore, collection of semen with an artificial vagina from ganders housed singly, with insemination weekly but on consecutive days, should result in successful reproduction of geese.

43 NAL Call. No.: 47.8 AM33P
A comparison of three continuous and four shuttle anticoccidial programs. Guneratne, J.R.M.; Gard, D.I.
Champaign, Ill. : Poultry Science Association; 1991 Sep. Poultry science v. 70 (9): p. 1888-1894; 1991 Sep. Includes references.

Language: English

Descriptors: Broilers; Coccidiostats; Narasin; Nicarbazin; Intestines; Lesions; Growth; Body weight; Feed conversion; Mortality; Feed intake; Adverse effects; Heat stress

Abstract: Continuous programs of a combination of narasin (40 ppm) and nicarbazin (40 ppm) (NaNi), narasin at levels of 60 and 70 ppm, and a 2 by 2 factorial shuttle design (NaNi or nicarbazin at 125 ppm, each for 27 or 28 days, followed by narasin at 60 or 70 ppm to termination), were compared with unmedicated controls for their anticoccidial efficacy and growth performance in nine broiler trials conducted in seven countries outside the United States. Cecal coccidial lesions were reduced only by treatments that incorporated nicarbazin either at the 40-ppm level in NaNi or at 125 ppm, whereas total intestinal lesion scores were reduced by all the anticoccidial programs tested. At Day 28, the three treatments containing NaNi and the treatment containing narasin at 60 ppm significantly improved weight gain and feed efficiencies over the two treatments containing nicarbazin at 125 ppm and the unmedicated controls. At termination all the anticoccidial programs significantly decreased the mortality rate and improved bird weights and feed efficiencies. Birds on the treatments containing NaNi either in the two shuttle programs or in the continuous program were significantly heavier than those on the two treatments containing nicarbazin at 125 ppm in shuttle programs.

44 NAL Call. No.: 47.8 AM33P
Comparison of two methods for determining broiler processing yield. Fletcher, D.L.; Cason, J.A.

Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 1010-1014; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Carcass yield; Processing losses; Estimation; Evisceration; Chicken meat

Abstract: Two experiments were conducted to compare conventional hand evisceration and yield-by-difference (YBD) methods of determining broiler processing yield. In each experiment, 192 birds from 24 pens were killed by bleeding for 2 min, scalded at 59 C for 2 min, and picked for 30 s in a rotary batch picker. Yield-by-difference was determined by removing and weighing the nonsalable portion of the carcass (inedible viscera, and nongastrointestinal waste). Conventional processing was performed by hand. Data were analyzed by pen and treatment for means and coefficient of variation. Live weight and New York dressed weights of birds processed by the two methods were not significantly (P<.05) different in either experiment. The YBD resulted in a significantly greater yield as calculated from live weight or New York-dressed weight. Coefficients of variation were not significantly different. These results indicate that the YBD procedure could be used to estimate absolute yield better but does not offer any advantages in reduction of yield variation. The YBD would not be practical for further yield or carcass studies.

45 NAL Call. No.: QR115.I57
Competitive exclusion of campylobacters from poultry with K-bacteria and Broilact.
Aho, M.; Nuotio, L.; Nurmi, E.; Kiiskinen, T.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Mar.
International journal of food microbiology v. 15 (3/4): p. 265-275; 1992 Mar. Includes references.

Language: English

Descriptors: Salmonella; Poultry meat; Biological competition; Campylobacter; Chicks

Abstract: The competitive exclusion (CE) product (Broilact) which is effective against Salmonellas, was found to be inactive against campylobacters. Microecological concepts were applied in the search of a new competitive flora and two novel strains ('K-bacteria') were isolated. These strains resembled campylobacters but differed from them in morphology, enzyme profiles (API), cellular fatty acid profiles and when tested with a ribosomal RNA hybridization probe (Gene-Trak). Two-week laboratory trials on broiler chickens showed that CE treatment may protect the birds against campylobacters but revealed the need for facultatively anaerobic bacteria in establishing a protective flora. A 5-week pilot scale trial was carried out. The trial involved 1800 newly hatched chicks in 30 groups. K-bacteria and Broilact, which provided the necessary facultatively anaerobic bacteria, were administered to some of the birds in the first drinking water. A seeder bird technique was used to challenge experimental and control birds with Campylobacter jejuni biotype 2 (broiler origin). Three seeder birds were placed in each group of 60 birds. Groups were sampled weekly for campylobacters and finally at the slaughterhouse. From each group, the caecal contents of two birds were examined quantitatively for campylobacters. The performance of the birds was also monitored during the trial. The results showed a 1.5 week delay in the onset of campylobacter infection in treated chicks and a consistently lower level of colonization in comparison with control birds. At slaughter, levels of carriage in caecal contents of treated birds were 1.5-2.0 log10 units lower than those of controls, despite apparent stress from harvesting and transportation. The treatment had no economically important effects on the performance of the birds during rearing.

46 NAL Call. No.: 47.8 AM33P
Computer-aide heat acclimation in broiler cockerels.
Davis, G.S.; Edens, F.W.; Parkhurst, C.R.
Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 302-306; 1991 Feb. Includes references.

Language: English

Descriptors: North Carolina; Broilers; Cocks; Heat stress; Heat resistance; Poultry housing; Environmental control; Microcomputers; Computer programming; Blood chemistry; Blood plasma; Mortality

Abstract: A battery-powered BASIC CMOS microcomputer was used to control) the environment in a solar-assisted poultry house containing heat-acclimated and control broiler chickens. The computer features complete isolation from commercial power sources, power consumption in the 100-mA range, integrated circuit time clock, a 16-channel analog to digital converter to measure temperature, and 16 channels of output for control of poultry house equipment. Three-week-old broiler cockerels were subjected to daily 4-h heating episodes (35 C) for 3 wk and then were exposed to heat stress (38 C) for 4 h. Based upon mortality and performance parameters, it was concluded that computer assisted-acclimation would be a method to improve heat resistance in broiler chickens.

47 NAL Call. No.: 286.81 F322
Control of heat stress essential to keep hens laying in hot weather. Muirhead, S.
Minnetonka, Minn. : Miller Publishing Co; 1993 Apr05.
Feedstuffs v. 65 (14): p. 13; 1993 Apr05.

Language: English

Descriptors: Hens; Heat stress; Weather; Temperature

48 NAL Call. No.: 41.8 AV5
Controlled early feed restriction as a potential means of reducing the incidence of ascites in broilers.
Shlosberg, A.; Berman, E.; Bendheim, U.; Plavnik, I.
Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Oct. Avian diseases v. 35 (4): p. 681-684; 1991 Oct. Includes references.

Language: English

Descriptors: Chicks; Restricted feeding; Ascites; Pelleted feeds; Feed meals; Cold stress; Mortality; Disease control

Abstract: Male broiler chicks were grown at cold temperatures to enhance susceptibility to the ascites syndrome. Various feeding regimens were used to determine whether they could influence mortality due to ascites. It was found that a precisely controlled early feed-restriction regimen at the age of 6 to 11 days significantly reduced mortality from all causes and mortality due to ascites, while maintaining optimum body weight and feed conversion at marketing age.

49 NAL Call. No.: 47.8 AM33P
Cooling of drinking water for laying hens.
Damron, B.L.
Champaign, Ill. : Poultry Science Association; 1991 Nov.
Poultry science v. 70 (11): p. 2368-2370; 1991 Nov. Includes references.

Language: English

Descriptors: Florida; Hens; Drinking water; Cooling; Laying performance; Egg quality; Environmental temperature; Body weight; Feed intake

Abstract: The cooling of laying hen drinking water from ambient temperature (approximately 25 to 28 C) to 21.1 or 10 C during daylight hours of July to September was investigated over an 8-wk period as a means of improving hot weather performance of hens. Eight replicate groups of five individually caged birds were exposed to each drinking water regimen provided in plastic troughs. Water was chilled by colder water circulated through copper coils. In-house temperatures during the trial reached or exceeded 32.2 C on 57% of the days; the average maximum temperature was 31.9 C. Egg production, daily feed intake, mortality rate, body

weight change, and fecal moisture were not significantly altered from the ambient response by the provision of cooled drinking water. Both egg Haugh unit and specific gravity values were significantly improved by the 21.1 C treatment but egg weights were reduced in association with both cool water treatments. Cooling of laying hen drinking water did not appear to offer a production advantage; however, some benefits may be realized in the areas of egg interior and shell quality with cooling from 28 to 21.1 C.

50 NAL Call. No.: 41.8 AV5
Correlation of water activity and other environmental conditions with repeated detection of Salmonella contamination on poultry farms. Opara, O.O.; Carr, L.E.; Russek-Cohen, E.; Tate, C.R.; Mallinson, E.T.; Miller, R.G.; Stewart, L.E.; Johnston, R.W.; Joseph, S.W. Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 664-671; 1992 Jul. Includes references.

Language: English

Descriptors: Broilers; Flocks; Salmonella; Microbial contamination; Water; Activity; Litter; Ammonia; Temperature; Ph; Moisture content; Ash; Environmental factors

Abstract: Three flocks on 13 different broiler farms were monitored for Salmonella over three consecutive growout periods using the drag swab (DS) technique. One house was consistently negative for Salmonella contamination (7.7%); four houses were consistently positive (30.8%); and eight houses (61.5%) alternated between either a DS Salmonella negative or positive status. Simultaneously, numerous environmental parameters of the litter surface were measured, including water activity (Aw), ammonia, temperature, pH, moisture content (MC), ash content, and volatile solids. Analysis of these data as a corollary, to either Salmonella-negative or -positive DS results revealed significant correlation coefficients for some of the parameters, especially, Aw. The results suggest that there should be further exploration of remedial intervention based on control of some of the physical features of litter (e.g., controlling litter Aw and possibly MC and pH levels) in poultry houses.

51 NAL Call. No.: 47.8 AM33P
Daily energy allotment and reproductive performance of broiler breeder males. Attia, Y.A.; Yamani, K.A.; Burke, W.H.
Champaign, Ill. : Poultry Science Association; 1993 Jan. Poultry science v. 72 (1): p. 42-50; 1993 Jan. Includes references.

Language: English

Descriptors: Broilers; Cocks; Body weight; Diet; Metabolizable energy; Egg fertility; Egg hatchability; Energy intake; Testes; Weight; Carcass composition; Laying performance; Progeny; Pododermatitis

Abstract: Ross broiler breeder males, housed in floor pens with females and fed from separate feeders, were given 125 g/day of isonitrogenous diets formulated to provide 300, 340, and 380 kcal per male per day between 28 and 60 wk of age. Males given 300 kcal/day maintained their initial BW and were consistently lighter than those fed the two higher energy levels; BW of males given the two higher energy allotments did not differ from each other. Fertility levels, over the whole experiment, averaged 80.1, 91.1, and 83.0% for the low-, intermediate-, and high-energy groups, respectively. Fertility dropped slightly over time in all groups but showed a precipitous fall in the low-energy group between 48 and 60 wk. Hatchability of fertile eggs showed a significant decrease over time but no treatment differences were found. Hatchability of eggs set, like fertility, showed a significant quadratic regression on energy allocation. A significant linear effect of energy level on 60-wk testes weights was found but carcass composition at 60 wk was unrelated to dietary energy allocation. Males fed 300 kcal/day had less severe pododermatitis than males in other groups, but the correlation between BW and pododermatitis score was not significant. Average 6-wk BW of approximately 500 offspring of males fed the low-energy diet, raised comingled with those from other male treatments in three separate growth trials, were consistently and significantly lower than those of offspring of males fed 380 kcal/day.

52 NAL Call. No.: 275.29 G29B
Dark-out light restriction for rearing broiler breeders. Wilson, J.L.; Mauldin, J.M.; Czarick, M. III
Athens, Ga. : The Service; 1991 Jul.
Bulletin - Cooperative Extension Service, University of Georgia, College of Agriculture (1053): 11 p. ill; 1991 Jul.

Language: English

Descriptors: Broiler production; Chicken housing; Light regime; Photosensitivity

53 NAL Call. No.: S671.A66
Design of a poultry disease isolation facility with programmable environmental control.
Branton, S.L.; Simmons, J.D.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Sep. Applied engineering in agriculture v. 8 (5): p. 695-699; 1992 Sep. Includes references.

Language: English

Descriptors: Pig housing; Structural design; Animal diseases; Isolation; Quarantine; Environmental control

Abstract: An 8 X 25 m (26 X 82 ft) block building was converted from an outdated environmental research facility to a state-of-the-art biological isolation laboratory for poultry disease research. Modification included interior partitioning into two large environmental chambers, the addition of insulation in walls and ceiling, 70 kW (20 tons) of refrigeration, 32 fiber glass biological isolation units, appropriate air handling and waste removal, and a computer-based environmental controller. The facility has been in use for two years and has been used in conducting research with both broilers and layers with no occurrence of cross-contamination. To date, the facility has performed as intended with no problems other than the accumulation of poultry dust with resultant persistent clogging of the medium efficiency pleated roughing filter. This problem was rectified through the incorporation of a lanolin-impregnated roll roughing filter into the filter system upstream of the pleated roughing filter.

54 NAL Call. No.: 47.8 B77
Design of nest boxes for laying cages.
Appleby, M.C.; Smith, S.F.
Oxfordshire : Carfax Publishing Company; 1991 Sep.
British poultry science v. 32 (4): p. 667-678; 1991 Sep. Includes references.

Language: English

Descriptors: Hens; Animal welfare; Animal behavior; Cages; Nesting; Egg production; Wood shavings; Nests; Oviposition

55 NAL Call. No.: 41.8 V643
Designing environments for animals-not for public perceptions. Duncan, L.J.H.
London : Bailliere Tindall; 1992 Nov.
British veterinary journal v. 148 (6): p. 475-477; 1992 Nov. Includes references.

Language: English

Descriptors: Hens; Battery cages; Animal welfare; Animal behavior

56 NAL Call. No.: 47.8 AM33P
Developing future-minded strategies for sustainable poultry production. Stenholm, C.W.; Waggoner, D.B.
Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 203-210; 1991 Feb. Includes references.

Language: English

Descriptors: U.S.A.; Poultry industry; Sustainability; International trade; Consumer preferences; Environmental impact; Research support

Abstract: Poultry is one of the world's major and fastest growing sources of meat, representing over 22% of all meat production in 1989. Because of their high nutrient content and relatively low caloric value, egg and poultry products are natural candidates to meet emerging consumer demands. The United States poultry industry must continue to meet the challenge of designing foods that meet consumers' definition of what is safe and what is healthy. Any agricultural production system should stand the test of scientific scrutiny, economic analysis, and social acceptance and impact. The agricultural science sector should develop best management practices that continue to provide profitability and sustainability for producers. The poultry industry in the United States and many other countries has progressed probably more than any other branch of livestock production in the trend toward intensive production systems. Voluntary codes of practice adhered to by producers of farm animals is an effective option that can be employed to help solve concerns about animal welfare. The poultry industry of the future will need to meet steadily consumer demand for wholesome meat, while addressing issues of health and safety waste management, and water and air pollution.

57 NAL Call. No.: 47.8 AM33P
Diet dilution and compensatory growth in broilers.
Leeson, S.; Summer, J.D.; Caston, L.J.
Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 867-873; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Underfeeding; Energy value; Compensatory growth; Cottonseed husks; Liveweight gain; Feed intake; Feed conversion; Carcass quality

Abstract: Two experiments were conducted to note the response of broiler chickens to degrees of diet dilution from 4 to 11 days of age. In Experiment 1, broilers were fed conventional broiler diets from 0 to 4 and 11 to 56 days of age. From 4 to 11 days, birds were fed a conventional corn and soybean meal broiler starter, or the same diet in which major nutrients were replaced with 25, 40, or 55% ground rice hulls. Minerals and vitamin sources were not affected by dilution. Each of the three diluted diets together with an undiluted control diet was fed to three replicate floor pen groups of 30 male or 30 female broilers. In a second similar experiment, male birds were fed a regular broiler starter from 4 to 11 days or a diet diluted with 50% rice hulls. In this second experiment, rice hulls were substituted for all ingredients including those providing vitamin and mineral supplements. In Experiment 1, diet dilution resulted in a significant ($P<.05$) reduction in body weight at 11 days of age, although by 42 days there was complete recovery of body weight with no change in overall efficiency of feed utilization. This same trend was seen in both sexes. Calculation of energy balance suggests these birds to have used energy very efficiently during the period of undernutrition. Diet dilution had no effect on carcass characteristics at 42 days, although for males at 56 days there was an indication of reduced abdominal fat content ($P<.05$). In Experiment 2, compensatory gain was incomplete, although results were confounded due to an outbreak of infectious bronchitis. It is concluded that broiler chickens can withstand a 7-day period of early undernutrition without loss in regular performance characteristics. The response of birds to diet dilution is likely a factor of degree, method, and duration of undernutrition and of age in relation to sexual maturity.

58 NAL Call. No.: 47.8 AM33P
Dietary zinc methionine effect on eggshell quality of hens drinking saline water.
Moreng, R.E.; Balnave, D.; Zhang, D.
Champaign, Ill. : Poultry Science Association; 1992 Jul.
Poultry science v. 71 (7): p. 1163-1167; 1992 Jul. Includes references.

Language: English

Descriptors: Hens; Drinking water; Saline water; Zinc; Methionine; Tap water; Egg shell quality; Breaking strength; Egg shell defects; Zinc sulfate; Feed intake; Water intake; Weight; Laying performance

Abstract: In two experiments individually caged 60-wk-old laying hens were exposed to daily temperatures ranging between 18 and 35 C and given various dietary and drinking water treatments. In Experiment 1 these were: 1) basal diet and town water; 2) basal diet and town water supplemented with 2 g NaCl/L; 3) basal diet supplemented with .2 g zinc methionine (Zinpro-200)/kg diet and town water; or 4) basal diet supplemented with .2 g zinc methionine/kg and town water supplemented with 2 g NaCl/L. In Experiment 2, Treatments 1 and 2 were the same as in Experiment 1. Birds on Treatments 3 and 4 received the town water supplemented with 2 g NaCl/L and the basal diet supplemented with either .5 g zinc methionine/kg (Treatment 3) or .28 g ZnSO4H2O/kg to approximate the same dietary zinc concentration in Treatment 3 (Treatment 4). In both experiments, dietary zinc methionine plus 2 g NaCl/L in the drinking water significantly improved shell breaking strength over those birds on the 2 g NaCl/L with no zinc methionine supplementation. This same pattern occurred for shell weight, shell weight per unit of surface area, and percentage of shell defects. There were no improvements in the parameters measured from the supplementation of ZnSO4. The zinc methionine compound apparently was effective in overcoming the negative influence of the added 2 g NaCl/L of town water.

59 NAL Call. No.: 47.8 B77
Differential leucocyte responses to various degrees of food restriction in broilers, turkeys and ducks.
Maxwell, M.H.; Hocking, P.M.; Robertson, G.W.
Oxfordshire : Carfax Publishing Company; 1992 Mar.
British poultry science v. 33 (1): p. 177-187; 1992 Mar. Includes references.

Language: English

Descriptors: Poultry; Restricted feeding; Stress response; Blood picture

60 NAL Call. No.: 382 SO12
Differential response of ducks and chicks to dietary sorghum tannins. Elkin, R.G.; Rogler, J.C.; Sullivan, T.W.
Essex : Elsevier Applied Science; 1991.
Journal of the science of food and agriculture v. 57 (4): p. 543-553; 1991. Includes references.

Language: English

Descriptors: Diet; Ducks; Chicks; Sorghum; Tannins; Performance

Abstract: White Pekin ducklings were reared in floor pens and given access to nipple-type waterers in order to eliminate a feeding behaviour previously observed in battery brooder-raised ducks in which sorghum tannins were possibly detoxicated by exposure of the ground grain to water. High-tannin sorghum (HTS)-soya bean meal and low-tannin sorghum (LTS)-soya bean meal diets, suboptimal in protein, with or without supplemental methionine, and either in dry, mash or pellet form, were fed to both day-old ducks and chicks for either 14 or 17 days, respectively. The chicks were reared in battery brooders. In contrast to previous findings with ducks raised in battery brooders, HTS-fed ducks reared in floor pens exhibited reduced weight gain and feed efficiency values compared with LTS-fed ducks. However, the magnitude of the growth depression caused by feeding ducks HTS versus LTS was much less than that observed in chicks fed the identical diets (17 versus 33%, respectively). Methionine supplementation of the HTS diets completely overcame the reduced weight gain in ducks, but feed efficiency values were still significantly poorer than those of ducks fed methionine-supplemented LTS diets. In contrast, although HTS-fed chicks responded to dietary methionine supplementation, they still exhibited poorer weight gain and feed efficiency values compared with birds fed LTS diets similarly supplemented. Increasing the dietary level of supplemental methionine did not result in any further improvement in performance of chicks fed either LTS- or HTS-based diets. It was concluded that, compared with chickens, ducks are less affected by dietary sorghum tannins.

61 NAL Call. No.: 41.8 R312
A disc ELISA for the detection of salmonella group D antibodies in poultry. Minga, U.M.; Wray, C.
London : British Veterinary Association; 1992 May.
Research in veterinary science v. 52 (3): p. 384-386; 1992 May. Includes references.

Language: English

Descriptors: Poultry; Salmonella gallinarum; Salmonella enteritidis; Elisa; Antibodies; Detection; Immunodiagnosis

Abstract: An ELISA using lipopolysaccharide antigens prepared from Salmonella gallinarum and S enteritidis was developed for the serological diagnosis of fowl typhoid and S enteritidis infection in poultry. There was good agreement between the results of the ELISA and conventional serological tests when samples from naturally infected birds and S enteritidis immunised birds were tested. Some cross reactions were observed when serum samples from S typhimurium infected birds were tested by ELISA. Subsequently a disc ELISA, using filter paper discs, was developed to facilitate sampling and testing of poultry. There was good correlation between the results of the disc and serum ELISAs and the test is recommended for the field testing of birds.

62 NAL Call. No.: QL750.A6
Diurnal and individual variation in behaviour of restricted-fed broiler breeders.
Kostal, L.; Savory, C.J.; Hughes, B.O.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Jan.
Applied animal behaviour science v. 32 (4): p. 361-374; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Restricted feeding; Animal behavior; Diurnal variation; Variation; Stress; Corticosterone; Blood plasma; Fearfulness; Body weight

63 NAL Call. No.: QL750.A6
Diurnal behavior patterns of cage-reared Brown Tsaiya ducks (Anas platyrhynchos var. domestica).
Lee, S.R.; Lee, Y.P.; Chen, B.J.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Aug.
Applied animal behaviour science v. 34 (3): p. 255-262; 1992 Aug. Includes references.

Language: English

Descriptors: Ducks; Anas platyrhynchos; Diurnal activity; Behavior patterns; Age differences; Cages; Acclimatization; Animal behavior

64 NAL Call. No.: 290.9 AM32T
Dust net generation rate in a poultry layer house.
Qi, R.; Manbeck, H.B.; Maghirang, R.G.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Sep. Transactions of the ASAE v. 35 (5): p. 1639-1645. ill; 1992 Sep. Literature review. Includes references.

Language: English

Descriptors: Pennsylvania; Poultry housing; Air quality; Artificial ventilation; Dust; Interactions; Lighting; Literature reviews; Particle density; Air pollutants; Mathematical models

Abstract: Dust particle net generation rates, based on the particle concentration data obtained in a commercial poultry facility during a complete laying season of one flock of birds, were calculated and compared to published values. The layer house was mechanically ventilated with a housing capacity for 112,000 caged birds. Two seasonal (hot and cold) ventilation rates were used at different times during the 14 weekly sample periods

that are included in this study. The daily lighting scheme in the house consisted of 17 lighted hours followed by 7 darkened hours. Hourly dust particle net generation rates for respirable and total particles were calculated. For the 14 tested weeks, mean particle volume generation rates were 0.76 mm3/h.bird and 1.06 mm3/h.bird, respectively, for respirable and total particles. Based on a measured particle density of 1750 kg/m3, the mean mass generation rates of respirable and total particles were 1.32 mg/h.bird and 1.84 mg/h.bird, respectively. Both respirable and total particle generation rates were significantly ($P < 0.05$) influenced by both ventilation rate and lighting levels.

65 NAL Call. No.: 47.8 AM33P
Early feed restriction of broilers: effects on abdominal fat pad, liver, and gizzard weights, fat deposition, and carcass composition. Fontana, E.A.; Weaver, W.D. Jr; Denbow, D.M.; Watkins, B.A. Champaign, Ill. : Poultry Science Association; 1993 Feb. Poultry science v. 72 (2): p. 243-250; 1993 Feb. Includes references.

Language: English

Descriptors: Broilers; Restricted feeding; Dietary fat; Dietary protein; Abdominal fat; Organs; Weight; Sex differences; Fat percentage; Body protein

Abstract: A total of five experiments were conducted to investigate the effects, of early feed restriction on organ weights, fat deposition, and carcass composition in broilers. In Experiments 1 and 2, broiler chicks were reared in litter pens for 49 days, whereas Experiments 3, 4, and 5, conducted in battery cages for 28 days. Feed restriction in all experiments was accomplished by providing male broiler chicks 40 kcal per bird per day for 7 (Experiments 1 and 2) or 6 (Experiments 3, 4, and 5) days, starting at 4 days of age. Feed restriction of broiler pullets in Experiment 1 was imposed from 4 to 9 days of age. Furthermore, the starter and grower diets in Experiment 2 contained either 1 or 4% added fat and the starter diets in Experiments 3, 4, and 5 contained either 21 or 26% protein. No significant differences were observed for abdominal fat pad and gizzard weights, liver and carcass fat, or carcass protein between early restricted birds and ad libitum controls at 49 days of age in Experiments 1 and 2. Furthermore, with the exception of Experiment 4, no differences in abdominal fat pad weights were observed among the different feeding regimens. Significant increases in abdominal fat pad weights, percentage liver, and percentage carcass fat were noted for females at 49 days of age when compared with male broilers. Carcass fat was significantly higher and carcass protein was significantly lower in broilers fed commercial versus reduced fat diets. Broilers fed a 21% protein diet had significantly heavier abdominal fat pad weights at 28 days of age than birds fed a 26% protein diet. No significant interactions were observed between the various treatments for the different variables measured. Results from the present studies indicate that early feed restriction minimally affects organ weights, fat deposition, and carcass composition of broiler chickens later in life.

66 NAL Call. No.: 47.8 AM33P
Effect of beak-trimming age and high fiber grower diets on layer performance. Bell, D.D.; Kuney, D.R. Champaign, Ill. : Poultry Science Association; 1991 May. Poultry science v. 70 (5): p. 1105-1112; 1991 May. Includes references.

Language: English

Descriptors: Hens; Beak; Debeaking; Age; Egg production; Strain differences; Hen feeding; Fiber content; Body weight; Feed intake; Mortality; Costs; Profitability

Abstract: The performance of three commercial strains of White leghorn layers was compared following beak trimming (BT) at 6 or 12 wk of age when fed diets containing 4.45 and 6.30% fiber between 6 and 12 or 12 and 18 wk of age, respectively. Body weights were lower at 12 wk in the 6-wk BT pullets, but were heavier at 18 wk when compared with the 12 wk BT pullets. Eighteen-week body weights were unaffected by feeding regimens. Six week BT resulted in higher hen-day and hen housed egg production, total egg mass, feed consumption, and total egg income. Profitability was superior for the 6-wk BT treatment ($P = .072$). Feeding the high fiber diets from 6 to 12 or 12 to 18 wk of age resulted in no differences in any of the adult performance traits measured compared with the control diet.

67 NAL Call. No.: 41.8 R312
Effect of bone strength on the frequency of broken bones in hens. Knowles, T.G.; Broom, D.M.; Gregory, N.G.; Wilkins, L.J. London : British Veterinary Association; 1993 Jan.
Research in veterinary science v. 54 (1): p. 15-19; 1993 Jan. Includes references.

Language: English

Descriptors: Hens; Bone fractures; Bone strength; Frequency; Body weight; Bones; Humerus; Breed differences; Battery cages

Abstract: Bird weight, breaking strength of humerus and tibiotarsus and the number of bones broken during culling were recorded for four breeds of end-of-lay hens housed in battery cages. Tbe probability of a bone being broken increased with bird weight and decreased with increasing bone strength. Bone strength increased with bird weight within each breed but the increase in strength was not great enough to prevent the extra damage suffered by heavier birds. There were differences in tibiotarsal strength between the four breeds of bird but overall no breed was more likely to suffer from broken bones than another. The rate of increase of bone strength with weight was similar between breeds and between humerus and tibiotarsus. The results show that differences in bone strength due to the type of housing system in which birds are kept are great enough to affect the ease with which bones are broken during bird handling during removal from cages at the end of lay.

68 NAL Call. No.: 47.8 AM33P
The effect of carbon dioxide as a preslaughter stunning method for turkeys. Fleming, B.K.; Froning, G.W.; Beck, M.M.; Sosnicki, A.A. Champaign, Ill. : Poultry Science Association; 1991 Oct. Poultry science v. 70 (10): p. 2201-2206; 1991 Oct. Includes references.

Language: English

Descriptors: Turkeys; Carbon dioxide; Stunning; Meat quality; Turkey meat; Color; Hemorrhage; Slaughter; Animal welfare; Muscle physiology; Ph; Water holding capacity; Muscles; Hemoglobin; Myoglobin; Cytochrome c

Abstract: The objective of the present research was to determine the effects of CO2 as an immobilization agent on turkey meat quality. In the study, two concentrations of CO2 were used, 40 and 60%, electrical stunning served as the control. As compared with electrical stunning, there was a significant ($P < .05$) reduction in severity of struggle during the lag stage of immobilization with both concentrations of CO2; during the lag phase of CO2 immobilization the bird shows no sign of stress. Hemorrhagic scores for the thigh muscle were significantly lower ($P < .05$) for the 40 and 60% CO2 groups when compared with the electrical stunning treatment. Total heme pigments and hemoglobin concentrations were significantly lower in the groups immobilized by CO2 ($P < .05$) than in the control group. However, control birds exhibited significantly ($P < .05$) lower levels of cytochrome c when compared with the groups immobilized by CO2. Postslaughter pH of birds immobilized with CO2 was significantly ($P < .05$) lower than that of the control groups. There was no significant difference ($P < .05$) in water holding capacity between treatment groups. Shear force was significantly lower ($P < .05$) for the 40% CO2 treatment group, when compared with other immobilization treatments. These results indicate that CO2 mobilization may have potential application as a humane stunning technique.

69 NAL Call. No.: 41.8 V641
Effect of catching method and lighting intensity on the prevalence of broken bones and on the ease of handling of end-of-lay hens.
Gregory, N.G.; Wilkins, L.J.; Alvey, D.M.; Tucker, S.A. London : The Association; 1993 Feb06.
The Veterinary record : journal of the British Veterinary Association v. 132 (6): p. 127-129; 1993 Feb06. Includes references.

Language: English

Descriptors: Hens; Bone fractures

70 NAL Call. No.: 41.8 R312
Effect of depth of immersion in the waterbath on the effectiveness of electrical stunning in chickens.
Gregory, N.G.; Wooton, S.B.
London : British Veterinary Association; 1991 Sep.
Research in veterinary science v. 51 (2): p. 200-202; 1991 Sep. Includes references.

Language: English

Descriptors: Broilers; Stunning; Head; Neck; Body regions; Bioelectric potential; Animal welfare

Abstract: Broiler chickens were electrically stunned either by immersing their heads, necks and upper breast in a waterbath stunner or by immersing their heads only. The time to recovery of muscular activity was assessed, and it was found that the deeper immersion was associated with a slightly (10 second) shorter time to resumption of head righting. When hens which had previously been implanted with electroencephalogram electrodes were electrically stunned it was found that the incidence of somatosensory evoked responses during the first 60 seconds after applying the current was not influenced by the depth of immersion. It was concluded that depth of immersion had little influence on the effectiveness of electrical stunning.

71 NAL Call. No.: 47.8 AM33P
Effect of diet and population density on male turkeys under various environmental conditions. 2. Body composition and meat yield. Halvorson, J.C.; Waibel, P.E.; Oju, E.M.; Noll, S.L.; El Halawani, M.E.
Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 935-940; 1991 Apr. Includes references.

Language: English

Descriptors: Turkeys; Stocking density; Dietary fat; Pelleted feeds; Light regime; Environmental temperature; Carcass yield; Abdominal fat; Carcass composition; Breast muscle

Abstract: Large White Nicholas male turkeys were reared at two stocking densities (.21 or .46 m2 per bird) and fed one of four diets: 1) control corn and soybean (mash) with 1% fat (CSM); 2) as Diet 1, pelleted (CSP); 3) as Diet 1 with supplemental fat increasing from 1 through 8% with age (CSF); and 4) as Diet 1 with barley at 0, 20, 35, 50, and 65% during successive 4-wk periods (CSB). The turkeys were reared in four environments: (A) intermittent light schedule [4(2 h light (L):4 h dark (D))] with temperature at 7 or 21 C during light and dark photoperiod, respectively, (B) and (D) with intermittent light (2L:4D) with a constant 21 and 7 C temperatures, respectively, (C) continuous light cycle (18L:6D) with temperatures as in Environment A. At 20 wk of age, two turkeys per replicate pen, were killed for determination of body composition and meat yield. Compared with turkeys fed CSM diet, those on CSF and CSP diet had increased percentage carcass fat. Meat yield per bird and percentage carcass fat were greater for turkeys reared at .46 m2 per bird compared with rearing at .21 m2 per bird. Pelleting and fat supplementation resulted in significantly increased amounts of breast meat and leg compared with CSM. Breast meat yield (percentage) and amount were greater at 7 C (Environment D) than at 21 C (Environment B) and the cycling regimen (Environment A). Percentage abdominal fat was greatest at 7 C. Interactions of environment and diet were detected for breast meat yield percentage ($P<.023$) and weight ($P<.036$). Diet type had no effect on percentage breast meat or weight in Environment C. An increased amount of breast meat was obtained by feeding CSP in Environments A, B, and D, and dietary fat supplementation increased breast meat yield in Environments A and D over CSM treatment.

72 NAL Call. No.: 47.8 AM33P
Effect of dietary aluminum and vitamin D interaction on growth and calcium and phosphorus metabolism of broiler chicks.
Hussein, A.S.; Cantor, A.H.; Pescatore, A.J.; Johnson, T.H. Champaign, Ill. : Poultry Science Association; 1993 Feb. Poultry science v. 72 (2): p. 306-309; 1993 Feb. Includes references.

Language: English

Descriptors: Chicks; Broilers; Dietary minerals; Aluminum; Cholecalciferol; Mineral metabolism; Growth; Blood chemistry

Abstract: The interaction of dietary aluminum (as aluminum sulfate) and vitamin D on growth performance and calcium and phosphorus metabolism was investigated using male broiler chicks. A corn-soybean broiler starter diet, containing .88% Ca and .45% available P and without added cholecalciferol (vitamin D3), was fed with 0 or.2% Al and with 0, 100, or 200 ICU of vitamin D3/kg of diet in a complete factorial arrangement. Four replicate cages of 10 chicks, 1 day of age, were assigned to each dietary treatment. Average body weight gain (328 versus, 545 g), feed intake (611 versus 784 g), gain:feed (.54 versus .68), and plasma inorganic P (4.2 versus 6.7 mg/dL) were significantly reduced ($P < .05$) in chicks fed diets with .2% Al, compared with those fed 0% Al. These four variables were improved by increasing the level of vitamin D3 in the diet from 0 to 100 ICU/kg. However, further improvements were not obtained by elevating the vitamin D3 level to 200 ICU/kg. There were significant interactions of Al and vitamin D3 on gain, feed intake, and gain:feed, but not on plasma P. Gain and feed intake were significantly decreased by Al at each level of vitamin D3. Plasma total Ca was significantly increased by vitamin D3, but was unaffected by Al. Increasing the level of dietary vitamin D3 did not completely alleviate the negative effects of Al.

73 NAL Call. No.: 47.8 AM33P
Effect of dietary supplemental pyridoxine levels on the hatchability of turkey eggs.
Robel, E.J.
Champaign, Ill. : Poultry Science Association; 1992 Oct.
Poultry science v. 71 (10): p. 1733-1738; 1992 Oct. Includes references.

Language: English

Descriptors: Turkey eggs; Turkey egg hatchability; Turkey hen feeding; Pyridoxine; Feed supplements; Maize; Soybean oilmeal; Laying performance; Egg yolk

Abstract: Two identical experiments were conducted each with 120 Large White turkey hens in individual cages to determine the value of dietary pyridoxine supplementation for increasing hatchability. The hens were fed a basal corn and soybean meal diet. Weekly data responses were averaged across 5- to 6-wk timespans and recorded in three grouped time periods over the reproduction cycles. The hens were photostimulated at 31 wk of age and at 33 wk of age were assigned to dietary treatments containing 0, 6, 12, and 18 mg of supplemented pyridoxine/kg of diet. Thirty hens were fed each dietary treatment. In Experiment 1, eggs were collected for 4 days in the middle of each time period and egg yolk and albumen were assayed separately for vitamin B6. Although the vitamin B6 concentration in egg yolk was stable (1.9 micrograms/g dried basis), concentrations of vitamin B6 in egg albumen increased with incremental dietary pyridoxine levels; however, the average level of vitamin B6 in egg albumen was only 4% of the average level in egg yolk. About 37 micrograms of vitamin B6 per egg (82 g) was assayed in eggs from all treatments in the production periods. Incremental dietary levels of supplemented pyridoxine above the basal (unsupplemented pyridoxine) diet level did not result in increasing hatchability or egg vitamin B6 levels. Differences were not observed for 7-day or 28-day embryo deaths among treatments within the three 5- or 6-wk production periods of both experiments.

74 NAL Call. No.: 47.8 AM33P
Effect of early feed restriction on growth, feed conversion, and mortality in brolier chickens.
Fontana, E.A.; Weaver, W.D. Jr; Watkins, B.A.; Denbow, D.M. Champaign, Ill. : Poultry Science Association; 1992 Aug. Poultry science v. 71 (8): p. 1296-1305; 1992 Aug. Includes references.

Language: English

Descriptors: Broilers; Restricted feeding; Unrestricted feeding; Diet; Sulfur amino acids; Protein content; Body weight; Feed conversion efficiency; Liveweight gain; Mortality; Sex differences

Abstract: Two floor pen and two battery experiments were conducted to determine the effects of early feed restriction on the performance of commercial broilers. Feed restriction was induced in all experiments by providing chicks with 40 kcal of ME per bird per day, commencing at 4 days of age. Male chicks were feed-restricted for 7 (Experiments 1 and 2) or 6 days (Experiments 3 and 4), whereas broiler females were restricted for 5 days (Experiment 1). Ad libitum feeding was resumed after the restriction periods, and continued through the conclusion of the experiments at 49 Experiments I and 2) or 28 Experiments 3 and 4) days of age. Broilers provided ad libitum access to feed for the entire experimental period served as the controls in each study. Broilers subjected to an early feed restriction had significantly (P less than or equal to .05) lower mean body weights than controls for all ages measured in the four experiments. However, feed conversion ratios for restricted broilers were significantly lower at 28 (Experiments 1 through 4) and 49 (Experiments 1 and 2) days of age than for birds consuming feed ad libitum. Through regression analyses, it was estimated that male broilers in Experiments I and 2 would require approximately 2 additional days to obtain body weights similar to those observed ion control broilers and would still maintain a lower feed conversion ratio at this older age. in Experiments I and 2, weekly body weight gains for restricted broilers were significantly lower than for controls from 0 through 28 days of age. However, restricted broilers (7 days) in Experiment 2 had significantly higher rates of gain from 29 to 49 days of age than unrestricted controls. Total pen body weights for restricted and ad libitum groups were similar at 49 days of age in Experiments 1 and 2, which reflected the significant difference in mortality observed between the two groups.

75 NAL Call. No.: QL750.A6
Effect of early handling on growth, mortality and feed efficiency in White Leghorns.
Leonard, M.L.; Fairfull, R.W.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Jul.
Applied animal behaviour science v. 34 (1/2): p. 121-128; 1992 Jul. Includes references.

Language: English

Descriptors: Chicks; Animal husbandry; Handling; Growth rate; Mortality; Feed conversion efficiency; Cannibalism

76 NAL Call. No.: 41.8 V643
Effect of electrical stunning frequency on ventricular fibrillation, downgrading and broken bones in broilers, hens and quails. Gregory, N.G.; Wilkins, L.J.; Wotton, S.B.
London : Bailliere Tindall; 1991 Jan.
British veterinary journal v. 47 (1): p. 71-77; 1991 Jan. Includes references.

Language: English

Descriptors: Broilers; Hens; Quails; Stunning; Heart; Electric current; Hemorrhage; Bone fractures; Animal welfare; Carcass quality

Abstract: The effect of stunning current frequency on the incidence of ventricular fibrillation was determined in broilers and hens. When a pulsed unipolar square wave (DC) was used the incidence of ventricular fibrillation decreased as the frequency was increased beyond 125 Hz. When a sinusoidal AC was used, 50 Hz killed some of the birds whereas at the corresponding r.m.s. currents no birds experienced a ventricular fibrillation with 1500 Hz. In quail, it was found that between 45 and 110 mA (50 Hz) all birds experienced a ventricular fibrillation. The effect of 50, 200 and 350 Hz square wave DC on carcass downgrading was examined in broilers, and there were no differences between the groups. It was concluded that there were few advantages from using high frequency stunning currents in poultry.

77 NAL Call. No.: QL750.A6
The effect of environmental enrichment during rearing on fear reactions and depopulation trauma in adult caged hens.
Reed, H.J.; Wilkins, L.J.; Austin, S.D.; Gregory, N.G. Amsterdam ; New York : Elsevier, 1984-; 1993 Mar.
Applied animal behaviour science v. 36 (1): p. 39-46; 1993 Mar. Includes references.

Language: English

Descriptors: Hens; Battery cages; Fearfulness; Trauma; Removal

78 NAL Call. No.: 47.8 AM33P
Effect of exposure to operant-controlled microwaves on certain blood and immunological parameters in the young chick.
Braithwaite, L.A.; Morrison, W.D.; Bate, L.; Otten, L.; Hunter, B.; Pei, D.C.T.
Champaign, Ill. : Poultry Science Association; 1991 Mar.
Poultry science v. 70 (3): p. 509-514; 1991 Mar. Includes references.

Language: English

Descriptors: Chicks; Broilers; Microwave radiation; Heating; Conditioning; Responses; Heat stress; Heating costs

Abstract: Twenty-two 1-wk-old broiler chicks (Gallus domesticus) were housed at 16 C and operantly conditioned to activate either a 250-W infrared bulb (control) or a microwave generator delivering 13 mW/cm2 (treated). Plasma corticosterone concentration did not differ between groups (P>.05) at 4 wk of age. At that time the birds were killed, and post-mortem examination revealed no treatment differences in gross morphology of the chicks or in weights of spleen and bursa of Fabricius (P>.05). Histological study of comparable segments of spleen bursa, adrenal, and thyroid tissue did not show differences in any of the chosen parameters (P>.05). Heterophil:lymphocyte ratios, packed cell volume, and total plasma protein content were similar between groups (P>.05). These results suggest that operant exposure to low density microwave radiation did not result in stress or immunological disturbances.

79 NAL Call. No.: 47.8 Am33P
Effect of feather coverage and temperature on layer performance. Peguri, A.; Coon, C.
Champaign, IL : Poultry Science Association, 1921-; 1993 Jul. Poultry science v. 72 (7): p. 1318-1329; 1993 Jul. Includes references.

Language: English

Descriptors: Hens; Laying performance; Feed intake; Metabolizable energy; Feathers; Environmental temperature; Egg weight; Body weight; Egg mass; Energy cost of maintenance

Abstract: An experiment was conducted with 59-wk-old DeKalb XL White Leghorns to determine the effect of percentage feather coverage (FC) on performance and nutrient intake of layers housed in cold (12.8 C), thermoneutral (23.9 C), and hot (33.9 C) temperatures. At each temperature, 60 hens had 0, 50, or 100% feathers removed and were fed diets containing 2,865 kcal ME/kg. Feed intake of hens housed at 23.9 C (115 g/day for all FC groups) was 25 g/day higher (P < .05) than for hens housed at 33 C and 13 g/day lower (P < .05) than for hens at 12.8 C. The feed intake of hens (across an temperatures) with 100% FC (98 g/day) increased (P <.05) by 26 g/day as FC decreased from 100 to 0%. Percentage hen-day egg production (EP) (across feather treatments) was decreased 7.5 and 6.7% (P < .05) at 12.8 and 33.9 C, respectively, compared with 23.9 C. Total lack of feathers decreased (P < .05) EP from hens with 100% FC by 9.2 and 6.4% at 12.8 and 23.9 C, respectively. Total lack of feathers at 33.9 C increased EP 5.46% compared with 100% FC. Egg weight was reduced 1.9 g (P < .05) at 33.9 C when compared with hens at 23.9 C. Hens without feathers produced a 1.8 g heavier egg (P < .05) than hens with 100% FC. The egg mass (EM) of hens housed at 12.8 and 33.9 C was less than hens at 23.9 C across all feather treatments. Metabolizable energy efficiency (kilocalories ME per gram EM) was improved (P < .05) by the highest temperature across all feather treatments and by increasing FC to 50 or 100% compared with 0% FC. The maintenance ME requirement for hens housed at 12.8 C with 0% FC was 190.4 kcal/kg of BW, which was twice the requirement of hens housed at 33.9 C with 0% FC. Results indicate economic importance of maintaining FC for layers in cold and thermoneutral temperatures and benefits of increased EM output for hens housed in hot climates with partial or complete feather loss.

80 NAL Call. No.: 47.8 AM33P
The effect of feed intake on body temperature and water consumption of male broilers during heat exposure.
Lott, B.D.
Champaign, Ill. : Poultry Science Association; 1991 Apr.
Poultry science v. 70 (4): p. 756-759; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Feed intake; Body temperature; Water intake; Heat stress; Restricted feeding; Acclimatization

Abstract: Two trials were conducted to study the effect of feed intake on rectal temperature and water consumption of acclimated and unacclimated broilers during heat exposure. Male broiler chicks, 100 per trial, were raised as one group to 29 days for Trial 1 and 36 days for Trial 2. The birds were moved to environmental chambers and 50 per trial were acclimated by being subjected to 3 consecutive days of 24 C, 35 C, 24 C cyclic temperature. After acclimation, the birds were exposed to a linear change in temperature from 24 to 41 C over 3 h with a constant 10 C dewpoint, starting at 0800 h on Day 34 for Trial 1 and on Day 41 for Trial 2. The feeding schedule for the day of the heat exposure was as follows. For the feed group, feed was removed from the birds at 0400 h and placed back at 0700 h. For the no feed group, feed was removed at 0700 h. At 0800 h, feed was removed from all birds but water was accessible throughout the heat exposure. Acclimated and unacclimated birds given access to feed for 1 h before a heat exposure consumed 60 and 50 mL of water per broiler, respectively, during the heat exposure. However, for broilers not receiving feed, the water consumption was 58 and 30 mL per broiler, respectively. Acclimated and unacclimated broilers given access to feed had similar body temperatures, but the acclimated broilers not receiving feed had a significantly lower ending rectal temperature than the unacclimated group.

81 NAL Call. No.: 47.8 AM33P
The effect of feed restriction and Eimeria maxima infection with or without medication on growth and feed intake in broilers.
Newcombe, M.; Fitz-Coy, S.H.; Harter-Dennis, J.M.
Champaign, Ill. : Poultry Science Association; 1992 Sep.
Poultry science v. 71 (9): p. 1442-1449; 1992 Sep. Includes references.

Language: English

Descriptors: Broilers; Restricted feeding; Eimeria maxima; Experimental infections; Salinomycin; Feed intake; Halofuginone; Compensatory growth; Feed conversion; Intestines; Lesions; Body weight; Abdominal fat; Meat cuts

Abstract: Day-old male broiler chicks were raised in floor pens. At 4 days of age, birds in 75% of the pens were inoculated with Eimeria maxima via the feed. There were four dietary treatments: uninoculated, unmedicated control (UUC), infected, unmedicated control (IUC), infected, halofuginone-medicated (3 ppm, HM), or infected, salinomycin-medicated (66 ppm, SM). At 6 days of age, birds in 50% of the pens of each treatment were restricted for 5 days to their maintenance energy intake level. The remainder consumed feed ad libitum. Medication reduced growth from 0 to 6 days of age and feed intake was depressed, irrespective of medication, in infected birds from 0 to 21 days of age. Growth, however, was improved with intake of coccidiostat over IUC from 6 to 11 days of age but did not match UUC until 28 days of age. At 42 and 49 days of age, infected birds were lighter than UUC birds. Dressing percentage for HM and SM birds was greater than that of UUC birds at 49 days of age but HM birds also had a greater percentage of abdominal fat at both 42 and 49 days of age. Feed restriction resulted in some compensatory growth immediately following refeeding. Experimental feed:gain ratio was improved in restricted birds (1.98 versus 2.03 g:g). At 42 and 49 days of age, restricted birds were lighter than birds eating ad libitum and also had a significantly greater percentage abdominal fat. A lower breast yield was observed at 42 days of age in restricted birds.

82 NAL Call. No.: 47.8 AM33P
Effect of feeding palmitic, oleic and linoleic acids to Japanese quail hens (Coturnix coturnix japonica). 1. Reproductive performance and tissue fatty acids.
Vilchez, C.; Touchburn, S.P.; Chavez, E.R.; Chan, C.W. Champaign, Ill. : Poultry Science Association; 1991 Dec. Poultry science v. 70 (12): p. 2484-2493; 1991 Dec. Includes references.

Language: English

Descriptors: Japanese quails; Palmitic acid; Oleic acid; Linoleic acid; Female fertility; Egg yolk composition; Blood plasma; Egg weight; Egg hatchability; Hatching weight; Cholesterol; Phosphorus; Body weight; Liver

Abstract: A study was conducted to evaluate the effects of diets containing 3% of either palmitic acid (Diet PA), oleic acid (Diet OA), or linoleic acid (Diet LA) on reproductive performance, fatty acid composition of egg yolk, plasma and liver, and total plasma phosphorus of Japanese quail. Each diet was fed to 20 individually caged hens from 5 wk of age. A 24-wk production period started at 8 wk of age. Fertile eggs for incubation were obtained by placing at random a male in the cage with the female for 15 to 20 min twice per week. The males were kept in separate individual cages and fed a turkey grower diet throughout. Feed consumption, egg production, egg output, and the number of chicks per hen were higher (P<.05) in birds fed Diet PA than in those fed Diet OA or Diet LA. Hatchability was not different (P>.05) between Diet PA and Diet OA, but they were higher (P<.05) than that of Diet LA. Quail weight at hatch from birds fed Diet LA was heavier (P<.05) than those from Diet OA, but not different (P>.05) from those fed Diet PA. Total plasma phosphorus concentration was higher (P<.05) in birds fed Diet PA than in those fed Diet LA. High levels of oleic and linoleic acids were found in egg yolk, plasma, and liver lipids from birds fed Diet OA and Diet LA, respectively. Feeding Diet PA resulted in elevated levels of palmitoleic acid in all three tissues. The highest overall reproductive performance on Diet PA suggests that palmitic acid has some physiological role in reproduction. The sustained near-maximal levels of egg production and fertility achieved in this trial indicate the superiority of the mating procedure, which would also permit testing the response of male and female birds while minimizing injuries incurred by the females.

83 NAL Call. No.: 47.8 AM33P
Effect of fructooliogsaccharide on Salmonella colonization of the chicken intestine.
Bailey, J.S.; Blankenship, L.C.; Cox, N.A.
Champaign, Ill. : Poultry Science Association; 1991 Dec.
Poultry science v. 70 (12): p. 2433-2438; 1991 Dec. Includes references.

Language: English

Descriptors: Fowls; Salmonella typhimurium; Colonizing ability; Oligosaccharides; Oral administration; Competitive ability; Stress response; Feed additives

Abstract: The influence of fructooligosaccharide (FOS) on the ability of Salmonella typhimurium to grow and colonize the gut of chickens was investigated. In vitro studies showed that Salmonella did not grow when FOS was the sole carbon source. When FOS was fed to chicks at the .375% level, little influence on Salmonella colonization was observed. At the .75% level 12% fewer FOS-fed birds were colonized with Salmonella compared with control birds. When chicks given a partially protective competitive exclusion (CE) culture were fed diets supplemented with .75% FOS, only 4 of 21 (19%) chickens challenged with 10(9) Salmonella cells on Day 7 became colonized as compared with 14 of 23 (61%) chickens given CE alone. When chickens were stressed by feed and water deprivation on Day 13 and challenged with 10(9) Salmonella on Day 14, 33 of 36 (92%) chickens fed a control diet were colonized compared with only 9 of 36 (25%) chickens fed a .75% FOS diet. Chickens treated with FOS had a fourfold reduction in the level of Salmonella present in the ceca. Feeding FOS in the diet of chickens may lead to a shift in the intestinal gut microflora, and under some circumstances may result in reduced susceptibility to Salmonella colonization.

84 NAL Call. No.: 41.8 V641
Effect of husbandry system on broken bones and bone strength in hens. Gregory, N.G.; Wilkins, L.J.; Kestin,

S.C.; Belyavin, C.G.; Alvey, D.M. London : The Association; 1991 Apr27.
The Veterinary record : journal of the British Veterinary Association v. 128 (17): p. 397-399; 1991 Apr27. Includes references.

Language: English

Descriptors: Hens; Poultry housing; Molting; Bone fractures; Bone strength; Battery husbandry; Cages; Deep litter housing

85 NAL Call. No.: 41.8 AV5
Effect of infectious bursal disease virus vaccines on persistence and pathogenicity of modified live reovirus vaccines in chickens. Montgomery, R.D.; Maslin, W.R.
Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Jan. Avian diseases v. 35 (1): p. 147-157; 1991 Jan. Includes references.

Language: English

Descriptors: Chicks; Live vaccines; Infectious bursal disease virus; Avian reovirus; Pathogenicity; Persistence; Safety; Disease prevention; Stress; Tendons; Bursa fabricii; Lesions

Abstract: Two commercially available live reovirus vaccines, alone or in combination with two infectious bursal disease virus (IBDV) vaccines, were evaluated for safety and efficacy in specific-pathogen-free leghorn chicks. Four trials were conducted to evaluate the vaccine combinations. At periodic intervals during the trials, tissues were collected and assayed for residual reovirus and examined for histological changes. Six weeks following reovirus vaccination, all treatment groups were challenged with a virulent field isolate of reovirus and sampled 1 week later for the final time. The two reovirus vaccines were safe and effective if given at 1 week of age, regardless of whether the vaccinates had been exposed to IBDV at 1 day. However, both reovirus vaccines persisted in the tendons of 1-day-old vaccinates. The effects of IBDV vaccines were generally minor and reflected by increases in the number of pre-challenge or post-challenge virus recoveries from some of the treatment groups receiving both type vaccines.

86 NAL Call. No.: 47.8 AM33P
Effect of modifications of semen diluent with cell culture serum replacements on fresh and stored turkey semen quality and hen fertility. Bakst, M.; Cecil, H.
Champaign, Ill. : Poultry Science Association; 1992 Apr. Poultry science v. 71 (4): p. 754-764; 1992 Apr. Includes references.

Language: English

Descriptors: Turkeys; Semen diluents; Spermatozoa; Culture media; Motility; Artificial insemination; Turkey egg fertility; Viability; Computer analysis; Semen preservation

Abstract: Two commercially available serum replacements formulated as supplements to somatic cell culture media were used with a turkey semen diluent to determine their effect on semen quality and spermatozoal fecundity before and after semen storage for 24 h. Progressive motility estimates (visual) and spermatozoal motility characteristics estimated by a computer-assisted semen analysis system, and sperm viability tests (the ethidium bromide exclusion procedure and a sperm stress test) were used to evaluate the semen. Although the presence of the serum replacements significantly increased spermatozoal motility, fertility was not augmented by the presence of the serum replacements. Computer-derived spermatozoal velocity and the percentage of nonviable spermatozoa estimated by the sperm stress test were negatively correlated with hen fertility. It was concluded that although the serum replacements augmented some spermatozoal motility characteristics, they failed to improve the fecundity of spermatozoa either before or after semen storage for 24 h.

87 NAL Call. No.: 47.8 AM33P
Effect of number of hens per nipple waterer on the performance of several strains of layers in cages.

Gernat, A.G.; Adams, A.W.
Champaign, Ill. : Poultry Science Association; 1992 Aug.
Poultry science v. 71 (8): p. 1292-1295; 1992 Aug. Includes references.

Language: English

Descriptors: Hens; Strain differences; Floor pens; Water intake; Nipple drinkers; Laying performance; Liveweight gain; Egg weight; Feed intake; Feed conversion efficiency

Abstract: Two experiments were designed to study the effects of housing in cages with several hens per nipple waterer (HPN) ratios on performance of several strains of White Leghorn pullets. In Experiment 1, only body weight gain and water consumption were significantly affected by the HPN; hens at the 2:1 HPN gained more weight and consumed more water per day than those at the 4:1 HPN. The lack of a significant strain by HPN interaction indicated that the four strains responded similarly to the different HPN ratios. In Experiment 2, hens in cages with 3.5:1 and 7:1 HPN consumed significantly more water and feed than those in cages with 10:1 and 14:1 HPN. In both experiments, the HPN had no significant effect on age at sexual maturity, egg production, mortality, and egg weight, but efficiency of feed usage for egg production decreased with the 3.5:1 and 7:1 HPN.

88 NAL Call. No.: 47.8 AM33P
Effect of overcooked soybean meal on turkey performance. Lee, H.; Garlich, J.D.; Ferket, P.R.
Champaign, Ill. : Poultry Science Association; 1991 Dec. Poultry science v. 70 (12): p. 2509-2515; 1991 Dec. Includes references.

Language: English

Descriptors: Turkeys; Soybean oilmeal; Liveweight gain; Feed conversion efficiency; Heat processing; Dietary protein; Solubility; In vitro

Abstract: Three turkey growth experiments were conducted to evaluate the effect of over cooked soybean meal (SBM) on BW gain and gain:feed ratio (FE). On two occasions soybean meals were custom prepared by changing the temperature and the retention time (RT) of the desolventizer-toaster unit at a commercial soybean processing plant. Three different meals were produced for each occasion mainly by altering RT from normal to approximately 1.35 and 2.43 times normal operating conditions (designated SBM1 to 3 on the first occasion and SBM4 to 6 on the second occasion). For SBM1 to 6, urease activities were .06, .00, .00, .20, .01 and .00 delta pH, protein solubilities in .1 M borate at 40 C were 44, 45, 16, 44, 32, and 24%, and protein solubilities in 2% KOH were 86, 84, 76, 90, 85, and 85%, respectively. In two sequential long-term experiments, SBM1 to 3 were fed to turkeys from 0 to 8 wk, then a control (normal processing conditions, SBMF), was fed to the all treatment groups from 8 to 12 wk of age. The SBM4 to 6 were fed from 12 to 18 wk of age after rerandomizing treatment allocation of replicate pens. In the first trial, poults fed SBM3 showed significantly reduced BW gain from 3 wk on and a lower FE shown at 9 wk. No difference in BW gain and FE was observed in the trial from 12 to 18 wk. In a 15-day, short-term experiment starting with 3-day-old poults and feeding diets containing SBM2 to 6, BW gain and FE did not differ among treatment groups. It is concluded that SBM did not show a detrimental effect on turkey growth until it was overcooked by 2.4 times the normal conditions. The usual operating conditions in a commercial processing plant are well within the range for producing adequate SBM for poultry feed.

89 NAL Call. No.: 47.8 B77
Effect of perches in laying cages on welfare and production of hens. Duncan, E.T.; Appleby, M.C.; Hughes, B.O.
Oxfordshire : Carfax Publishing Company; 1992 Mar.
British poultry science v. 33 (1): p. 25-35; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Battery cages; Perches

90 NAL Call. No.: 47.8 AM33P
Effect of peripheral foot cooling on metabolic rate and thermoreregulation of fed and fasted chicken hens in a hot environment.
Muiruri, H.K.; Harrison, P.C.
Champaign, Ill. : Poultry Science Association; 1991 Jan.
Poultry science v. 70 (1): p. 74-79; 1991 Jan. Includes references.

Language: English

Descriptors: Hens; Feet; Cooling; Perches; Heat stress; Metabolism; Fasting; Environmental temperature; Polypnea; Heat production; Body temperature

91 NAL Call. No.: 47.8 AM33P
Effect of rearing floor type and ten-day beak trimming on stress and performance of caged layers.
Struwe, F.J.; Gleaves, E.W.; Douglas, J.H.; Bond, P.L. Jr Champaign, Ill. : Poultry Science Association; 1992 Jan. Poultry science v. 71 (1): p. 70-75; 1992 Jan. Includes references.

Language: English

Descriptors: Hens; Beak; Debeaking; Stress; Body weight; Feed intake; Egg production; Floors; Wire netting; Litter; Feathers; Adrenal glands; Heart; Spleen; Weight; Blood; Corticosterone

Abstract: Beak trimming pullets at an early age is a widespread industry practice. There is some concern that this practice may have effects on the subsequent performance of the birds in the production phase. Effects of beak treatment (trimmed or untrimmed) and rearing floor type (litter or wire) on performance of caged layers were evaluated in a 2 X 2 factorial arrangement of treatments. Pullets that were trimmed or untrimmed at 10 days of age and reared on either litter or wire floors were placed in a cage house. Production factors and stress measurements were recorded to determine detrimental effects of the early trimming and rearing floor types. No interactions (P=.15) between rearing floor type and beak treatment were observed for BW, feed consumption, egg production, heart weight, spleen weight, or blood corticosterone. However, an interaction (P=.02) between rearing floor type and beak treatment was observed for adrenal weight. There were no differences (P=.08) in the final BW of the pullets. Birds reared on litter ate considerably (P=.0002) more than those reared on wire. There were no differences (P=.27) in egg production rate. Adrenal weights were different (P=.007), with the litter-raised birds having much smaller adrenals at the end of the 36-wk trial. Hearts of the beak-trimmed birds were smaller (P=.02) than those of the untrimmed birds. There were no differences in spleen weights (P=.07) or blood corticosterone levels (P=.07). Differences in the feather cover were observed.

92 NAL Call. No.: 47.8 AM33P
Effect of roost temperature on performance of chickens in hot ambient environments.
Muiruri, H.K.; Harrison, P.C.
Champaign, Ill. : Poultry Science Association; 1991 Nov.
Poultry science v. 70 (11): p. 2253-2258; 1991 Nov. Includes references.

Language: English

Descriptors: Hens; Laying performance; Air temperature; Heat stress; Chicken housing; Egg weight; Feed intake; Feed conversion; Egg fertility; Egg hatchability

Abstract: A split-plot experiment was conducted in thermally controlled chambers using Columbian Plymouth Rock chickens to determine the effect of water-cooled roosts on performance in hot ambient conditions. The birds were subjected to 25 +/- 1, 35 +/- 1, and 25 +/- 1 C ambient temperature treatments for 2, 3, and 2 wk, respectively. Roost temperature treatments were either cool (20 +/- 1 C) or air-equilibrated (25 +/- 1 or 35 +/- 1 C). The performance parameters evaluated were percentage hen-day egg production, egg weight, feed intake, feed conversion, fertility, and hatchability. Birds subjected to the water-cooled roost treatment had consistently higher performance than birds using the air-equilibrated roost under all three ambient temperatures. Both

ambient and roost temperature treatments significantly influenced percentage hen-day egg production, average daily feed intake, and percentage hatchability (P<-.05). However, the biggest differences in performance were observed during the heat-stress period. Decreases in performance during the heat-stress period from the thermoneutral control values were: 5.95 and 13.1 percentage points for hen-day egg production, 22.2 and 34.8 percentage points for average daily feed intake, and 5.17 and 15.38 percentage points for hatchability in water-cooled and air-equilibrated roost treatments, respectively. The ambient and roost temperature treatments did not significantly affect egg weight, feed conversion, or percentage fertility. The improved performance with water-cooled over air-equilibrated roost treatments, especially during heatstress periods, indicates that the water-cooled roosts minimized the deleterious effects of heat stress through conductive heat loss from the birds to the roost.

93 NAL Call. No.: 41.8 AM3A
Effect of short-term exposure of chickens to corticosterone on resistance to challenge exposure with Escherichia coli and antibody response to sheep erythrocytes.
Gross, W.B.
Schaumburg, Ill. : American Veterinary Medical Association; 1992 Mar. American journal of veterinary research v. 53 (3): p. 291-293; 1992 Mar. Includes references.

Language: English

Descriptors: Fowls; Corticosterone; Disease resistance; Pericarditis; Escherichia coli; Antibody formation; Dosage; Timing; Erythrocytes; Sheep

Abstract: Chickens in a low-stress environment (heterophil/lymphocyte ratio 0.31) were given feed containing 30, 40, or 60 mg of corticosterone/kg of feed for 0.5 hour. Between 0.5 to 12 hours later, chickens were exposed to Escherichia coli via the air sac route. For each dose of corticosterone, there was an untreated control group that was exposed to E coli via the air sac route. The prevalence of pericarditis was reduced from 78 to 7% between 2 and 4 hours after exposure. Resistance was associated with heterophil/lymphocyte (H/L) ratios greater than 1.04. Peak H/L ratios correlated positively with amount of corticosterone in the feed. In one experiment, chickens were inoculated IV with sheep erythrocytes at various times after consumption of feed containing corticosterone. Suppression of antibody responsiveness was most pronounced 4 hours later. Antibody responsiveness correlated positively with lymphocyte numbers. Histologic examination of air sacs was made following euthanasia at various times after E coli exposure. Lesions observed in control chickens included: edema at 0.5 hour, beginning of heterophil infiltration at 1 hour, increased edema and heterophil infiltration at 2 hours, and severe edema and heterophil infiltration at 4 hours. Lesions were not observed in chickens that had been given feed containing 40 mg of corticosterone/kg of feed.

94 NAL Call. No.: 47.8 B77
Effect of stresses before slaughter on changes to the physiological, biochemical and physical characteristics of duck muscle. Chen, M.T.; Lin, S.S.; Lin, L.C.
Oxfordshire : Carfax Publishing Company; 1991 Dec.
British poultry science v. 32 (5): p. 997-1004; 1991 Dec. Includes references.

Language: English

Descriptors: Ducks; Duck meat; Stress; Meat quality

95 NAL Call. No.: 47.8 AM33P
Effect of time of feeding oviposition on time and production parameters in broiler breeders.
Wilson, H.R.; Keeling, L.J.
Champaign, Ill. : Poultry Science Association; 1991 Feb.
Poultry science v. 70 (2): p. 254-259; 1991 Feb. Includes references.

Language: English

Descriptors: Broilers; Breeding life; Hen feeding; Egg production; Timing; Egg shell thickness; Egg weight

Abstract: In Experiment 1, four pens of 90 Ross dwarf broiler breeder hens and 9 cocks each were assigned to feeding times of 0830, 1130, and 1430 h. Eggs were collected hourly from 0800 to 1600 h, 5 days/wk for 4 wk. In Experiment 2, five pens of 30 Arbor Acres hens and 3 cocks each were assigned to feeding times of 0830, 1130, 1430, and 1730 h. Eggs were collected hourly from 0700 to 1600 for Days 6 through 10 of a 10-day treatment period. Feeding time did not significantly change oviposition time in dwarf broiler breeders, except for an increase in oviposition at 1600 h for hens fed at 1130 and 1430 h. Peak oviposition times were 1000 and 1100 h with distribution of ovipositions throughout the day. Egg weight shell thickness, and egg production were not significantly affected by feeding time. In the standard-sized strain afternoon feeding times significantly increased the proportion of afternoon ovipositions. The incidence of floor, dirty, cracked and abnormal eggs was not significantly changed by feeding time in either experiment.

96 NAL Call. No.: 47.8 AM33P
Effectiveness of zinc bacitracin on production traits and energy metabolism of heat-stressed hens compared with hens kept under moderate temperature. Manner, K.; Wang, K.
Champaign, Ill. : Poultry Science Association; 1991 Oct. Poultry science v. 70 (10): p. 2139-2147; 1991 Oct. Includes references.

Language: English

Descriptors: Hens; Heat stress; Zinc bacitracin; Heat production; Heat tolerance; Egg shell quality; Critical temperature; Feed intake; Mode of action

Abstract: Two experiments with a total of 100 White Leghorn hens (26 to 59 wk of age) and 120 Rhode Island Red chickens (4 to 12 wk of age) were conducted to study the effect of 100 mg zinc bacitracin (ZBA)/kg of feed on hens and chickens acclimatized to 20 or 34 C environments. Layers were provided ad libitum access to a diet containing 11.12 MJ ME/kg (1 MJ=.239 Mcal) and 174 g CP/kg supplemented with 0 and 100 mg ZBA/kg. Body weight gain, egg number, total egg mass, and feed efficiency of ZBA-treated hens kept at a moderate temperature (20 C) were not significantly improved by 3.5, 2.6. 3.3, and 3.1%, respectively. However ZBA supplementation induced a more pronounced increase in performance in heat-stressed hens. The respective traits were significantly improved by 66.3, 15.4, 16.9, and 5.9%. Additionally, treated hens maintained at 34 C consumed significantly more feed than untreated hens. Eggshell breaking strength of treated hens held under normal conditions was not significantly improved. Feeding ZBA to heat-stressed hens led to a statistically higher breaking strength. Supplementation with ZBA for hens acclimatized to 20 and 34 C reduced fasting heat production by 4.1 and 7.6%, respectively. However, in the 20 C environment the differences were significant at only one of seven ages. The upper critical temperature (UCT) of ZBA-treated hens increased significantly at both temperatures from 34 to 42 wk of age relative to the control group. No significant effects of ZBA on UCT were observed at 24 to 32 wk and 40 to 52 wk of age. Heat tolerance of chickens 4 to 12 wk of age fed ZBA was significantly improved by 23.7% (20 C) and 51.2% (34 C). Results indicated a clear response of ZBA on improving performance of hens acclimatized to 34 C, which was due to overall heat production, especially for hens kept at constant high temperature. The effect of ZBA on hens housed under thermoneutral (20 C) conditions was not statistically significant.

97 NAL Call. No.: 41.8 R312
Effects of age, sex and housing on the trabecular bone of laying strain domestic fowl.
Wilson, S.; Duff, S.R.I.; Whitehead, C.C.
London : British Veterinary Association; 1992 Jul.
Research in veterinary science v. 53 (1): p. 52-58; 1992 Jul. Includes references.

Language: English

Descriptors: Fowls; Osteoporosis; Osteomalacia; Bones; Volume; Age differences; Sex differences; Normal values; Cages; Floor pens

Abstract: To determine the effects of age, sex and housing on trabecular bone volume, samples were collected from groups of male and female domestic fowl housed in cages or floor pens from four to 60 weeks old.

Between 25 and 60 weeks old, trabecular bone volume decreased by 25 per cent in sections of free thoracic vertebrae (T5) from female birds, the loss occurring at an earlier age in caged birds. Over the sample period, TBV in male caged birds diminished by 35 per cent, but male floor birds showed no reduction in trabecular bone volume. At 60 weeks, trabecular bone volume was 30 per cent greater in male caged birds and 40 per cent greater in male floor birds than in the corresponding females. In reproductively active females, no trabecular osteoid was observed, indicating no new trabecular bone formation. However, trabecular osteoid was present in two birds aged 60 weeks which had regressed ovaries. Osteomalacia was not seen in any of the bone samples.

98 NAL Call. No.: 47.8 AM33P
Effects of air humidity during incubation and age after hatch on heat tolerance of neonatal male and female chicks.
Hamdy, A.M.M.; Hel, W. van der; Henken, A.M.; Galal, A.G.; Abd-Elmoty, A.K.I. Champaign, Ill. : Poultry Science Association; 1991 Jul. Poultry science v. 70 (7): p. 1499-1506; 1991 Jul. Includes references.

Language: English

Descriptors: Chicks; Humidity; Heat tolerance; Sex differences; Weight losses; Body weight; Newborn animals; Hatching date; Hatching weight; Egg weight; Heat stress; Heat production; Body temperature; Mortality

Abstract: Effects of incubation 45 versus 55% relative humidity (RH) and early versus late hatching time on heat tolerance of neonatal male and female chicks were studied. Chicks were exposed for 48 h to temperatures of 35 (Experiment 1), 37 (Experiment 2), or 39 C (Experiment 3). Chicks that hatched from eggs incubated at 45% RH were lighter at hatch than chicks that hatched from eggs incubated at 55% RH. Chicks that hatched from eggs incubated at 55% RH lost more body weight and water during heat exposure than those that hatched from eggs incubated at 45% RH. Body weight and water loss during heat exposure of chicks that hatched early and late was similar. However, chicks that hatched late maintained their initial heat production and respiratory quotient better during heat exposure than chicks that hatched early. Body weight and water loss of male and female chicks was similar. At 37 and 39 C, heat production of chicks fell to lower values during the 2nd day of exposure compared with the 1st day. It was concluded that chicks that hatched late, i.e., with a short holding period in the hatcher, and coming from eggs incubated at 45% RH had increased heat tolerance in comparison with the other chicks.

99 NAL Call. No.: 47.8 AM33P
Effects of amino acid restriction during starter and grower periods on subsequent performance and incidence of leg disorders in male Large White turkeys.
Waldroup, P.W.; Adams, M.H.; Waldroup, A.L.
Champaign, Ill. : Poultry Science Association; 1993 May.
Poultry science v. 72 (5): p. 816-828; 1993 May. Includes references.

Language: English

Descriptors: Turkeys; Amino acids; Legs; Abnormalities; Diet; Growth; Performance; Carcass composition; Restricted feeding; Body weight; Feed conversion efficiency; Age differences

Abstract: Male Nicholas Large White turkeys were fed diets formulated to meet a minimum of 100, 110, or 120% of NRC (1984) amino acid recommendations. There were three periods when 75% of recommended standards were fed: 0 to 3 wk, 0 to 6 wk, or 6 to 12 wk. A fourth (control) group was not restricted at any time. Four pens of 12 males were fed each amino acid by restriction combination. At 18 wk, leg scores were assigned to all birds and representative samples of birds processed for parts yield. All birds fed restricted diets had significantly lower BW at 18 wk than unrestricted controls but did not differ in feed utilization. Dietary amino acid levels significantly influenced BW and feed utilization, but there was no interaction with restriction times. There were no significant effects of amino acid levels or restriction times on incidence of leg disorders. Breast meat yields (quantity and percentage of carcass) were significantly influenced by both restriction time and amino acid levels. There seemed to be little if any compensatory gain following amino acid restriction in these studies.

100 NAL Call. No.: 41.8 AV5
Effects of ascorbic acid on stress and disease in chickens. Gross, W.B.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 688-692; 1992 Jul. Includes references.

Language: English

Descriptors: Fowls; Ascorbic acid; Stress; Fowl diseases; Disease resistance; Furaltadone; Neutrophils; Lymphocytes; Corticotropin; Feed conversion efficiency; Newcastle disease virus; Mycoplasma gallisepticum; Escherichia coli

Abstract: White Leghorn chickens were given feed containing 100 mg of ascorbic acid (AA)/kg. One day later, treated chickens and a similar group of unmedicated control chickens were chilled for 1 hour at 6 C, exposed to an unusual sound, fasted, or subjected to rough handling. Heterophil:lymphocytes (H:L) ratios were determined one day later. The AA-treated birds had significantly lower H:L ratios than untreated controls. Chickens that received a diet containing AA had lower H:L ratios than controls (0.86 vs. 1.65) following administration of adrenocorticotropic hormone. Chickens fed a diet containing AA showed increased resistance to a combined Newcastle disease virus-Mycoplasma gallisepticum infection and to a secondary Escherichia coli infection, as well as to a primary E. coli challenge infection. The effects of AA and an antibacterial drug (furaltadone) were additive. In all experiments, the optimum dose of AA was 100 mg/kg of feed. There was a negative correlation between AA level in the diet and feed efficiency.

101 NAL Call. No.: 47.8 AM33P
Effects of bird density on Salmonella contamination of prechill carcasses. Waldroup, A.L.; Skinner, J.T.; Hierholzer, R.E.; Kopek, J.M.; Waldroup, P.W. Champaign, Ill. : Poultry Science Association; 1992 May. Poultry science v. 71 (5): p. 844-849; 1992 May. Includes references.

Language: English

Descriptors: Broilers; Salmonella typhimurium; Carcasses; Stocking density; Floor pens; Feed intake; Feed conversion; Mortality; Infections; Incidence

Abstract: Two similar trials were conducted to evaluate the effects of bird density on Salmonella contamination of processed broilers. Commercial strain broiler clucks were reared in floor pens on new litter at densities of 557, 619, 697, 796, 929, and 1,115 cm2 per bird. Twenty percent of the chicks in each density were gavaged directly into the crop with .5 mL of 108 nalidixic-acid-resistant (NAR) Salmonella typhimurium on Day 2. Twenty percent of the uninoculated birds in each density category were processed at 42 days. Prechill carcasses were evaluated for NAR Salmonella incidence using the whole carcass rinse technique and a mechanical shaking device. The resulting NAR Salmonella contamination rates (from lowest to highest bird densities) were as follows: 55, 4.2, 35.7, 34.3, 88.9, and 20% in Trial 1; and 30, 20.8, 28.6, 50, 58.3, and 30% in Trial 2. A random sample of the prechill carcasses of gavaged birds indicated a contamination rate of 13.8% in Trial 1 and 61.1% in Trial 2. The NAR Salmonella contamination rates of the prechill carcasses did not appear to be affected by the bird densities evaluated in these trials. Feed intake and body weight at 42 days were adversely affected by the highest bird density, but feed utilization was not affected.

102 NAL Call. No.: QP1.C6
The effects of chronic exposure to elevated environmental temperature on intestinal morphology and nutrient absorption in the domestic fowl (Gallus domesticus).
Mitchell, M.A.; Carlisle, A.J.
Elmsford, N.Y.: Pergamon Press; 1992 Jan.
Comparative biochemistry and physiology : A : Comparative physiology v. 101 (1): p. 137-142; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Jejunum; Galactose; Methionine; Intestinal absorption; Morphology; Environmental temperature; Heat stress; Food intake; Growth rate; Triiodothyronine; Thyroxine; Glucagon; Hypothyroidism

Abstract: Exposure of growing broiler chickens to elevated environmental temperature (35 degrees C) for two weeks, markedly reduced food intake (29%) and growth rate (37%) compared to birds maintained at 22 degrees C. These changes in growth were accompanied by increased in vivo jejunal uptakes of galactose (36%) and methionine (50%) measured per unit intestinal dry weight. Both the electrogenic (phloridzin sensitive) and non-electrogenic (phloridzin insensitive) components of galactose absorption were increased by 24 and 52% respectively during the chronic heat stress. The size of the absorptive compartment may be reduced by the heat stress as reflected by decreased villus heights (19%) and wet (26%) and dry (31%) weights per unit length of jejunum. It is suggested that the changes in hexose and amino acid during chronic exposure to elevated ambient temperature may reflect adaptations to optimise nutrient absorption in the face of reduced nutrition and decreases in the size of the absorptive compartment. A functional hypothyroidism (plasma luminal T3 decreased by 66%) associated with heat stress may contribute to the observed alterations in jejunal structure and function.

103 NAL Call. No.: 47.8 AM33P
The effects of darkling beetles on broiler performance. Skewes, P.A.; Monroe, J.L.
Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 1034-1036; 1991 Apr.
Includes references.

Language: English

Descriptors: Broilers; Alphitobius diaperinus; Infestation; Litter; Fowl diseases; Mortality; Feed conversion

Abstract: Six polyvinylchlorine pipe darkling beetle traps were placed in 20 commercial broiler production facilities, and the relative level of beetle infestation was determined from weekly sampling during 4 wk of the growout period. The average number of beetles found at each facility was compared with the following production parameters: mortality, feed conversion, condemnation rate, and production cost. In the 20 commercial broiler flocks evaluated, the level of darkling beetles within the facility was not related to any of the production parameters measured.

104 NAL Call. No.: 47.8 AM33P
Effects of dietary aluminum and niacin on chick tibiae. Johnson, N.E.; Harland, B.F.; Ross, E.; Gautz, L.; Dunn, M.A. Champaign, Ill. : Poultry Science Association; 1992 Jul. Poultry science v. 71 (7): p. 1188-1195; 1992 Jul.
Includes references.

Language: English

Descriptors: Chicks; Tibia; Dietary minerals; Aluminum; Nicotinic acid; Bone strength; Bone ash; Feed intake; Feed conversion efficiency; Mineral content

Abstract: Effects of dietary aluminum chloride and niacin on bone mineral content and bone structural measurements were studied using young male Leghorn chicks. Standard chick rations containing .8% Ca and .4 or .5% available P were fed as control diets in three experiments. Experimental diets contained .05, .1, or.3% Al, or 1.0 or 1.5% niacin, or both and were fed for 2 wk. Tibia weights were decreased by 1.5% niacin, .3% Al, and by .1% Al plus 1.5% niacin ($P < .05$). Breaking strength of tibiae was decreased ($P < .05$) by 1.5% niacin, .1% Al, and .1% Al plus 1.5% niacin. Ultimate stress, which is force per unit area, was decreased by .3% Al and .05% Al plus 1.5% niacin ($P < .05$). Niacin had no significant effect on bone mineral content. In Experiment 3, .3% Al decreased P, Ca, Mg and Zn content of the tibiae ($P < .05$). These findings indicate that feeding high levels of supplemental niacin results in decreased bone strength in chicks with no change in mineral content of the tibiae. Aluminum fed at levels of .3% of the diet causes a decrease in bone strength with concomitant changes in bone mineral content.

105 NAL Call. No.: 47.8 AM33P
Effects of dietary amino acids levels on bone development in broiler chickens. Skinner, J.T.; Beasley, J.N.;

Waldroup, P.W.
Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 941-946; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Bone formation; Tibia; Bone ash; Dietary minerals; Bone strength; Growth; Calcium; Amino acids; Feed intake; Histology; Bone mineralization

Abstract: Studies with several species suggest that dietary protein may influence bone calcification. Six pens of six male broilers in two consecutive trails were fed from 1 to 21 days either .5 or 1.0% Ca in diets with 80, 90, 100, 110, or 120% of the amino acid (AA) standards suggested by Thomas et al. in 1986 at a constant .46% nonphytate P. The BW add feed conversion rate (FCR) were determined, and bone measurements were taken. Both AA and Ca levels influenced BW with an interaction of the two factors. The Ca level, but not AA level influenced FCR. The lower Ca level inhibited feed intake. Increasing AA levels reduced bone ash but did not affect tibia breaking strength. There was an interaction of AA and Ca on tibia ash, tibia weight, and tibia length. The higher AA levels supported normal linear growth of the tibia but decreased rate of calcification, especially in the diets with .5% Ca. In diets with marginal Ca levels, higher AA levels may reduce bone calcification.

106 NAL Call. No.: 47.8 AM33P
Effects of dietary fat source on sudden death syndrome and cardiac sarcoplasmic reticular calcium transport in broiler chickens. Chung, H.C.; Guenter, W.; Rotter, R.G.; Crow, G.H.; Stanger, N.E. Champaign, Ill. : Poultry Science Association; 1993 Feb. Poultry science v. 72 (2): p. 310-316; 1993 Feb. Includes references.

Language: English

Descriptors: Broilers; Dietary fat; Tallow; Sunflower oil; Mortality; Heart diseases; Incidence; Phospholipids; Calcium; Cell membranes

Abstract: Wheat and soybean diets supplemented with either tallow or sunflower oil (SFO) were fed to broiler chicks. Variables examined included performance, incidence of sudden death syndrome (SDS), and cardiac sarcoplasmic reticular (SR) calcium transport. The phospholipid content of head tissues was also determined. Birds fed the SFO diet gained significantly ($P < .05$) more weight over the first 21 days of age and had a significantly better feed:gain ratio ($P < .01$). The incidence of SDS mortality up to 39 days of age was also lower ($P < .05$) for SFO-fed birds than for those fed the tallow diet. Calcium (45Ca2+) uptake and calcium-magnesium 5'-adenosinetriphosphatase (Ca2+ + Mg2+-ATPase) activity in cardiac SR vesicles did not differ due to diet ($P > .05$). However, compared with similar weight pen-mates showing no disease signs, SDS birds had depressed 45Ca2+ uptake ($P < .01$) and Ca(2+) + Mg2+-ATPase activity ($P < .05$) of cardiac SR vesicles. The phosphatidylcholine concentration in the cell membranes of heart tissue of tallow-fed birds was significantly higher ($P < .05$) than in SFO-fed chicks. No differences were seen in other phospholipid constituents. The SDS birds, however, had significantly ($P < .05$) lower phosphatidylethanolamine plus phosphatidylglycerol, sphingomyelin, and total phospholipid concentrations in the heart tissues than the pen-mate controls. The results support the hypotheses that SDS in broilers is a cardiac dysfunction associated with defective cardiac SR membrane function and that dietary fat type is implicated with the syndrome.

107 NAL Call. No.: 47.8 AM33P
Effects of different coccidiostats on performance of large white turkeys. Cabel, M.C.; Waldroup, P.W. Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 241-249; 1991 Feb. Includes references.

Language: English

Descriptors: Turkeys; Coccidia; Coccidiosis; Coccidiostats; Liveweight gain; Body weight; Dietary fat; Feed intake; Feed conversion

Abstract: Two trials were conducted to evaluate the effects of feeding various anticoccidial products to turkeys to 8 wk and then growing to market age (16 wk for hens and 20 wk for toms). Anticoccidials evaluated in the first trial included amprolium at 187.5 mg/kg for 0 to 4 wk and 125 mg/kg for 4 to 8 wk butynorate at 375 mg/kg for 0 to 8 wk, monensin at both 60 (MON-60) and 100 mg/kg for 0 to 8 wk; zoalene at 187.5 mg/kg for 0 to 4 wk and 125 mg/kg for 4 to 8 wk; and halofuginone at 3 mg/kg for 0 to 8 wk. In the second trial MON-60 was replaced by a combination of sulfadimethoxine (62.5 mg/kg) plus ormetoprim (37.5 Mg/kg) for 0 to 8 wk. In each trial each treatment was fed to four pens of 16 hens and four pens of 12 toms. Several of the anticoccidials significantly influenced the weight of both hens and toms by producing lower weights at the end of the 8-wk feeding period than birds in other treatments. However, after removal of the anticoccidials, compensatory gains were observed in almost every instance. Significant effects of previous anticoccidial feeding were noted on body weight of hens at 16 wk but not on weights of toms at 20 wk.

108 NAL Call. No.: 47.8 Am33P
Effects of different floor types and levels of washing of waterers on broiler performance and bacteria count of drinking water.
Andrews, L.D.; Stamps, L.K.; Moore, R.W.; Newberry, L.A. Champaign, IL : Poultry Science Association, 1921-; 1993 Jul. Poultry science v. 72 (7): p. 1224-1229; 1993 Jul. Includes references.

Language: English

Descriptors: Broilers; Floors; Drinkers; Drinking water; Bacterial count; Broiler performance; Washing; Body weight; Breast blisters; Follicles; Carcass quality; Feed conversion; Mortality

Abstract: The objective of the present experiment was to determine the effect of different flooring materials and washing of waterers on broiler performance. The floor treatments were 1) black, plastic-coated expanded metal, relatively rigid (B); 2) white plastic, semi-rigid, with rectangular openings (WR); 3) white plastic, semi-rigid, with square openings (WS); and 4) 3 cm of rice huh litter (C). One hanging waterer was placed in each pen. Wash treatments were 1) trough and bell washed every Monday, Wednesday, and Friday (AW); 2) wash trough only on Monday, Wednesday, and Friday (TW); and 3) the waterers were never washed after the 2nd wk (NW). Broilers reared on C has significantly lower BW than those broilers on B floors. Broilers reared on the B and WS floors had significantly higher breast blister scores and percentage of birds with blisters than broilers reared on C floors. Broilers reared on C had lower enlarged feather follicle scores than those reared on afl raised floors and a lower percentage of enlarged feather follicles than those broilers reared on WS or WR floors. Broilers reared on WS+TW had significantly better feed conversion than WS+AW, B+TW, and B+AW treatments. Broilers reared on WR+TW treatment were significantly higher in breast blister score than broilers reared on WR+AW, C+TW, and C+AW treatments. Broilers reared on C+TW and C+AW treatments were significantly lower in breast blister score except for broilers reared on C+NW, WR+AW, and WS+AW treatments. Broilers reared on C+NW treatment were significantly lower in enlarged feather follicle score than those broilers reared on B+TW, WR+AW, and WS+NW treatments. Broilers reared on C+TW and C+AW were significantly lower in enlarged feather follicle score than all treatments except C+NW treatment. Broilers reared on WR+TW and WS+AW treatments were significantly higher in percentage enlarged feather follicles than all C treatments and B+NW treatment. Broilers reared on C+TW and C+AW treatments had significantly lower percentage enlarged feather follicles than all treatments except C+NW and B+NW treatments. Little difference was found among floor types and wash treatments for bacteria count of the drinking water.

109 NAL Call. No.: QL750.A6
Effects of environmental enrichment and gentle handling on behaviour and fear responses of transported broilers.
Nicol, C.J.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Jun.
Applied animal behaviour science v. 33 (4): p. 367-380; 1992 Jun. Includes references.

Language: English

Descriptors: Broilers; Transport of animals; Fearfulness; Animal behavior; Environment; Enrichment; Handling

110 NAL Call. No.: 47.8 AM33P
Effects of feed restriction and subsequent gorging with limited access to water on male turkeys fed graded levels of monensin.
Watkins, K.L.; Novilla, M.N.; Campi, T.W.
Champaign, Ill. : Poultry Science Association; 1993 Apr. Poultry science v. 72 (4): p. 677-683; 1993 Apr.
Includes references.

Language: English

Descriptors: Turkeys; Restricted feeding; Diet; Monensin; Toxicity; Unrestricted feeding; Water intake; Feed intake; Performance; Muscles; Histopathology

Abstract: A floor pen study was conducted to determine the effects of feed restriction with subsequent gorging and water restriction on 5- to 10-wk-old toms fed graded levels of monensin. Eight treatments were factorially arranged with four levels of dietary monensin (0, 60, 100, and 140 ppm) and two feeding-watering regimens (ad libitum and restricted). Restricted birds had access to feed daily from 0800 to 1200 h and had no access to water during this period. The ad libitum birds had full access to feed and water. Feed restriction decreased ($P < .01$) feed intake, body weight gain, and mortality but had no effect ($P > .10$) on feed:gain ratio. The mortality rate of restricted birds was 82% less ($P < .01$) than that of ad libitum birds. Monensin fed at either 100 or 140 ppm reduced ($P <.05$) the feed intake of ad libitum birds, but had no effect on the feed intake of restricted birds. Increasing the level of dietary monensin linearly increased ($P < .05$) gain, however, this effect was more evident in restricted birds than in ad libitum birds. Feed efficiency was linearly improved ($P < .01$) by increasing levels of dietary monensin regardless of feeding regimen. Monensin had no ($P > .10$) influence on the incidence of mortality. No treatment-related abnormalities were observed during either interim or terminal necropsies. Neither clinical signs of ionophore toxicity nor pathologic findings attributed to monensin treatment were observed during the study. Under the conditions of this experiment, the gorging of monensin treated (60 to 140 ppm) feed without access to water will not adversely affect the health status, or increase the mortality rate, of 5- to 10-wk-old male turkeys.

111 NAL Call. No.: 47.8 AM33P
Effects of feeding Fusarium moniliforme culture material, containing known levels of fumonisin B1, on the young broiler chick.
Weibking, T.S.; Ledoux, D.R.; Bermudez, A.J.; Turk, J.R.; Rottinghaus, G.E.; Wang, E.; Merrill, A.H. Jr
Champaign, Ill. : Poultry Science Association; 1993 Mar. Poultry science v. 72 (3): p. 456-466; 1993 Mar.
Includes references.

Language: English

Descriptors: Chicks; Gibberella fujikuroi; Mycotoxins; Dosage effects; Sphingosine; Culture media; Broilers; Feed intake; Liveweight gain; Feed conversion; Blood chemistry; Blood picture; Organs; Weight; Liver

Abstract: The effects of feeding Fusarium moniliforme culture material, containing known concentrations of fumonisin B1 (FB1), were studied in broiler chicks. Day-old chicks were allotted randomly to dietary treatments containing 0, 1.02, 2.04, 3.06, 4.08, 5.10, 6.12, and 7.14% fumonisin culture material (FCM). These levels of FCM supplied 0, 75, 150, 225, 300, 375, 450, and 525 mg of FB1/kg of feed. Each dietary treatment was fed to four pen replicates of six birds each for 21 days. Chicks fed FCM that supplied 450 and 525 mg FB1/kg diet had lower ($P < .05$) feed intakes and BW gains; increased ($P < .05$) liver and kidney weights; and increased ($P < .05$) mean cell hemoglobin, and mean cell hemoglobin concentrations. Compared with controls, chicks fed FCM had increased ($P < .05$) free sphinganine levels and sphinganine:sphingosine ratios. Treatment-associated histological lesions were only observed in the liver of chicks fed diets containing FCM that supplied 225 mg FB1/kg or higher. Diets containing FCM that supplied levels as low as 75 mg FB1/kg affected the physiology of chicks by increasing free sphinganine levels and sphinganine:sphingosine ratios. Because inhibition of sphingolipid biosynthesis has been hypothesized as the mechanism of action of FB1, this suggests that diets containing 75 mg FB1/kg FCM may be toxic to young broiler chicks.

112 NAL Call. No.: 47.8 Am33P
Effects of formaldehyde fumigation of housing on carotenoid pigmentation in three breeds of chickens.
Allen, P.C.
Champaign, IL : Poultry Science Association, 1921-; 1993 Jun.
Poultry science v. 72 (6): p. 1040-1045; 1993 Jun. Includes references.

Language: English

Descriptors: Chicks; Breed differences; Formaldehyde; Fumigation; Carotenoids; Broilers; Xanthophyll; Blood plasma; Fowl feeding; Parasitoids; Body weight

Abstract: Three breeds of chickens (two broiler breeds, A and B, and one layer breed, C) were raised from 1 day to 3 wk of age in either standard housing or housing additionally fumigated with formaldehyde. Groups of chicks from each breed in both housings received either regular poultry starter ration or this ration supplemented with marigold meal. At 3 wk of age, chicks of all three breeds had higher (111, 113, and 115%) mean body weights when raised in fumigated housing. There was no significant effect of supplemental carotenoids on body weight. Chicks of all three breeds raised in fumigated housing had significantly higher plasma carotenoid concentrations when fed either regular or supplemented feed, and, with the exception of Breed A on regular feed, also had significantly increased skin carotenoid values. No significant differences among breeds in plasma or skin carotenoid values were seen in chicks fed regular ration. However, significant differences were seen among groups of chicks fed supplemental carotenoids. The layer breed, C, had the highest percentage increase in carotenoid pigmentation when fed the carotenoid-supplemented diet in fumigated housing.

113 NAL Call. No.: 47.8 AM33P
Effects of genetic strain and light management on the reproductive performance of turkeys.
Havenstein, G.B.; Nestor, K.E.; Bacon, W.L.; Renner, P.A. Champaign, Ill. : Poultry Science Association; 1992 Oct. Poultry science v. 71 (10): p. 1590-1594; 1992 Oct. Includes references.

Language: English

Descriptors: Turkeys; Strain differences; Laying performance; Light regime; Lighting; Energy consumption; Costs

Abstract: The laying performance of six genetic strains of turkeys, which have been bred and maintained at the Ohio Agricultural Research and Development Center, Wooster, OH, was compared under three laying house lighting regimens over a period of 3 yr. Light Treatment 1 (L1) consisted of 14 h of continuous light (L) and 10 h of dark (D; 14L:10D) throughout the laying period. Treatment 2 (L2) consisted of 14 h of intermittent light (IL, 15 min L and 45 min D/h) followed by 10 h of continuous dark. The IL treatment was started following a period (6 wk) in which the hens were trained to use the trapnests. Thus, during the first 6 wk of their laying period, L2 hens were also provided 14L:10D. Treatment 3 (L3) hens were provided the same program as L1 for the first 14 wk of the laying period. They were then moved to a continuous period of 19L:5D for the remainder of the laying period. All eggs produced were recorded through 180 days after the first egg was laid. Traits studied included: the number of days to first egg after light stimulation; the number of eggs produced through 84, 120, and 180 days after the first egg was laid; the average clutch length; the maximum clutch length; the total days lost to broodiness; the rate of lay; and the effective length of the laying period. Highly significant differences ($P < .01$) were observed among the strains used for all traits measured. Light treatments showed no significant effects on any trait measured. Thus, from the present studies, the delayed IL program provides an economically attractive management program for environmentally controlled turkey breeder houses. Savings of 75% of the light energy used during approximately 6 mo of the lay period were realized. Economically, the L3 program would be disadvantageous, because electrical usage was increased 35% after the period of daylength increase with no apparent increase in productivity.

114 NAL Call. No.: 47.8 AM33P
Effects of high temperature on growth and efficiency of male and female broilers from lines selected for high weight gain, favorable feed conversion, and high or low fat content.

Cahaner, A.; Leenstra, F.
Champaign, Ill. : Poultry Science Association; 1992 Aug.
Poultry science v. 71 (8): p. 1237-1250; 1992 Aug. Includes references.

Language: English

Descriptors: Broilers; Environmental temperature; Liveweight gain; Body weight; Body composition; Feed conversion; Protein efficiency ratio; Line differences; Sex differences; Age differences; Selection criteria

Abstract: Male and female broiler chicks from five different broiler crosses (WI, LF, and HF = Israeli chicks selected for high body weight gain, and low and high abdominal fat, respectively; FC and WN = Dutch chicks selected for favorable feed conversion and high body weight gain, respectively) were raised at a high ambient temperature (32 to 33 C). Weight gain, protein and fat content in the carcass and feed, and protein efficiency were determined at 4, 6, and 8 wk of age. The effect of the high temperature was evaluated by comparing these data with those of similar chicks raised at a normal temperature (20 to 33 C) up to 6 wk of age. The reductions in body weight, protein gain, and feed and protein efficiency due to the high temperature increased with age and were much larger in males than in females. This trend was more pronounced in WI and WN chicks than in LF, HF, and FC chicks. Females of WI and WN crosses were as heavy as males at 6 wk and heavier at 8 wk. In LF, HF, and FC crosses, both sexes had similar weights at 8 wk. Growth reduction due to the high temperature was largest in the groups with the highest growth rate at the normal temperature WI and WN males). Chicks with a lower growth rate and a higher capacity for energy storage in fat depots (all females, HF chicks), or a higher capacity for heat loss (FC chicks), were less affected by the high temperature. The results suggest that females should be preferred over males for broiler production in hot facilities or locations. Broiler genotypes selected for feed efficiency at the expense of fast growth may allow for a more profitable broiler production in high-temperature regions.

115 NAL Call. No.: 47.8 AM33P
Effects of light sources and the presence or absence of males on reproduction of female breeder turkeys.
Felts, J.V.; Leighton, A.T. Jr; Denbow, D.M.; Hulet, R.M. Champaign, Ill. : Poultry Science Association; 1992 Nov.
Poultry science v. 71 (11): p. 1817-1822; 1992 Nov. Includes references.

Language: English

Descriptors: Turkeys; Turkey egg production; Artificial light; Fluorescent light; Lighting; Males; Laying performance; Broodiness; Egg quality

Abstract: The effects of sodium vapor (SV), daylight fluorescent (DF), and incandescent (IN) light sources and the influence of the presence or absence of males on reproduction of female turkeys were evaluated. Hens under SV and DF lights consistently laid more eggs than those under IN lights. There were no significant differences in hen-day egg production among hens in the physical presence of males and hens allowed visual and vocal contact with males. However, hen-day egg production was significantly lower for females in pens in which males were absent. Fertility, hatchability, days to first egg, egg weight, and egg specific gravity were unaffected by light source treatments or by the presence or absence of males in pens of females.

116 NAL Call. No.: 410 B77
Effects of long-term deprivation of sand on dustbathing behaviour in laying hens.
Liere, D.W. van; Wiepkema, P.R.
London : Academic Press; 1992 Apr.
Animal behaviour v. 43 (pt.4): p. 549-558; 1992 Apr. Includes references.

Language: English

Descriptors: Hens; Dust bathing; Sand; Deprivation

Abstract: During 21 weeks of sand deprivation, intact and beak-trimmed laying hens, Gallus gallus domesticus, dustbathed on a barren floor (sham-dustbathing). The amount of dustbathing increased during the experiment to the same level (in the intact hens) as in non-deprived control hens, or to a higher level (in the beak-trimmed hens). During deprivation, the proportion of complete sham-dustbaths increased, while the consummatory rubbing behaviour within these sham-dustbaths seemed to become more dominant than in baths in sand. After 16 weeks deprivation, abnormal sham-dustbaths started with rubbing instead of appetitive tossing behaviour. The hypothesis that the motivation to dustbathe increases during deprivation was supported, but on the first day after the long-term deprivation there was no significant compensation for the deprived bathing in sand and, instead, signs of conflict bathing and fear were found. Thus, sand as a bathing material becomes unfamiliar after long-term deprivation. In a second experiment, intact hens were deprived of sand for up to 30 weeks, but at either 3-5 or 28-30 weeks they were prevented from sham-dustbathing for 3 consecutive days. As they compensated for the deprived sham-dustbathing activity thereafter, the performance of dustbathing per se may be facilitated intrinsically.

117 NAL Call. No.: 47.8 B77
Effects of nest linings, pecking strips and partitioning on nest use and behaviour in modified battery cages.
Reed, H.J.; Nicol, C.J.
Oxfordshire : Carfax Publishing Company; 1992 Sep.
British poultry science v. 33 (4): p. 719-727; 1992 Sep. Includes references.

Language: English

Descriptors: Hens; Battery cages; Nests; Reproductive behavior; Laying performance

118 NAL Call. No.: SF481.J68
Effects of potassium chloride supplementation of growth of heat-distressed broilers.
Smith, M.O.; Teeter, R.G.
Athens, Ga. : Applied Poultry Science, Inc; 1992.
Journal of applied poultry research v. 1 (3): p. 321-324; 1992. Includes references.

Language: English

Descriptors: Oklahoma; Chicks; Heat stress; Potassium chloride; Drinking water; Liveweight gain

119 NAL Call. No.: 47.8 AM33P
Effects of rearing density and feeder and waterer spaces on the productivity and fearful behavior of layers.
Anderson, K.E.; Adams, A.W.
Champaign, Ill. : Poultry Science Association; 1992 Jan.
Poultry science v. 71 (1): p. 53-58; 1992 Jan. Includes references.

Language: English

Descriptors: Hens; Stocking density; Feed dispensers; Drinkers; Fearfulness; Body weight; Liveweight gain; Feed intake; Feed conversion; Egg production

Abstract: Two groups of White Leghorn pullets reared in cages were used to study the effects of rearing density and feeder and waterer spaces on their performance and fearful behavior. In Experiment 1, rearing densities of 221, 249, 277, and 304 cm(2) per bird, 5.4 cm feeder space per bird, and a cup waterer to pullet ratio of 1:7 had no significant effect on 18-wk body weight, body weight uniformity, body weight gain, age at sexual maturity, feed consumption, and mortality rate during the laying period. In Experiment 2, pullets reared at a density of 193 versus 221 cm(2) had lower (P<.001) 18-wk body weights but increased (P<.001) weight gain during the laying period. Pullets reared with 2.7 versus 5.4 cm of feeder space weighed less (P<.001) at 18 wk, but gained (P<.001) more weight and consumed more (P<.05) feed during the laying period. A cup waterer to pullet ratio of 1:14 versus 1:7 increased (P<.05) age at sexual maturity and body weight gain. Density had no consistent effect on egg production in either experiment. There were no carryover effects of rearing density in Experiment 1 or

density, and feeder and waterer space in Experiment 2 on fearful behavior. Hens were more (P<.001) fearful at 34 wk of age (peak production) than at 54 wk of age (postpeak production). The negative effects associated with floor, feeder, and waterer spaces during the rearing period were transitory and did not persist into the production period.

120 NAL Call. No.: 47.8 AM33P
Effects of sex, heat stress, body weight, and genetic strain on the dietary lysine requirement of broiler chicks.
Han, Y.; Baker, D.H.
Champaign, Ill. : Poultry Science Association; 1993 Apr.
Poultry science v. 72 (4): p. 701-708; 1993 Apr. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Body weight; Strain differences; Lysine; Dosage effects; Sex differences; Environmental temperature; Diet; Growth rate; Nutrient requirements

Abstract: Experiments were carried out to investigate the effects of sex, heat stress (37 C), body weight (heavy and light within strain), and strain of chicks on the dietary lysine requirement of chicks during 8 to 22 days posthatching. A lysine-deficient basal diet (.64% total lysine, 23% CP, 3,200 kcal MEn/kg) containing corn, feather meal, and soybean meal was supplemented with graded levels of L-lysine.HCl to produce growth response curves. The lysine-deficient diet contained .52% true digestible lysine as determined with a precision-fed cecectomized adult cockerel assay (Experiment 1). Hubbard X Hubbard chicks were used in Experiment 2 and New Hampshire X Columbian crossbred chicks were used in Experiments 3 and 4. Experiment 2 compared lysine requirements of male and female chicks. Weight gains between sexes were similar when diets were deficient in lysine, but males grew faster than females when lysine-adequate diets were fed. Male chicks required a higher level of dietary lysine than females for both maximal weight gain and feed efficiency. Also, regardless of sex, the lysine requirement (percentage of diet) for maximal feed efficiency was higher than that for maximal weight gain. In Experiment 3, heat stress reduced weight gain and feed intake of both males and females by about 22%, and it increased the lysine requirement of female but not male chicks. In Experiment 4, light and heavy chicks were selected from male and female populations. Heavy and light chicks exhibited the same dietary lysine requirement for maximal growth. However, the lysine requirement for maximal feed efficiency was higher for heavy birds than for light birds. There was no strain effect on the lysine requirement.

121 NAL Call. No.: 47.8 AM33P
The effects of shuttle programs upon the growth of broilers and the development of immunity to Eimeria species.
Chapman, H.D.; Hacker, A.B.
Champaign, Ill. : Poultry Science Association; 1993 Apr.
Poultry science v. 72 (4): p. 658-663; 1993 Apr. Includes references.

Language: English

Descriptors: Broilers; Eimeria; Coccidiostats; Coccidiosis; Litter; Oocysts; Body weight; Feed conversion; Intestines; Lesions; Immunity

Abstract: A floor-pen trial was conducted to investigate the effects of different shuttle programs upon the growth of broilers to 8 wk of age. Nicarbazin, halofuginone, and robenidine, when included in the starter feed for 3 wk, were effective in preventing lesions due to Eimeria. The effects of medication upon performance were apparent, medicated groups gaining more weight by 6 wk and having a lower feed conversion at 6, 7, and 8 wk than the unmedicated controls. There were no significant differences in body weight at 6, 7, or 8 wk or feed conversion at 6 or 7 wk among the medicated groups, whether medication was withdrawn for 7 or 14 days. A decrease in the number of small and medium oocysts in the litter was observed as the trial progressed. Few large oocysts (Eimeria maxima) were seen in the medicated groups. Numbers of oocysts did not increase following withdrawal of medication. Birds from all medicated groups were challenged at 6 wk with oocysts of Eimeria

acervulina, Eimeria maxima, or Eimeria tenella. Weight gains were similar to that of the unchallenged controls, indicating that they had acquired immunity to these species of Eimeria.

122 NAL Call. No.: QL750.A6
Effects of social status on the performance of non-interactive behaviours in small groups of laying hens.
Bradshaw, R.H.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Mar.
Applied animal behaviour science v. 33 (1): p. 77-81; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Social dominance; Groups; Animal behavior; Aggressive behavior; Animal welfare; Interactions

123 NAL Call. No.: 47.8 AM33P
Effects of sodium bicarbonate and potassium chloride drinking water supplementation. 1. Performance and exterior carcass quality of broilers grown under thermoneutral or cyclic heat-stress conditions.
Whiting, T.S.; Andrews, L.D.; Stamps, L.
Champaign, Ill. : Poultry Science Association; 1991 Jan. Poultry science v. 70 (1): p. 53-59; 1991 Jan. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Potassium chloride; Sodium bicarbonate; Water intake; Alkalosis; Body weight; Carcass weight; Follicles; Feathers; Infections; Skin diseases; Cyclic fluctuations

124 NAL Call. No.: 41.8 V643
Effects of spatial allowance, group size and perches on the behaviour of hens in cages with nests.
Reed, H.J.; Nicol, C.J.
London : Bailliere Tindall; 1992 Nov.
British veterinary journal v. 148 (6): p. 529-534; 1992 Nov. Includes references.

Language: English

Descriptors: Hens; Cages; Nests; Animal welfare; Stocking density; Animal behavior; Perches; Excreta

125 NAL Call. No.: 47.8 AM33P
The effects of stress, Escherichia coli, dietary ethylenediaminetetraacetic acid, and their interaction on tissue trace elements in chicks. Tufft, L.S.; Nockels, C.F.
Champaign, Ill. : Poultry Science Association; 1991 Dec. Poultry science v. 70 (12): p. 2439-2449; 1991 Dec. Includes references.

Language: English

Descriptors: Chicks; Stress; Edta; Escherichia coli; Copper; Iron; Zinc; Blood serum; Organs; Weight; Infection; Body weight; Liver; Spleen; Bursa fabricii; Kinetics

Abstract: The present study determined effects of Escherichia coli infection, crowding stress, and EDTA supplementation on Cu, Fe, and Zn levels in the serum, liver, bursa of Fabricius, and spleen of chickens. Organ weights as a percentage of BW were affected by treatments prior to and after infection. Liver and spleen weights as a percentage of BW increased with infection but bursa weight decreased. One week of stress increased hepatic Cu, but 3 wk of EDTA ingestion increased serum Cu and serum, hepatic, bursal, and splenic Fe. These elemental changes resulting from EDTA may have predisposed the chicks to a higher mortality rate from E. coli compared with controls. Peak mortality occurred 2 days after infection, coincident with an increased serum Cu, decreased serum and bursal Fe and Zn and increased hepatic and splenic Zn. At 7 days postinfection, recovering

chicks experienced decreased hepatic Fe, elevated hepatic Zn, decreased bursal Cu, Fe, and Zn, and increased splenic Cu, Fe, and Zn. The current study demonstrates the interactive effects of EDTA, stress, and E. coli infection on serum and organ trace element concentration.

126 NAL Call. No.: QP1.C6
Effects of stressors on blood glucose and hepatic glycogen concentrations in turkey poults.
Donaldson, W.E.; Christensen, V.L.; Krueger, K.K.
Elmsford, N.Y.: Pergamon Press; 1991.
Comparative biochemistry and physiology : A : Comparative physiology v. 100 (4): p. 945-947; 1991. Includes references.

Language: English

Descriptors: Poults; Hatcheries; Stresses; Stress response; Carbohydrate metabolism; Glucose; Glycogen; Liver; Blood sugar

Abstract: 1. The putatively stressful procedures of sexing, toe trimming, snood removal, beak trimming and injection of antibiotic solution, as performed in a commercial hatchery, elevated blood glucose levels and depressed hepatic glycogen levels in newly-hatched turkey poults. 2. The first procedure performed, cloacal sexing, was sufficient to elevate blood glucose, but all procedures were required before depression of hepatic glycogen occurred. 3. Blood glucose levels declined in both untreated (INITIAL) and fully-treated (FINAL) poults over a 24 hr holding period. 4. Hepatic glycogen declined with 24 hr holding of INITIAL poults but increased with holding of FINAL poults.

127 NAL Call. No.: 47.8 AM33P
Effects of two feeding systems, two protein levels, and different dietary energy sources and levels on performance of squabbing pigeons. Waldie, G.A.; Olomu, J.M.; Cheng, K.M.; Sim, J.
Champaign, Ill. : Poultry Science Association; 1991 May. Poultry science v. 70 (5): p. 1206-1212; 1991 May. Includes references.

Language: English

Descriptors: Pigeons; Reproductive performance; Poultry feeding; Maize; Pelleted feeds; Dietary fat; Protein intake; Laying performance; Energy intake

Abstract: Two experiments were conducted to study the effects on the performance of squabbing pigeons of two feeding systems based on two protein levels, two fat sources, and varying fat and energy levels. The first experiment was carried out with birds housed in pens and fed pelleted feeds of different CP levels (16 and 22%), with or without whole yellow corn. In the second experiment, birds were housed in pair cages. Two fat types (sunflower oil and animal tallow) were tested at three levels (0, 3, and 6%) to give three energy levels (2,650, 2,900, and 3,150 kcal ME/kg of diet) in isonitrogenous diets (15% CP). In the first experiment, the 16% CP diet with corn adversely affected squab livability and growth without affecting egg production traits or adult body weight. The 22% CP diet with or without corn and the 16% CP diet without corn gave similar responses for both the adult birds and their squabs. Daily intakes per pair of birds fed these three diets varied between 106 and 126 g for feed, 17.4 and 23.4 g for CP, and 340 and 398 kcal ME. In the second experiment birds fed the diet with no supplemental fat did not produce squabs, whereas fat-supplemented diets resulted in production of at least six squabs. The source of fat did not significantly affect squab production. Feed intake decreased with increase in dietary energy level, resulting in similar consumption levels of energy for birds on all the diets. Average energy intake was about 235 kcal ME per pair per day for pigeons not producing squabs. Energy intake did not appear to correlate with squab production. It was concluded from the experiments that a single 16% CP diet could replace the usual commercial high protein diet (22%) fed along with corn in a cafeteria-style feeding system without adversely affecting egg and squab production. Furthermore, it seems desirable to supplement the diets of pigeons with fats for efficient squab production.

128 NAL Call. No.: 47.8 AM33P
Effects of two nipple drinker types with different flow rates on the productive performance of broiler chickens during summerlike growing conditions.
Carpenter, G.H.; Peterson, R.A.; Jones, W.T.; Daly, K.R.; Hypes, W.A. Champaign, Ill. : Poultry Science Association; 1992 Sep. Poultry science v. 71 (9): p. 1450-1456; 1992 Sep. Includes references.

Language: English

Descriptors: Broilers; Nipple drinkers; Drinking water; Water flow; Body weight; Feed conversion efficiency; Mortality; Chicks; Sex differences

Abstract: Three trials were conducted to study the effects of a high flow volume (2.3 mL/s) nipple waterer (HFN) versus a low flow volume (.4 mL/s) nipple waterer (LFN) on the productive performance of broiler chickens as measured by average body weight (kilograms), average feed conversion (kilograms:kilogram), and percentage mortality rate. Equal numbers of male and female birds were used during Trial 1; only male birds were used during Trials 2 and 3. All trials were conducted during the summer months. An attempt was made during Trial 2 to expose the birds to artificial heat stress. No differences were seen during any of the trials in feed conversion between the two treatments. In Trial 1 the only significant difference ($P < .05$) exhibited was in average male body weight (1.87 kg HFN; 1.84 kg LFN). A highly significant difference (P less than or equal to .01) was seen in average body weight (1.75 kg HFN; 1.64 kg LFN) during Trial 2. Average body weight difference during Trial 3 was highly significant at 42 days of age but not at Day 49. Mortality rate figures during Trial 2 indicate a highly significant difference during the 38-day period prior to heat stress (2.2% LFN; .4% HFN), and significant difference during the heat stress period (38 to 44 days; 2.9% LFN; 1.5% HFN. During Trial 3 mortality rate differences were significant by 49 days (20.6% LFN; 11.4% HFN) although there was no difference at 42 days. All instances of significant difference indicate that superior performance (lower mortality rate or higher body weight) can be expected from male broilers reared on HFN waterers.

129 NAL Call. No.: 47.8 AM33P
Effects of type of cage front and feed trough partitions on productivity and ingestive, agnostic, and fearful behaviors of egg-type hens. Anderson, K.E.; Adams, A.W.
Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 770-775; 1991 Apr. Includes references.

Language: English

Descriptors: Hens; Cages; Eating; Feed troughs; Aggressive behavior; Egg production; Feed conversion; Fearfulness; Feathers; Wire

Abstract: Two groups of White Leghorn pullets reared in floor pens were used to study the effects on performance and behavior in cages of horizontal wire cage fronts with and without feed trough partitions (HP and H, respectively) and vertical wire cage fronts with and without feed trough partitions (VP and V, respectively). In Experiment 1, hens in HP and VP cages consumed more ($P<.05$) feed than hens in either H or V cages. This greater feed consumption combined with similar egg production resulted in significantly poorer feed conversion ($P<.05$) for hens in VP cages. Hens in HP cages had fewer drinking bouts ($P<.05$) and an intermediate amount of feeding time. Hens in H, V, and VP cages did not differ significantly in number of drinking bouts and feeding times. There were differences in feeding location preferences among treatments ($P<.05$) but not within treatments. In Experiment 2, effects of horizontal (H) and vertical (V) wire cage fronts were examined to determine their effects on productivity and fearful behavior. Hens in H cages had better feather scores ($P<.05$) than hens in V cages. Type of cage front had no significant effects on age at sexual maturity, egg production, mortality rate, average egg weight, and body weight.

130 NAL Call. No.: 47.8 AM33P
Effects on chick performance of ammonia and heat stressors in various combination sequences.
Johnson, R.W.; Curtis, S.E.; Shanks, R.D.

Champaign, Ill. : Poultry Science Association; 1991 May.
Poultry science v. 70 (5): p. 1132-1137; 1991 May. Includes references.

Language: English

Descriptors: Chicks; Ammonia; Heat stress; Growth; Feed intake; Feed conversion; Stresses; Age; Stress response; Liveweight gain

Abstract: The purpose of the present study was to evaluate the effects of previous experience with a stressor on chicks' subsequent performance when exposed later to the same stressor or to a different stressor. Performance was measured in chicks exposed to aerial ammonia, environmental heat, or both in reciprocal sequences in two consecutive periods. Four (2 X 2 factorial) treatment combinations of ammonia [0 ppm (a) or 125 ppm (A)] and heat [30 C (h) or 36.5 C (H)] stressors were imposed in each of two consecutive 4-day periods, giving a total of 16 treatments. Weight gain (G), feed intake (F), and the gain:feed ratio (G:F) in Periods 1 (Days 9 to 13 posthatch) and 2 (Days 13 to 17 posthatch) were analyzed. Stressors decreased performance in both periods, but the effect was greater in Period 2. Synergism between A and H in Period 2 decreased chicks'G, F, and G:F in Period 2. Stress-depressed productive traits in Period 1 were succeeded in Period 2 not by residual negative effects but by compensatory responses: prior exposure to stressors in Period 1 was not detrimental to the chicks' subsequent G or G:F in Period 2. For example, chicks switched from Treatment ah in Period 1 to AH in Period 2 had lower G in Period 2 than did those going from either Ah, aH or AH in Period 1 to AH in Period 2. It was concluded that exposure to stressors early on enhanced the chicks' ability to cope with the same or with different stressors later and that compensatory responses occurred as the result of short-term exposure to stressors.

131 NAL Call. No.: 47.8 AM33P
Efficacy of different anticoccidials against experimental coccidiosis in large white turkeys.
Cabel, M.C.; Norton, R.A.; Yazwinski, T.A.; Waldroup, P.W. Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 289-292; 1991 Feb. Includes references.

Language: English

Descriptors: Turkeys; Coccidiosis; Coccidiostats; Eimeria; Liveweight gain; Intestines; Lesions; Drug resistance; Experimental infections

Abstract: Two trials were conducted to compare the efficacy of currently approved anticoccidials for turkeys against challenge using a field isolate of mixed Eimeria species; E. adenoides, E. gallopavonis, and E. meleagrimitis. Poults in wire-floored cages were fed unmedicated diets from day-old to 3 wk of age. Diets were supplemented with either amprolium (AMP, 125 mg/kg), butynorate (BUT, 375 mg/kg), monensin (MON-60, 60 mg/kg; MON-100, 100 mg/kg), halofuginone (HAL; 3 mg/kg), zoalene (ZOA; 125 mg/kg), or suladimethoxine plus ormetoprim (SUL + ORM 62,5 mg/kg and 37.5 mg/kg, respectively). After 2 days on the test diets, poults were individually weighed and inoculated with sporulated coccidial oocysts from the field isolate. Total fecal collections were obtained for Days 0 to 5 and 6 to 10 to estimate oocyst output. At 10 days postinoculation, the birds were individually weighed and killed to determine severity of intestinal lesions. The HAL and MON were most effective and Amp, ZOA, and SUL + ORM were least effective in maintaining weight and in reducing the severity of intestinal lesions. All the coccidiostat tested reduced oocyst passage, but poults fed HAL produced fewer oocysts. The results demonstrated differences in efficacy among anticoccidials with the more recently approved drugs providing the best protection against coccidiosis.

132 NAL Call. No.: 47.8 AM33P
Efficacy of hydrated sodium calcium aluminosilicate to reduce the individual and combined toxicity of aflatoxin and ochratoxin A.
Huff, W.E.; Kubena, L.F.; Harvey, R.B.; Phillips, T.D. Champaign, Ill. : Poultry Science Association; 1992 Jan.
Poultry science v. 71 (1): p. 64-69; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Aflatoxins; Ochratoxins; Toxicity; Silicates; Clay minerals; Synergism; Organs; Weight; Blood serum; Blood chemistry

Abstract: A 2 X 2 X 2 factorial arrangement of treatments consisting of dietary aflatoxin (3.5 micrograms/g), ochratoxin A (2.0 micrograms/g), and hydrated sodium calcium aluminosilicate (HSCAS,.5%) was used to evaluate the individual and combined effects of these treatments. There were six replicate pens of 10 broilers per pen for each of the eight treatments. The broilers were maintained on these treatments from 1 day to 3 wk of age with feed and water available for ad libitum intake. Aflatoxin and ochratoxin A each significantly decreased body weight, serum protein, albumin, and cholesterol, and increased the relative weight of the liver, kidney, and proventriculus. Aflatoxin increased the relative weight of the heart and decreased serum aspartate aminotransferase activity and ochratoxin A increased serum uric acid. The toxicity resulting from the combination of aflatoxin and ochratoxin A was more severe than when either of these mycotoxins were present alone. Addition of HSCAS alone did not alter any of the parameters evaluated. The HSCAS reduced the toxicity of aflatoxin, but had little effect on either the toxicity of ochratoxin A alone or the toxicity resulting from the combination of aflatoxin and ochratoxin A.

133 NAL Call. No.: 100 Al1H
Energy savings with use of double sidewall curtains on broiler houses. Koon, J.L.; Flood, J.R.; Trumbull, R.D.; Brewer, R.N.
Auburn, Ala. : Agricultural Experiment Station of Auburn University, 1954-; 1993.
Highlights of agricultural research v. 40 (2): p. 11; 1993.

Language: English

Descriptors: Alabama; Cabt; Energy conservation; Chicken housing; Insulation; Insulating materials; Construction; Broiler production

134 NAL Call. No.: SF774.J68
Erysipelas in caged laying chickens and suspected erysipeloid in animal caretakers.
Mutalib, A.A.; King, J.M.; McDonough, P.L.
Lawrence, Kan. : AAVLD; 1993 Apr.
Journal of veterinary diagnostic investigation v. 5 (2): p. 198-201; 1993 Apr. Includes references.

Language: English

Descriptors: Chickens; Erysipelothrix rhusiopathiae; Zoonoses

135 NAL Call. No.: 41.8 AU72
Erysipelothrix rhusiopathiae infection of guinea fowl (Numbida meleagris). Campbell, G.W.; Taylor, J.D.; Harrower, B.J.
Brunswick, Victoria : Australian Veterinary Association; 1992 Jan. Australian veterinary journal v. 69 (1): p. 13; 1992 Jan. Includes references.

Language: English

Descriptors: Queensland; Guineafowls; Erysipelothrix rhusiopathiae; Outbreaks; Symptoms; Epidemiology; Histopathology; Stress

136 NAL Call. No.: S671.A66
Evaluation of a catalytic air-treatment system for ammonia control in broiler houses.
Mote, C.R.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Mar. Applied engineering in agriculture v. 7 (2): p. 254-260; 1991 Mar. Includes references.

Language: English

Descriptors: Broilers; Animal housing; Air quality; Air flow; Catalytic activity; Ammonia; Control; Monitoring; Equations

Abstract: Air in an 18-bird capacity broiler growth chamber was recirculated through a heated ceramic honeycomb coated with platinum and alumina throughout the production cycle for two batches of broilers. Ammonia concentration of the air inside the catalyst-treated chamber was always less than the ammonia concentration in a similar companion chamber not treated by the catalyst. Performance of the birds in the two growth chambers was similar. Energy considerations suggest a catalytic air-treatment system can reduce the energy required to control ammonia concentrations in broiler houses during cold weather, but can not economically replace all ventilation for ammonia control in situations where ventilation for ammonia control is an acceptable practice.

137 NAL Call. No.: 47.8 AM33P
Evaluation of cage floor systems for production of commercial broilers. Akpobome, G.O.; Fanguy, R.C.
Champaign, Ill. : Poultry Science Association; 1992 Feb. Poultry science v. 71 (2): p. 274-280; 1992 Feb. Includes references.

Language: English

Descriptors: Broilers; Litter; Floors; Cages; Wire netting; Floor type; Body weight; Feed conversion; Carcass quality; Abdominal fat; Bone fractures

Abstract: Flooring materials evaluated consisted of three types of mesh (wire, steel, and plastic), three types of perforated floor (wood, styrofoam, and plastic), and three types of doweling (rigid, rotating, and padded). A solid wood floor with wood shavings litter served as a control. Parameters measured included body weight at 4, 6, and 8 wk and dressed carcass weight. Breast blisters, feather soilage, broken bones, feed consumption, percentage abdominal fat, and mortality rate for each floor type were also evaluated. Birds grown on wire mesh floors experienced a significant reduction in live body weight at 6 and 8 wk of age when compared with all other floor types tested. The remaining experimental floor types were comparable to the litter floor control group when using body weight as the performance criterion. The mesh floors experienced the highest incidence of breast blisters and the padded dowel group experienced the least. Feather soilage was a problem only with the perforated wood and styrofoam floor systems. Abdominal fat did not seem to be related to experimental floor type. The incidence of wing breakage during processing was significantly greater than leg breakage for all floor systems tested. Mortality was only a problem with the birds reared on wire mesh floors. The overall data suggests that a padded dowel floor system can be used to produce cage broilers about 2500 g in weight without leg or breast damage and that these birds will be equivalent to those currently produced by the industry on a litter floor system.

138 NAL Call. No.: 47.8 AM33P
Evaluation of egg injection of folic acid and effect of supplemental folic acid on hatchability and poult weight. Robel, E.J.
Champaign, Ill. : Poultry Science Association; 1993 Mar.
Poultry science v. 72 (3): p. 546-553; 1993 Mar. Includes references.

Language: English

Descriptors: Turkeys; Hens; Folic acid; Turkey eggs; Turkey egg hatchability; Embryonic development; Folic acid deficiency; Injection

Abstract: Two experiments were conducted with Large White turkey hens housed individually in cages in a conventional house. In Experiment 1, three dietary treatments were used: an unsupplemented practical corn-soybean meal basal diet; the basal diet supplemented with 2.64 mg folic acid/kg of diet; and the basal diet supplemented with 5.51 mg folic acid/kg of diet. Eggs from hens fed 2.64 mg folic acid/kg of diet were injected with folic acid in 20 injection trials over two production cycles. The response data from dietary supplemental folic acid were analyzed on a production period basis using all of the hens, and on a subset of hens producing

eggs in each production period, for hatchability of fertile eggs and poult weight. The response patterns in each case were similar. Incremental dietary supplemental folic acid levels produced a positive linear response pattern on the transfer of folic acid in eggs, but did not result in a hatchability increase over the unsupplemented folic acid basal diet. Hatchability increase did not occur for eggs injected at 25 days of incubation with 19.3 micrograms folic acid per egg in 20 injection trials over two cycles of production. The results of the study indicate that hatchability is not increased in turkey eggs from hens fed supplemental folic acid or with egg folic acid injections. However, egg and poult weights were significantly increased ($P < .05$) in eggs containing 6 to 7 mg folic acid/g of dried egg, from hens fed 5.51 mg folic acid/kg of diet.

139 NAL Call. No.: SB599.J69
Evaluation of methods to protect poultry house insulation from infestations by lesser mealworm (Coleoptera: Tenebrionidae).
Despins, J.L.; Turner, E.C. Jr; Pfeiffer, D.G.
Clemson, S.C. : South Carolina Entomological Society; 1991 Jul.
Journal of agricultural entomology v. 8 (3): p. 209-217; 1991 Jul. Includes references.

Language: English

Descriptors: Poultry housing; Insulation; Polystyrenes; Alphitobius diaperinus; Insect pests; Insect control; Tetrachlorvinphos; Pirimiphos-methyl

140 NAL Call. No.: 47.8 AM33P
Evaluation of the chemical and physical properties of hardwood bark used as a broiler litter material.
Brake, J.D.; Boyle, C.R.; Chamblee, T.N.; Schultz, C.D.; Peebles, E.D. Champaign, Ill. : Poultry Science Association; 1992 Mar. Poultry science v. 71 (3): p. 467-472; 1992 Mar. Includes references.

Language: English

Descriptors: Broilers; Litter; Bark; Pines; Wood shavings; Particle size; Water holding capacity; Moisture content; Nitrogen content; Body weight; Feed conversion; Carcass quality

Abstract: Various physical and chemical properties of hardwood bark (HB) and pine shavings (PS) were compared. Subsequently, efficacies of these materials as broiler litter were determined in two production trials. Upon receipt of each material, moisture content, pH, bulk density, and moisture absorbing capacity were determined. The PS had less moisture, less bulk density, and more moisture absorbing capacity than HB. However, the pH of PS and HB were not different. Trial 1 consisted of 16 replicate pens of HB and 8 pens of PS and Trial 2 involved 8 pens of HB, 8 pens of shredded HB, and 8 pens of PS. Each pen in each trial contained 50 broilers. No consistent differences in either pH, moisture, or nitrogen content were found in the litter types during the two growout periods. Body weight gain, feed conversion, and carcass grade were not affected by litter type.

141 NAL Call. No.: QR115.I57
Evaluation of the efficacy of Broilact in preventing infection of broiler chicks with Salmonella enteritidis PT4.
Cameron, D.M.; Carter, J.N.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Mar.
International journal of food microbiology v. 15 (3/4): p. 319-326; 1992 Mar.

Language: English

Descriptors: Salmonella enteritidis; Biological competition; Disease resistance; Evaluation; Chicks

Abstract: A study was conducted to evaluate treatment of day-old broiler chicks with Broilact, a live-culture preparation, for preventing intestinal colonization by a non-host-specific Salmonella (S. enteritidis PT4, with high resistance to nalidixic acid). Newly hatched broiler chicks were sprayed with Broilact, at a commercial hatchery and delivered on the same day to Huntingdon Research Centre. Control chicks from the same source

(i.e. chicks not treated with Broilact) were sent separately. Chicks were maintained in floor pens in groups of 40. The challenge was introduced by means of seeder birds infected with S. enteritidis PT4 (nal(r)) at a nominal dose level of 10(4) CFU per bird (3 seeder birds per pen of 40 contact birds). Groups of birds were killed 7, 28 and 40 days after challenge, and in each case caecal contents were examined culturally for the test organism. A total of 18 deaths occurred including 13 untreated contact birds, 3 Broilact-treated contact birds and 2 seeder birds. These were attributed to the experimental infection. Results of the examination of caecal contents from untreated control birds indicated that the challenge organism was successfully established in contact chicks via the seeder birds. The overall results for birds treated with Broilact showed a clear protective effect. with little indication of any significant infection by the challenge organism. It was concluded therefore that under the conditions of this study, Broilact was largely effective in preventing intestinal colonization by the non-host-specific S. enteritidis PT4.

142 NAL Call. No.: 41.8 AV5
Evaluation of vectorelectrocardiographic analysis of young broiler chickens as a predictive index for susceptibility to ascites syndrome. Odom, T.W.; Rosenbaum, L.M.; Hargis, B.M.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jan. Avian diseases v. 36 (1): p. 78-83; 1992 Jan. Includes references.

Language: English

Descriptors: Chicks; Broilers; Ascites; Susceptibility; Disease resistance; Prediction; Electrocardiography; High altitude; Hypoxia

Abstract: Vectorelectrocardiographic (VCG) analysis was performed on 50 male broiler chicks (1 week of age) before placement in a hypobaric chamber. During 5 weeks of exposure to hypobaric hypoxia (simulated altitude of 2900 m), all recorded mortality (38%) was due to the development of ascites syndrome. There was a positive correlation ($r = 0.74$, $P < 0.01$) between the increment in the frontal plane mean resultant vector magnitude divided by body weight (designated as the cardiac index [CI]), with the severity of right ventricular enlargement. Chicks developing ascites syndrome had a greater CI ($P < 0.05$) at 1 week of age when compared with chicks that did not develop the syndrome. Therefore, the CI calculated by VCG analysis recognizes right ventricular enlargement, suggesting that a pre-hatch or early post-hatch functional cardiac stress has occurred, predisposing the 1-week-old broiler chick to ascites syndrome. Application of the CI has a physiological index may prove useful in future studies targeted for selection of ascites syndrome resistance in broiler chickens.

143 NAL Call. No.: SF481.2.F56
Evaporate cooling versus tunnel ventilation.
Jacobs, R.D.; Bucklin, R.A.; Harms, R.H.; Sloan, D.R.
Gainesville, Fla. : Florida Agricultural Extension Service; 1992. Proceedings of the ... Florida Poultry Institute (501): p. 9; 1992. Meeting held Oct 13-14, 1992, Gainesville, Florida.

Language: English

Descriptors: Florida; Poultry housing; Evaporative cooling; Artificial ventilation

144 NAL Call. No.: 47.8 AM33P
Exclusion of broiler breeder females from male feeders with a male only grill. 1. Behavioral and technical aspects of design and development. Brake, J.; Khamidullin, T.N.; Fisinin, V.I.
Champaign, Ill. : Poultry Science Association; 1993 Mar. Poultry science v. 72 (3): p. 429-436; 1993 Mar. Includes references.

Language: English

Descriptors: Broilers; Hens; Cocks; Feeding behavior; Sex differences; Body measurements; Feeding habits; Feed troughs; Design; Fowl feeding; Feed intake

Abstract: A series of experiments was conducted in order to develop a feeder grill that would allow broiler breeder males, but not females, to eat. Females are typically excluded from male feeders by increasing the height of the feeder. However, male feeder heights that exclude most females increase the time required for males to consume a given amount of feed 19 to 60%. Typical male feeder height from floor to feeder pan lip in commercial practice is 55 cm, which is about the distance from floor to the head of the male in an erect posture. Females measure about 40 cm in an erect posture. Because the necks of males (8.0 cm) are longer than those of females (6.3 cm), the lip of male feeder pans was extended horizontally 12.7 cm with a wire mesh on the assumption that females could not stretch their necks enough to reach the feed. However, the females learned quickly to perch on the extended lip and eat. Total exclusion of females from the male feeder, regardless of feeder height, was achieved by placing a horizontal upper mesh 5.6 to 10.2 cm above the extended lip, and connecting the upper mesh to the lower extended lip of the feeder with vertical bars spaced 5.1 cm apart. The horizontal upper mesh prevented perching by females and the 5.1-cm spacing of the vertical bars allowed males but not females to reach the feed by inserting their heads and necks up to their shoulders. Male feed consumption time was decreased by this new grill by 18 to 50% in comparison to an unmodified feeder, but female access was eliminated.

145 NAL Call. No.: 410 B77
Exploratory activity as a measure of motivation in deprived hens. Nicol, C.J.; Guilford, T.
London : Academic Press; 1991 Feb.
Animal behaviour v. 41 (pt.2): p. 333-341; 1991 Feb. Includes references.

Language: English

Descriptors: Hens; Motivation; Exploration; Deprivation; Litter; Stimulation; Food deprivation

Abstract: It is not easy to assess an animal's motivational state during a period of deprivation caused by a lack of external stimulation. The extent to which the behaviourof hens, Gallus domesticus, in a circular tunnel attached to a test pen may be exploratory and,hence, may measure their motivational state during periods of food and litter deprivation was investigated.In experiment 1, hens that had been deprived of food for 3 h spent significantly longer in the tunnelthan non-deprived birds, although no food was, or had ever been, provided in the tunnel. During the testneither group was provided with food in the pen. In experiment 2, one group of hens was kept on a wire floor (Litter-deprived) and one group was kept on peat (Non-deprived), both for 6 weeks prior to being tested inthe same apparatus. During the test, half the birds of each group were provided with peat in the pen(Control), whilst the remainder had no peat (Experimental). Deprived Experimental hens spent significantlylonger in the tunnel than Non-deprived Experimental hens, suggesting that they may have been motivatedto obtain litter during the deprivation period itself.

146 NAL Call. No.: QL750.A6
Factors influencing floor-laying by hens in modified cages. Sherwin, C.M.; Nicol, C.J.
Amsterdam : Elsevier Science Publishers, B.V.; 1993 Apr. Applied animal behaviour science v. 36 (2/3): p. 211-222; 1993 Apr. Includes references.

Language: English

Descriptors: Hens; Oviposition; Cages

147 NAL Call. No.: S671.A66
A fan-actuated mecahnism for controlled exposure of a psychrometer wet buld sensor to a dusty environment. Costello, T.A.; Berry, I.L.; Benz, R.C.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jul. Applied engineering in agriculture v. 7 (4): p. 473-477; 1991 Jul. Includes references.

Language: English

Descriptors: Poultry housing; Humidity; Measurement; Aspirated psychrometers; Structural design; Performance testing

Abstract: An aspirated psychrometer which uses a unique mechanism for raising the wet bulb sensor from a reservoir and into the airstream during aspiration was designed and tested. The device uses thermocouples and an electronic datalogger to measure the wet bulb and dry bulb temperatures during aspiration. In laboratory tests over a wide range of vapor pressures, the root-mean-squared-difference (RMSD) between relative humidity from the psychrometer and a chilled mirror hygrometer was 0.3%. In tests in a commercial broiler house, differences between three psychrometers (RMSD=2.0%) could be traced to experimental uncertainty in temperature measurement. Tests in broiler houses have shown the psychrometer mechanisms to be reliable with minor maintenance required every five to ten days.

148 NAL Call. No.: QL750.A6
Fear levels in laying hens carried by hand and by mechanical conveyors. Scott, G.B.; Moran, P.
Amsterdam : Elsevier Science Publishers, B.V.; 1993 May. Applied animal behaviour science v. 36 (4): p. 337-345; 1993 May. Includes references.

Language: English

Descriptors: Hens; Fearfulness; Handling

149 NAL Call. No.: 47.8 AM33P
Feed and water consumption patterns of broilers at high environmental temperatures.
May, J.D.; Lott, B.D.
Champaign, Ill. : Poultry Science Association; 1992 Feb.
Poultry science v. 71 (2): p. 331-336; 1992 Feb. Includes references.

Language: English

Descriptors: Broilers; Feed intake; Water intake; Environmental temperature; Diurnal variation; Heat stress; Age differences; Acclimatization

Abstract: Broilers were reared on litter to determine the effect of cyclic environmental temperatures on feed and water consumption patterns. The temperatures were constant at 24 C for several days before cyclic temperatures were started. Control broilers continued at 24 C but the treatment was a daily 24-35-24 C cycle for 3 days. Broilers that were 5, 6, or 7 wk old consumed as much feed or water the 1st day of the cycle as on the succeeding days. Feed and water consumption were determined for 6-h periods each day beginning at minimum temperature with two periods during rising temperature and two periods during declining temperature. Feed consumption was depressed when the temperatures were declining. Water consumption increased during the 12 h when the temperature was maximum. At 7 wk, water consumption was greater for broilers on the cyclic temperature for each 6-h period except for the period of temperature decline immediately preceding the minimum temperature. Broilers exposed to the 3 days of cyclic temperatures consumed more water than controls during a subsequent exposure to temperatures up to 40.8 C. The data show that the increased water consumption and decreased feed consumption observed due to high, cyclic temperatures arise from changes that occur during some times of the day and no changes occur during other times. The increase in water consumption precedes the reduction in feed consumption.

150 NAL Call. No.: 290.9 AM32T
Field calibration of a transient model for broiler misting. Gates, R.S.; Overhults, D.G.; Bottcher, R.W.; Zhang, S.H. St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Sep. Transactions of the ASAE v. 35 (5): p. 1623-1631; 1992 Sep. Includes references.

Language: English

Descriptors: Chicken housing; Environmental control; Evaporative cooling; Mists; Mathematical models

Abstract: A transient model to predict temperature within a tunnel ventilated broiler house during misting is developed. The model is calibrated with field data to obtain steady-state constants; transient predictions are compared to measured temperatures during cyclic misting for two different size birds. Measured temperatures during cyclic misting are shown to swing between steady-state asymptotes predicted from the model. Transient response of the model was faster than measured temperature data, in part due to temperature sensor dynamic response. The model predicts the lengthwise temperature profile within the building during misting, and can be used to investigate alternate misting strategies and designs. Further improvements to the model are suggested.

151 NAL Call. No.: S671.A66
Field comparison of broiler house mechanical ventilation systems in a warm climate.
Bottcher, R.W.; Driggers, L.B.; Carter, T.A.; Hobbs, A.O. St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Jul. Applied engineering in agriculture v. 8 (4): p. 499-508; 1992 Jul. Includes references.

Language: English

Descriptors: U.S.A.; Poultry housing; Artificial ventilation; Mechanical methods; Comparisons

Abstract: Three separate systems for mechanical ventilation were monitored in commercial broiler houses during the spring and summer of 1988. The first sysm utilized buried earth tubes, plastic ventilation ducts, and hollow wall cavities as air inlets; the second system used pressure-controlled slot inlets; and the third system used evaporative cooling pads. The evaporative cooling system provided greater reduction in temperature at bird level than tempering air using earth tubes. An average reduction of 3.9 degrees C (7.1 degrees F) was obtained when outside air was above 32 degrees C (90 degrees F). During warm weather, air speeds at bird level were lower in the earth tube house [less than 0.5 m/s (100 fpm)] than the other houses [0.8-1.8 m/s (150-350 fpm)], due to differences in both maximum ventilation rate and air inlet designs. Productivity of the birds for all three houses was generally better than average for the poultry company. During hot weather the flock size in the earth tube house was reduced and end doors were opened for natural (wind) ventilation. Electrical energy consumption for the earth tube house was approximately twice that of the other houses due to the earth tube air movers.

152 NAL Call. No.: S671.A66
Field evaluation of reflective bubble-pack insulation in broiler housing. Bottcher, R.W.; Driggers, L.B.; Baughman, G.R.; Bisesi, P. St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 May. Applied engineering in agriculture v. 8 (3): p. 369-374; 1992 May. Includes references.

Language: English

Descriptors: Poultry housing; Insulating materials; Comparisons; Thermal properties; Energy consumption

Abstract: A reflective "bubble-pack" insulation was installed in a new broiler house in central North Carolina during the summer of 1988. This insulation consisted of a 0.64 cm (0.25 in.) thick layer of plastic with air pockets and aluminized exterior surfaces. Interior air and black globe temperatures, electricity, and heating fuel (LP gas) used for this house were compared with those for an adjacent house insulated with 15 cm (6 in.) of fiberglass batts with a vapor barrier. Heating fuel use over 10 broiler flocks was greater in the reflective insulation (RI) house than the fiberglass insulation (FI) house by 10 200 L (2700 gal), indicating a lower thermal resistance for the reflective insulation. This confirms laboratory evaluations of such materials (Cox and Baughman, 1985; Riskowski et al., 1989). Electricity use was slightly greater in the RI house (6 974 vs. 6 617 kWh). Differences between house temperatures (both black globe and air temperatures), averaged over each of three flocks, were 0.6 degrees C (1.0 degrees F) or less, indicating adequate heating and ventilation. Condensation was observed during cool weather on the interior ceiling near the eaves of the RI house, but not the FI house, and dust accumulated on the interior walls and ceiling of both houses. The thermal reflectance of the reflective insulation surface, 31 months after installation, was measured to be 0.61, a reduction of approximately 0.3 from the reflectance of the product in new condition.

153 NAL Call. No.: S671.A66
Field test of a PVC plant heat exchanger for animal housing. Kennedy, D.A.; Leonard, J.J.; Feddes, J.J.

St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jul. Applied engineering in agriculture v. 7 (4): p. 457-460; 1991 Jul. Includes references.

Language: English

Descriptors: Poultry housing; Poly(vinyl chloride); Heat exchangers; Structural design; Ventilation; Heat recovery; Economic analysis

Abstract: A heat exchanger was constructed using polyvinyl chloride (PVC) sheets for the core. The heat exchanger was installed in a broiler barn and operated in a parallel-flow configuration for 53 days. During this period, performance data were gathered during nine periods of approximately 24 h each. The mean flow rate of the supply air was 565 L/s (1200 CFM) and die mean effectiveness was 0.38. A thermostatically activated defrost cycle prevented ice build-up at ambient temperatures as low as- 35 degrees C (-31 degrees F). Maintenance, in terms of servicing and cleaning was minimal. Economic analysis indicated a simple payback period of three years under local conditions.

154 NAL Call. No.: S37.F72
Fly control for beef, dairy, poultry and swine producers. Jones, B.F.; Johnson, D.R.
Little Rock, Ark. : The Service; 1993 Apr.
FSA - Cooperative Extension Service, University of Arkansas (7029): 4 p.; 1993 Apr.

Language: English

Descriptors: Musca; Animal housing; Sanitation; Insect control; Insecticides

155 NAL Call. No.: RA644.S15U54 1992
Food safety and quality salmonella control efforts show need for more coordination : report to the Chairman, Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives.. Salmonella control efforts show need for more coordination United States. General Accounting Office; United States, Congress, House, Committee on Energy and Commerce, Subcommittee on Oversight and Investigations Washington, D.C. : The Office ; Gaithersburg, MD (P.O. Box 6015, Gaithersburg 20877) : The Office [distributor,; 1992; GA 1.13:RCED-92-69. 45 p. : ill. ; 28 cm. Cover title. April 1992. GAO/RCED-92-69. "B-246422"--P. [1]. Includes bibliographical references.

Language: English; English

Descriptors: Salmonellosis; Salmonellosis in poultry

156 NAL Call. No.: 290.9 AM32T
Fractionation of poultry litter for enhanced utilization. Ndegwa, P.M.; Thompson, S.A.; Merka, W.C.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 May. Transactions of the ASAE v. 34 (3): p. 992-997; 1991 May. Includes references.

Language: English

Descriptors: Georgia; Poultry industry; Problem analysis; Poultry manure; Particle size; Fractionation; Nitrogen; Phosphorus; Potassium; Separators; Waste utilization

Abstract: A potential waste management system for the use of poultry liner was studied based upon the fractionation of litter. It was determined that the compositions of the litter by particle size varied both with the number of flocks that had been raised on the litter and the type of house. As the number of flocks raised on the litter increased from one to three flocks, the amount of fine material increased from 23 to 41%, while the concentration of the middle fraction decreased from 47 to 40%, and the coarse fraction decreased from 26 to 16%. The efficiency of retrieval of the fine fraction from the raw litter by either a vibrating screen separator or a rotary drum separator were found not to be significantly different It was determined by chemical analysis that

the P and K concentrations appeared to be distributed uniformly throughout the litter in each fraction while the N was non-uniformly distributed. The concentration of N was greatest in the fine fraction.

157 NAL Call. No.: 47.8 AM33P
Genetic adaptation to multiple-bird cage environment is less evident with effective beak trimming.
Craig, J.V.; Muir, W.M.
Champaign, Ill. : Poultry Science Association; 1991 Oct.
Poultry science v. 70 (10): p. 2214-2217; 1991 Oct. Includes references.

Language: English

Descriptors: Hens; Beak; Cages; Stocking density; Survival; Debeaking; Line differences; Body weight

Abstract: Selection of hens with intact beaks for high performance in multiple-bird cages has produced a stock that clearly exceeds its unselected control when hens have intact beaks but shows less advantage when comparisons involve effectively beak-trimmed birds. The selected stock performed at about the same level as a stock recently derived from a commercial source (but with two generations of relaxed selection) when birds had intact beaks but at a lower level when birds had their beaks trimmed. Relative incidences of deaths from cannibalistic pecking were partially responsible for the results obtained.

158 NAL Call. No.: 47.8 B77
Genetic variation in the time of oviposition in the laying hen. Lillpers, K.
Oxfordshire : Carfax Publishing Company; 1991 May.
British poultry science v. 32 (2): p. 303-312; 1991 May. Includes references.

Language: English

Descriptors: Sweden; Hens; Oviposition; Timing; Genetic differences; Heritability; Line differences; Laying performance; Animal welfare; Selection program; Genetic correlation; Phenotypic correlation

159 NAL Call. No.: 47.8 AM33P
Growth and performance of broiler breeders fed bacitracin methylene disalicylate and zinc bacitracin.
Damron, B.L.; Wilson, H.R.; Fell, R.V.
Champaign, Ill. : Poultry Science Association; 1991 Jul.
Poultry science v. 70 (7): p. 1487-1492; 1991 Jul. Includes references.

Language: English

Descriptors: Broilers; Bacitracin; Zinc; Pullets; Body weight; Egg production; Egg hatchability; Feed conversion; Fertility; Dosage effects; Mortality

Abstract: Day-old Cobb broil breeder pullets were randomly allotted into 20 of floor pens where they were brooded and reared to 23 wk of age. Eight pens received a control diet containing no growth promotant. The other 12 were fed 55 mg of bacitracin methylene disalicylate/kg of diet. Males were reared separately on the control diet. Pullets were full-fed for the first 8 wk of life, then placed on a skip-a-day program with breeder-recommended feed allocations. At 23 wk of age bird numbers were reduced to 26 females per pen, three males added, and diets changed to the layer regimen Levels of 0, 27.5, 55, or 110 mg/kg of zinc bacitracin were each assigned to five pens with factorial attention to growing treatments Layer treatments were continued for 280 days. No significant differences were associated with the feeding of bacitracin methylene disalicylate among body weight or mortality data summarized at 18 and 23 wk. Eight-week feed efficiency was aft not affected in the laying phase, 110 mg/kg of zinc bacitracin significantly improved egg production and fatty over the unsupplemented controls. Hatch of fertile eggs. Overall hatchability, and the number of chicks per pen were all significantly improved by 27.5 mg/kg of zinc bacitracin. Higher drug levels supported no additional improvement. Feed efficiency, mortality rate, and final body weight were not significantly influenced by any level of supplementation. No effect of grower treatment upon subsequent layer performance was noted.

160 NAL Call. No.: 47.8 AM33P
Growth, body composition, and plasma androgen concentration of male broiler chickens subjected to different regimens of photoperiod and light intensity. Charles, R.G.; Robinson, F.E.; Hardin, R.T.; Yu, M.W.; Feddes, J.; Classen, H.L.
Champaign, Ill. : Poultry Science Association; 1992 Oct. Poultry science v. 71 (10): p. 1595-1605; 1992 Oct. Includes references.

Language: English

Descriptors: Broilers; Growth; Photoperiod; Light intensity; Body weight; Blood plasma; Body measurements; Feed conversion; Androgens; Body composition; Organs; Weight; Cocks

Abstract: Day-old male Hubbard broilers (960) were assigned to one of four treatments (two pens of 120 birds per treatment) to evaluate the effects of high (150 lx) versus low (5 lx) light intensity and constant 23 h light L):1 h dark (D) versus increasing (6L:18D increasing 4 h/wk to 23L:1D) photoperiod in a 2 X 2 factorial arrangement of treatments. Birds were raised to 8 wk on a typical commercial four-diet program. Low-intensity birds were heavier than high-intensity birds from 2 to 8 wk (3.25% heavier at 8 wk). Birds raised under constant photoperiod were heavier than birds raised under increasing photoperiod from 2 to 5 wk and at 7 wk of age (1.71% heavier at 7 wk). High-intensity bird carcasses had lower percentage body fat, weight of fat, and higher percentage body protein at 8 wk compared with low-intensity bird carcasses (7.77, 10.76, and 1.77%, respectively). High-intensity birds had smaller abdominal fat pads (weight and percentage of body weight) at 8 wk compared with low-intensity birds (15.46 and 12.17%, respectively). Photoperiod did not affect body composition. Birds treated with increasing photoperiod had larger testes (weight and percentage of body weight) at 8 wk compared with birds under the constant photoperiod (29.36 and 30.51%, respectively). Birds treated under increasing photoperiod had higher plasma androgen concentrations at 7 wk compared with birds under constant photoperiod (testosterone, .270 versus. 188 ng/ml; androstenedione, .632 versus .494 ng/ml). It appears that increasing daylength can stimulate the onset of sexual development in broilers as early as 7 wk of age but light intensity has no effect.

161 NAL Call. No.: 41.8 R312
Haematology and histopathology of seven-week-old broilers after early food restriction.
Maxwell, M.H.; Robertson, G.W.; Anderson, I.A.; Dick, L.A.; Lynch, M. London : British Veterinary Association; 1991 May.
Research in veterinary science v. 50 (3): p. 290-297; 1991 May. Includes references.

Language: English

Descriptors: Chicks; Broilers; Restricted feeding; Hematology; Histopathology; Ascites; Refeeding; Body weight

Abstract: The haematology and histopathology of seven-week-old broilers were examined after periods of early food restriction, for six, 10 or 14 days from six days old. After several weeks on an ad libitum diet the birds failed to compensate for the weight lost during early food restriction. Immediately after the periods of food restriction, the birds demonstrated significantly increased heterophil/lymphocyte ratios, reduced eosinophils and slightly raised basophil counts. At seven weeks old, a significant reduction was seen in red and white blood cells and thrombocyte numbers together with significant increases in mean cell haemoglobin and mean cell volume. The haematological profile demonstrated a macrocytic normochromic anaemia caused possibly by a folic acid deficiency as a result of the food restriction. Histopathological lesions were seen in the heart, lungs and liver from birds on all diets but there were more lesions the longer the food had been restricted. Lung disease was more marked where there was inadequate ventilation. Cartilaginous and osseous lung nodules were significantly fewer after food restriction. It was postulated that the increase in pathological lesions in the food-restricted birds may be associated with a stress response.

162 NAL Call. No.: S671.A66
Hardware for microcomputer control of the environment of a production broiler house.

Allison, J.M.; White, J.M.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jan. Applied engineering in agriculture v. 7 (1): p. 119-123; 1991 Jan. Includes references.

Language: English

Descriptors: Poultry housing; Broilers; Broiler production; Controlled atmospheres; Microcomputers; Environmental control

Abstract: A microcomputer-based system to control the environment of a totally enclosed broiler house was developed and tested. The system was installed in an existing producer owned broiler house. Environmental control was provided for the seven-week grow-out of the flock. This article describes the microcomputer hardware and modifications to the structure and existing hardware required to make the control system reliable, functional, and to assure continued operation if the microcomputer or electronic interfaces should fail.

163 NAL Call. No.: SF601.A47
Hazards in confinement housing--gases and dusts in confined animal houses for swine, poultry, horses and humans.
Pickrell, J.
Manhattan, Kan. : Kansas State University; 1991 Feb.
Veterinary and human toxicology v. 33 (1): p. 32-39; 1991 Feb. Includes references.

Language: English

Descriptors: Animal housing; Air pollutants

164 NAL Call. No.: 41.8 AV5
A highly fatal vascular disease of broiler breeder chickens. Shaw, D.P.; Halvorson, D.A.; Bergeland, M.E.; Newman, L.J. Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Jan. Avian diseases v. 35 (1): p. 235-240; 1991 Jan. Includes references.

Language: English

Descriptors: Broilers; Vascular diseases; Mortality; Case reports; Sex differences; Age; Histopathology; Symptoms; Outbreaks; Eye diseases

Abstract: A broiler breeder operation experienced a sudden outbreak of high mortality in nine different houses of breeders at eight different locations. In the first house to be affected, the losses were mainly in the females, but later flocks had losses up to 6.4%, mainly in the males. Affected chickens ranged in age from 7 to 22.5 weeks. Multifocal areas of necrosis and vasculitis were found in skin, muscle, and internal organs. No involvement of the brain was identified, but many of the birds had uveitis. The outbreak lasted 3 weeks and ended without treatment. Neither infectious agents nor mycotoxins were identified.

165 NAL Call. No.: 41.8 AV5
Histomoniasis in leghorn pullets on a Florida farm.
Homer, B.L.; Butcher, G.D.
Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Jul. Avian diseases v. 35 (3): p. 621-624; 1991 Jul. Includes references.

Language: English

Descriptors: Florida; Pullets; Histomonas meleagridis; Heterakis; Outbreaks; Poultry manure; Case reports

Abstract: Recurrent outbreaks of histomoniasis in flocks of 4-to-6-week-old white leghorn pullets is reported. In a typical outbreak, 5% of the pullets were stunted and listless with unkempt feathers. Mortality ranged from 2 to 3%, and the cull rate was approximately 2%. Ceca of affected chickens contained caseous cores. Histological

examination of the ceca revealed fibrinonecrotic ulcerative granulomatous typhlitis associated with numerous histomonad trophozoites in the cecal wall. The outbreaks of histomoniasis were associated with heavy parasitism of pullets by Heterakis gallinarum. Litter had not been completely removed from the houses for the past 10 years, providing a constant source of Histomonas-infected larvated Heterakis ova.

166 NAL Call. No.: 275.29 AL13P
Home laying flock.
Purser, J.
Fairbanks, Alaska : The Service; 1992 Mar.
Publication - University of Alaska, Cooperative Extension Service v.): 4 p.; 1992 Mar.

Language: English

Descriptors: Alaska; Hens; Egg production; Chicks; Cost benefit analysis; Chicken housing; Poultry feeding

167 NAL Call. No.: SF481.2.F56
House fly behavior patterns in high rise poultry houses. Hogsette, J.A.; Jacob, R.D.
Gainesville, Fla. : Florida Agricultural Extension Service; 1992. Proceedings of the ... Florida Poultry Institute (501): p. 13-15; 1992. Meeting held Oct 13-14, 1992, Gainesville, Florida.

Language: English

Descriptors: Florida; Musca domestica; Poultry housing; Sticky traps; Population density; Animal behavior

168 NAL Call. No.: TD930.A32
House-fly pupae as poultry manure converters for animal feed: A review. El Boushy, A.R.
Essex : Elsevier Applied Science Publishers; 1991.
Bioresource technology v. 38 (1): p. 45-49; 1991. Includes references.

Language: English

Descriptors: Poultry manure; Conversion; Musca domestica; Pupae; Concentrates; Biodegradation; Chemical analysis; Nutritive value; Feeding; Experiments; Chicks

169 NAL Call. No.: 47.8 AM33P
An improved procedure for intramagnal insemination of the chicken. Engel, H.N.; Froman, D.P.; Kirby, J.D.
Champaign, Ill. : Poultry Science Association; 1991 Sep. Poultry science v. 70 (9): p. 1965-1969; 1991 Sep. Includes references.

Language: English

Descriptors: Hens; Artificial insemination; Laparotomy; Xylazine; Anesthetics; Ketamine; Laying performance

Abstract: Intramagnal insemination is a useful technique in the analysis of spermatozoal function. Precise deposition of spermatozoa requires the use of laparotomy. However, hen-day egg production can be adversely affected by such a procedure. The present work demonstrates that postoperative hen-day egg production is affected by choice of anesthetic. Hens anesthetized with a mixture of ketamine and xylazine prior to laparotomy laid 14% fewer eggs ($P < .05$) when compared with intact controls. In contrast, the postoperative hen-day egg production of hens anesthetized with xylazine alone was comparable with that of intact controls ($P > .05$). Furthermore, the use of xylazine alone increased the case of handling sedated hens and decreased recovery time. Therefore, xylazine is recommended for anesthetizing hen prior to laparotomy.

170 NAL Call. No.: 275.29 W27P
Incubating, brooding and raising goslings.
Andrews, D.K.

Pullman, Wash. : The Service; 1992 Apr.
Extension bulletin - Washington State University, Cooperative Extension Service (1630): 5 p.; 1992 Apr.

Language: English

Descriptors: Goslings; Incubation; Brood care; Goose feeding; Leg weakness; Poultry diseases

171 NAL Call. No.: S533.F66F43
Indiana's 4-H pigeon resource manual.
McKinley, M.; Long, N.D.
West Lafayette, Ind. : The Service; 1992 Apr.
4-H - Purdue University Cooperative Extension Service (742): 38 p.; 1992 Apr. Includes references.

Language: English

Descriptors: Pigeons; Poultry housing; Poultry feeding; Poultry diseases; 4-h clubs; Shows

172 NAL Call. No.: 47.8 B77
Individual perching behaviour of laying hens and its effects of cages. Appleby, M.C.; Smith, S.F.; Hughes, B.O.
Oxfordshire : Carfax Publishing Company; 1992 May.
British poultry science v. 33 (2): p. 227-238; 1992 May. Includes references.

Language: English

Descriptors: Hens; Perches; Animal behavior; Animal welfare; Egg quality

173 NAL Call. No.: 47.8 AM33P
Influence of coccidiosis on Salmonella colonization in broiler chickens under floor-pen conditions.
Arakawa, A.; Fukata, T.; Baba, E.; McDougald, L.R.; Bailey, J.S.; Blankenship, L.C.
Champaign, Ill. : Poultry Science Association; 1992 Jan.
Poultry science v. 71 (1): p. 59-63; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Coccidiosis; Eimeria; Salmonella typhimurium; Nicarbazin; Mixed infections; Intestines; Lesions

Abstract: The influence of coccidiosis on colonization of Salmonella typhimurium in broiler chickens under floor pen conditions was studied by semiquantitative methods. Chickens of two groups, unmedicated and medicated with nicarbazin (125 ppm via the feed), were exposed to three species of Eimeria (Eimeria tenella, Eimeria maxima, and Eimeria acervulina) at 2, 3, and 4 wk of age and given S. typhimurium in the feed 2 days later. Salmonella typhimurium was isolated most often (100%) from ceca of chickens exposed at 3 wk of age. Birds in the unmedicated group were positive for S. typhimurium at a higher rate than those in the medicated group. Salmonella typhimurium was detected in livers only in a few unmedicated birds.

174 NAL Call. No.: 47.8 AM33P
The influence of egg sequence position on fertility, embryo viability, and embryo weight in broiler breeders.
Robinson, F.E.; Hardin, R.T.; Robinson, N.A.; Williams, B.J. Champaign, Ill. : Poultry Science Association; 1991 Apr. Poultry science v. 70 (4): p. 760-765; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Eggs; Sequences; Egg hatchability; Egg weight; Egg shell; Weight losses; Restricted feeding; Unrestricted feeding; Viability

Abstract: A study was undertaken to determine whether fertility, early embryo viability, and the weight of the egg, shell and embryo are influenced by the position of an egg in a laying sequence. One hundred and three Indian River broiler breeder hens were housed individually in cages at 21 wk of age. Beginning at 43 wk of age, each hen was inseminated once per week, with 50 microliter of fresh undiluted pooled semen from Indian River broiler breeder males. Beginning at 45 wk of age, and for the following 45 days, all eggs laid were collected. Eggs were collected hourly for 8 h after "lights on" and a final daily collection was made 14 h after lights on. Each egg was classified as "first-of-sequence" or "subsequent". Eggs were weighed and placed in a forced-air incubator twice per week. After 168 h of incubation, the eggs were removed from the incubator, weighed and assessed for fertility and embryo viability status. The embryo was also weighed. Shell weight was recorded after 3 to 4 days of air drying. Egg weight was significantly greater in first-of-sequence compared with subsequent eggs. First-of-sequence eggs exhibited significantly smaller Day 7 embryos (on a percentage basis), lower shell weight (on a percentage basis), and significantly less egg weight loss during the 7 day incubation period (absolute and percentage basis) than did subsequent eggs of a sequence. Least squares (LS) means for fertility did not differ significantly between first (87.02%) and subsequent (89.56%) eggs. There was no significant difference in LS means for embryo viability (number viable per 100 fertile eggs set X 100) between first (89.71%) and subsequent (92.75%) eggs. However, the number of viable embryos per 100 eggs set (fertility X viability) was significantly lower in first (78.74%) compared with subsequent (83.17%) eggs.

175 NAL Call. No.: 47.8 AM33P
Influence of increasing photoperiod and toe clipping on breast buttons of turkeys.
Newberry, R.C.
Champaign, Ill. : Poultry Science Association; 1992 Sep.
Poultry science v. 71 (9): p. 1471-1479; 1992 Sep. Includes references.

Language: English

Descriptors: Turkeys; Photoperiod; Defects; Skin; Breast blisters; Breast muscle; Claws; Surgical operations; Feed conversion; Body weight; Mortality; Carcasses; Rest; Duration

Abstract: Two 17-wk experiments compared the effects of an increasing photoperiod treatment (INC) versus a constant photoperiod treatment (23H), and intact toes versus clipped toes, on the breast button incidence and performance of heavy tom turkeys. Under INC, the photoperiod was increased gradually from 8 to 23 h between 4 and 16 wk. Under 23H, the photoperiod remained constant at 23 h. Use of INC versus 23H resulted in a significant reduction in breast button incidence at 17 wk in both experiments ($P < .05$). Toe clipping had no effect on breast button incidence. The presence of breast buttons was positively correlated with body weight at 12 wk, and area of unfeathered skin over the keel at 17 wk. In Experiment 1, the photoperiod treatments had no significant effect on 17-wk body weight or mortality, but the INC treatment had an adverse effect on feed efficiency ($P <.05$). In Experiment 2, turkeys reared under INC were heavier at 17 wk ($P < .05$), with similar feed efficiencies. Mortality was significantly lower on INC than 23H up to 12 wk in Experiment 2 ($P <.05$). Turkeys with intact toes were .44 kg heavier than turkeys with clipped toes at 17 wk in both experiments ($P < .05$) and had similar feed efficiencies. Mortality to 4 wk was lower for turkeys with intact than clipped toes in Experiment 2 ($P <.05$). Increasing photoperiod treatments have potential for improving turkey performance, survival, and carcass quality. The adverse impact of toe clipping on growth and early survival stresses the need for alternatives to toe clipping for prevention of downgrading due to scratches.

176 NAL Call. No.: 47.8 B77
Influence of stocking density and layer age on production traits and egg quality in Japanese quail.
Nagarajan, S.; Narahari, D.; Jayaprasad, I.A.; Thyagarajan, D. Oxfordshire : Carfax Publishing Company; 1991 May.
British poultry science v. 32 (2): p. 243-248; 1991 May. Includes references.

Language: English

Descriptors: Japanese quails; Stocking density; Age at first egg; Egg production; Egg weight; Egg quality; Body weight; Age differences; Egg shell thickness; Poultry housing

177 NAL Call. No.: 47.8 AM33P
Influence of wet and dry feed on laying hens under heat stress. Tadtiyanant, C.; Lyons, J.J.; Vandepopuliere, J.M.
Champaign, Ill. : Poultry Science Association; 1991 Jan. Poultry science v. 70 (1): p. 44-52; 1991 Jan. Includes references.

Language: English

Descriptors: Hens; Heat stress; Water intake; Feed intake; Dry matter; Wet feeding; Egg weight; Egg yolk; Egg production

178 NAL Call. No.: 41.8 AV5
Influenza in commercial broiler breeders.
Halvorson, D.A.; JSivanandan, V.; Lauer, D.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jan. Avian diseases v. 36 (1): p. 177-179; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Avian influenzavirus; Disease control; Disease transmission; Case reports

Abstract: Influenza was detected in a flock of broiler breeders during routine serological monitoring. Although there were no clinical signs, egg production may, have been affected in hens on one story of a two-story breeder house. Intensive measures were taken to avoid transmission to other farms. Two months after the flock was found to be serologically positive, sentinel hens were placed in the flock, and they became serologically positive 1 month later. In spite of this evidence for virus being present in the flock, no detectable transmission to any other farm occurred.

179 NAL Call. No.: 47.8 W89
Intermittent lighting regimes and mortality rates in laying hens. Lewis, P.D.; Perry, G.C.; Morris, T.R.; Midgley, M.M.
London : Butterworth; 1992 Jul.
World's poultry science journal v. 48 (2): p. 113-120; 1992 Jul. Literature review. Includes references.

Language: English

Descriptors: Hens; Light regime; Intermittent light; Mortality; Circadian rhythm; Physical activity; Body fat; Heat stress; Animal welfare; Animal behavior; Regulations; Literature reviews

180 NAL Call. No.: 49 AN55
Interrelationships between lack of shading shelter and poultry litter supplementation: food intake, live weight, water metabolism and embryo loss in beef cows grazing dry Mediterranean pasture.
Silanikove, N.; Gutman, M.
East Lothian, Scotland : Durrant; 1992 Dec.
Animal production v. 55 (pt.3): p. 371-376; 1992 Dec. Includes references.

Language: English

Descriptors: Israel; Beef cows; Heat stress; Poultry manure; Shade; Feed intake; Female fertility

181 NAL Call. No.: 47.8 AM33P
Introduction: applied ethology and poultry science.
Mench, J.A.
Champaign, Ill. : Poultry Science Association; 1992 Apr. Poultry science v. 71 (4): p. 631-633; 1992 Apr. Paper contributed to the Symposium on Quantifying the Behavior of Poultry. Includes references.

Language: English

Descriptors: Domestic animals; Animal behavior; Animal welfare

Abstract: As a scientific discipline, the study of the biological basis of behavior in animals, ethology, is comparatively new. Ethologists have traditionally conducted primarily observational studies designed to ascertain the evolutionary significance of behaviors in wild animals. There is, however, a growing branch of ethology that is concerned with the application of ethological principles to areas such as the management and welfare of economically important species like poultry. Because of the complexity of the causation and expression of behaviors in animals, it is particularly important that such studies be rigorously designed and analyzed. The purpose of this symposium was to stimulate interest in the study of poultry behavior and welfare, and to provide information about current methodology in ethology.

182 NAL Call. No.: 41.8 AV5
Investigation of a chronic feed-passage problem on a broiler farm in northwest Arkansas.
Apple, R.O.; Skeeles, J.K.; Houghten, G.E.; Beasley, J.N.; Kim, K.S. Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Apr. Avian diseases v. 35 (2): p. 422-425; 1991 Apr. Includes references.

Language: English

Descriptors: Arkansas; Broilers; Malabsorption; Avian reovirus; Symptoms; Pathology; Body weight

Abstract: A commercial broiler farm with a history of poor feed conversion and chronic feed-passage problems was chosen for investigation. Chickens were taken from the broiler flock at specified intervals during growout and tested by virus isolation and enzyme-linked immunosorbent assay (ELISA) for avian reovirus. Abnormal tissue pathology was first seen in the broilers at 9 days of age and continued sporadically throughout the growout period. Antireovirus antibody levels began to increase at 24 days of age. Avian reovirus and avian adenovirus was recovered at different intervals starting at 17 and 31 days of age, respectively. One-day-old specific-pathogen-free chicks housed in filtered-air positive-pressure isolation units were inoculated with two inocula recovered from the field study. Avian reovirus was recovered from the tissues of both treatment groups using chick kidney cells. Significant weight differences were seen in one of the two treatment groups. This avian reovirus was given the name SS-412.

183 NAL Call. No.: S605.5.O74
It's easy, fun and rewarding... grow you own chickens. Jesiolowski, J.
Emmaus, Pa. : Rodale Press, Inc; 1993 Mar.
Organic gardening v. 40 (3): p. 36-42; 1993 Mar.

Language: English

Descriptors: Fowls; Poultry; Farming; Free range husbandry; Yards; Domestic gardens

184 NAL Call. No.: 275.29 G29B
Key factors for poultry house ventilation.
Vest, L.; Tyson, B.L.
Athens, Ga. : The Service; 1991 Dec.
Bulletin - Cooperative Extension Service, University of Georgia, College of Agriculture v.): 11 p. ill; 1991 Dec.

Language: English

Descriptors: Poultry housing; Ventilation; Air quality

185 NAL Call. No.: 47.8 AM33P
Lack of an effect of taurine supplementation on the incidence of Sudden Death Syndrome in male broiler chicks.

Blair, R.; Jacob, J.P.; Gardiner, E.E.
Champaign, Ill. : Poultry Science Association; 1991 Mar.
Poultry science v. 70 (3): p. 554-560; 1991 Mar. Includes references.

Language: English

Descriptors: Broilers; Chicks; Taurine; Mortality; Myocardium; Broiler performance; Age differences; Etiology

Abstract: Two experiments were conducted to study the effect of taurine supplementation on growth and the incidence of Sudden Death Syndrome (SDS) in male broiler chickens. The 4,650 birds were day-old male broiler chickens raised in floor pens to 9 wk of age. In Experiment 1, the birds received diets containing 0, 250, 500, or 1,000 mg taurine/kg. In Experiment 2, the treatments were no added taurine, 500 mg taurine/kg feed, 1,000 mg taurine/kg feed, 250 mg taurine/L water, and 500 mg taurine/L water. Taurine supplementation did not have any significant influence on growth performance although supplementation of the feed at 250 mg/kg reduced the feed:gain ratio from 1.67 to 1.63 in Experiment 1, which was significant (P<.05). In general, mortality was unaffected by treatment with a few exceptions: in Experiment 2, SDS deaths were reduced significantly (P<.01) by supplementation of the feed with 500 mg taurine/kg, and at 3 and 6 wk of age, SDS deaths as a percentage of total deaths were reduced significantly with this treatment. The results are interpreted as suggesting that taurine does not play a major role in the etiology of SDS.

186 NAL Call. No.: 41.8 AV5
Late clinical expression of lameness related to associated osteomyelitis and tibial dyschondroplasia in male breeding turkeys.
Wyers, M.; Cherel, Y.; Plassiart, G.
Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Apr. Avian diseases v. 35 (2): p. 408-414; 1991 Apr. Includes references.

Language: English

Descriptors: Turkeys; Male animals; Stress; Transport of animals; Lameness; Osteomyelitis; Tibia; Dyschondroplasia

Abstract: A sudden outbreak of lameness related to transport stress is described in a flock of male breeding turkeys. Most of the affected turkeys exhibited obvious unilateral leg disorders. All were affected with tibial or metatarsal dyschondroplasia with at least one lesion associated with a large focus of necrosis. By histological examinations, bone lesions showed the typical feature of osteomyelitis. The inflammatory bone lesions appeared at only single isolated sites and were always associated with obvious sequestra of dyschondroplastic retained cartilage. Osteomyelitis seems to be an unexpected acute complication of previous dyschondroplasia in relation with different breeding stress situations. The resulting pain of the associated lesions could be the main cause of clinical expression of lameness. The pathogenesis of the phenomenon remains uncertain.

187 NAL Call. No.: 47.8 AM33P
Laying hen performance as affected by diet and caging density. Brake, J.D.; Peebles, E.D.
Champaign, Ill. : Poultry Science Association; 1992 Jun. Poultry science v. 71 (6): p. 945-950; 1992 Jun. Includes references.

Language: English

Descriptors: Hens; Stocking density; Cage density; Laying performance; Dietary protein; Lysine; Egg weight; Feed intake; Feed conversion efficiency; Sulfur amino acids

Abstract: Two trials were conducted to investigate the effects of caging density and diet on the performance of caged layers. Diets were formulated to contain .775, .725, and .675% lysine. The TSAA content was formulated to be 85% of the lysine content of each diet. Pullets were caged in 25.4 cm wide X 40.0 cm deep cages at three, two, or one bird per cage. Production data were collected for 112 days in Trial 1 and 168 days in Trial 2. As

dietary protein, lysine, and TSAA increased, hen-day egg production, egg weight, and feed conversion improved ($P < .05$). Feed consumption and feed per dozen eggs were not consistently affected by diet. Caging density had no consistent effects on any of the production parameters. No interactions were detected between dietary treatments and cage density in either trial.

188 NAL Call. No.: 100 M668
Less ammonia: healthier turkeys.
Wold, J.
St. Paul, Minn. : The Station; 1992.
Minnesota science - Agricultural Experiment Station, University of Minnesota v. 47 (1): p. 2, 3; 1992.

Language: English

Descriptors: Turkeys; Poultry housing; Slatted floors; Ammonia; Poultry droppings

189 NAL Call. No.: 47.8 AM33P
Light intensity and sex ratio effects on egg production, egg quality characteristics, and fertility in breeder Pekin ducks. Davis, G.S.; Parkhurst, C.R.; Brake, J.
Champaign, Ill. : Poultry Science Association; 1993 Jan. Poultry science v. 72 (1): p. 23-29; 1993 Jan. Includes references.

Language: English

Descriptors: Ducks; Egg production; Light intensity; Lamps; Sex ratio; Duck eggs; Egg weight; Egg shell quality; Egg fertility

Abstract: A flock of 520, 11-wk-old breeder Pekin ducklings was raised in 20 floor pens in a curtain-sided poultry house under decreasing day lengths. At 22 wk of age, the ducklings were photostimulated (16 h of light/day) with a combination of natural daylight and artificial light. After dusk, half of the ducklings were exposed to 10 lx of incandescent (IN) light and the other half were maintained under 172 lx of high-pressure sodium (HPS) light. In addition, each light treatment consisted of an equal number of pens with two different sex ratios, 22 hens:4 drakes (15% males) and 21 hens:5 drakes (19% males). Egg production, egg quality characteristics, and fertility were monitored from 22 to 52 wk of age. Ducklings housed under 172 lx of HPS light exhibited significantly (P less than or equal to .05) greater egg production between 23 and 34 wk of age. Egg weight, shell weight, and shell thickness were not consistently affected by the different light treatments or sex ratios. The sex ratios did not affect percentage egg fertility, but fertility was significantly (P less than or equal to .05) higher in the HPS light treatment during the last 15 wk of the study. It was concluded that HPS light of 172 lx can enhance egg production in breeder Pekin ducklings prior to peak production (37 wk), and HPS light can improve fertility following the peak egg production period. Furthermore, this study indicated that a breeder duckling flock with 15% males was adequate to achieve optimum fertility.

190 NAL Call. No.: 47.8 AM33P
Light intensity effects on reproductive performance of turkey breeder hens. Siopes, T.D.
Champaign, Ill. : Poultry Science Association; 1991 Oct. Poultry science v. 70 (10): p. 2049-2054; 1991 Oct. Includes references.

Language: English

Descriptors: Turkeys; Female fertility; Light regime; Light intensity; Laying performance; Feed intake; Egg weight

Abstract: Two trials were conducted to evaluate the reproductive performance of turkey hens to different light intensity during the lay period. In Trial 1 the hens were exposed to 16 h of light (L) and 8 h dark (D) per day (16L:8D) at 54,108,or 2161x and in Trial 2 a 2X2 factorial arrangement of treatments was used with main treatment factors being intensity level (54 versus 324 1x) and photoperiod (16L:8D) versus 14L:10D). Data were

collected for time to on set of lay, rate of lay, fertility, hatchability, and egg and poult weight in both trials, and feed intake in Trial 1. In both trials the light intensity treatments were similarly effective in the photoinduction of reproductive performance in Large White turkey hens. This occurred with daily photoperiods of both 14L:10D and 16L:8D in Trial 2 and there was no photoperiod by intensity interaction. There were no significant differences in feed intake or feed efficiency among the 54-, 108-, and 216-1x treatments of Trial 1. It may be concluded that reproductive performance of turkey hens in closed confinement is equivalent within an intensity range of 54 to 324 1x.

191 NAL Call. No.: 47.8 AM33P
Live performance and carcass yield of male broilers from two commercial strain crosses receiving rations containing lysine below and above the established requirement between six and eight weeks of age.
Acar, N.; Moran, E.T. Jr; Bilgili, S.F.
Champaign, Ill. : Poultry Science Association; 1991 Nov.
Poultry science v. 70 (11): p. 2315-2321; 1991 Nov. Includes references.

Language: English

Descriptors: Broilers; Strain differences; Crossbred progeny; Lysine; Breast muscle; Liveweight gain; Carcass yield; Body weight; Body parts; Abdominal fat

Abstract: A total of 1,440 male broilers from two commercial strain crosses, Peterson X Arbor Acres (PAA) and Ross X Ross (RR), was grown to 6 wk of age on crumbled starter (23.2% CP with 1.21% lysine and 3,231 kcal AMEn/kg) and grower (20% CP with 1.01% lysine and 3,234 kcal AMEn/kg) rations. One-half of the 24 birds from each pen were processed and deboned at 6 wk of age. The remaining birds subsequently received experimental rations from 6 to 8 wk of age based on corn, soybean meal, and corn gluten meal (basal ration = 18.1% CP and 2,961 kcal AMEn/kg) containing increasing levels of dietary lysine (.75, .85, 1.05, and 1.15% of complete feeds). All birds were then processed and deboned as performed at 6 wk. The main effects of dietary lysine and strain were analyzed by analysis of variance as a factorial arrangement at 8 wk of age. Live performance of PAA at 8 wk was significantly better than RR, and neither strain cross responded to lysine. The RR had a significantly lower percentage of abdominal fat, and greater percentages chilled carcass and yields of breast "fillets" (Pectoralis major), and "tenders" (Pectoralis minor) than PAA at both 6 and 8 wk. Dietary lysine alone did not affect any carcass characteristics, however, interactions existed between strain and lysine for abdominal fat, breast fillets yield, and tenders yield, which indicated that RR was at advantage for all factors when lysine attained .85%.

192 NAL Call. No.: S544.3.V8V52
Livestock and pets: poultry area fly control.
Turner, E.C.; Youngman, R.R.
Blacksburg, Va. : Extension Division, Virginia Polytechnic Institute and State University; 1992.
Publication - Virginia Cooperative Extension Service (456-018): p. 177-180; 1992. In the series analytic: Pest management guide for home grounds of animals / edited by B.J. Brinlee.

Language: English

Descriptors: Diptera; Insect control; Poultry housing; Integrated pest management; Hygiene; Bait traps; Spraying; Insecticides

193 NAL Call. No.: 47.8 AM33P
Lower gut contents of broiler chickens withdrawn from feed and held in cages. Papa, C.M.
Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 375-380; 1991 Feb. Includes references.

Language: English

Descriptors: Broilers; Fowl feeding; Digesta; Small intestine; Colon; Cecum; Cloaca; Excreta; Moisture content; Restricted feeding; Slaughter

Abstract: The purpose of the study was to evaluate We effect of feed withdrawal on the amount and condition of lower gut contents in broiler chickens. A total of 168 birds was used, there were seven treatments of feed withdrawal before slaughter. Data were combined into the following periods (hours of withdrawal) for statistical analysis: Period 1 = 0 and 4 h; Period 2 = 8 and 12 h; and Period 3 = 16, 20, and 24 h. Birds were killed by ether inhalation. Results indicated an increased production of excreta DM and greater loss of BW for birds subjected to the longer periods of withdrawal. The amounts of gross contents in the small intestine, ceca, colon, and cloaca were greater for Period 1 than for Periods 2 add 3. Percentages of moisture in the contents of these segments differed, as follows: in the small intestine, no differences were detected among periods; in the colon and cloaca, moisture content was lower for Period 1 than for Period 3, and no difference was detected between Periods 2 and 3; in the ceca, moisture content was higher for Period 1 than for Period 3, but again, no difference was detected between Periods 2 and 3. Cecal material was observed in the colon only 15 times, and the numbers in each period were about equal. Ether inhalation almost entirely eliminated peri-mortem excretion. In conclusion, the scheduling of feed withdrawal to occur within Period 2 (withdrawal 8 and 12 h before slaughter) seemed adequate for minimizing the potential of fecal contamination during preslaughter handling.

194 NAL Call. No.: SF481.2.P68
Management factors in leg disorders.
Classen, H.L.
Oxfordshire : Carfax Publishing Company; 1992.
Poultry Science Symposium v. 23: p. 195-211; 1992. In the series analytic: Bone biology and skeletal disorders in poultry / edited by C.C. Whitehead. Meeting held September 18-20, 1991, Edinburgh. Literature review. Includes references.

Language: English

Descriptors: Broilers; Turkeys; Intensive husbandry

195 NAL Call. No.: 275.29 G29L
Management guide for the backyard flock.
Sander, J.E.; Lacy, M.P.
Athens, Ga. : The Service; 1991 Aug.
Leaflet - Cooperative Extension Service, University of Georgia (429): 12 p. ill; 1991 Aug.

Language: English

Descriptors: Georgia; Chicken meat; Poultry housing; Poultry diseases; Poultry feeding; Residential areas

196 NAL Call. No.: S671.A66
Market turkey performance affected by floor type and brooding method. Chen, F.; Noll, S.L.; Clanton, C.J.; Janni, K.A.; Halvorson, D.A. St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Sep.
Applied engineering in agriculture v. 7 (5): p. 606-612; 1991 Sep. Includes references.

Language: English

Descriptors: Turkeys; Performance testing; Growth; Brooders; Floor type; Litter; Cages

Abstract: Two experiments with 320 Large White male turkeys (Nicholas strain) investigated the effect of partial replacement of litter with different types of slotted flooring (fiberglass, concrete, or wood in Experiment 1 and polyvinyl chloride pipe, concrete, or wood in Experiment 2) and the effect of brooding method (cage or floor) on later growing performance. Growth, mortality, feed efficiency, and foot pad dermatitis were not affected by partial replacement of the litter floor area with slotted flooring. Excreta buildup due to narrow slot width was a problem in Experiment 1. Turkeys reared on deep litter had greater breast blister scores than turkeys reared on

the wider-slotted flooring in Experiment 2. Slotted flooring reduced litter moisture in both experiments. Cage-brooded turkeys in Experiment 1 were heavier than floor-brooded turkeys at three weeks of age, had greater mortality, and in Experiment 2 had more breast blisters.

197 NAL Call. No.: 47.8 AM33P
Maternal body weight and feed allowance of breeders affect performance of dwarf broiler breeders and tibial ossification of their progeny. Triyuwanta; Leterrier, C.; Brillard, J.P.; Nys, Y.
Champaign, Ill. : Poultry Science Association; 1992 Feb. Poultry science v. 71 (2): p. 244-254; 1992 Feb. Includes references.

Language: English

Descriptors: Hens; Broilers; Body weight; Bone mineralization; Restricted feeding; Feed intake; Egg production; Egg hatchability; Mortality; Egg quality; Abdominal fat; Bone ash; Legs; Abnormalities; Tibia

Abstract: Four hundred and eight dwarf broiler breeder hens were raised collectively in a floor pen to 21 wk of age. At this age they were classified into four groups with reference to their individual BW as heavy (1.95 +/- .1 kg), medium (1.80 +/-.1 kg), light (1.69 +/-.1 kg), and ultralight (1.57 +/-.1 kg). All groups were individually caged at 23 wk of age. During the reproductive period, each group was divided into three subgroups fed on liberal, intermediate, or severe feed restriction (reaching up to 135, 125, and 115 g of daily feed allowance at 29 wk of age, respectively). Intergroup differences in BW were maintained throughout the experiment (21 to 61 wk) but tended to decrease with age. Hen-day egg production was depressed by the lower feed allowance. Fertility and hatchability were impaired when hens received the largest quantities of food. Hen size influenced female breeder performance only slightly. Shell quality and albumen quality were affected by the level of feed consumption. Egg weights as well as BW of the progeny at hatching were enhanced by increased maternal BW and feed allowance. This positive maternal effect was still present at 40 days of age. Despite better overall BW perfomances of the male versus female broilers, the abdominal fat pad of female broilers was heavier than that of males and tended to increase with breeder size and breeder feed allowance. Accordingly, tibial breaking strength and percentage ash of the progeny at hatching were markedly improved in proportion to the breeders' BW and to their feed allowance. The effect of breeder size on broiler tibial quality was maintained up to 40 days of age but the effect of breeder feed intake tended to disappear with increasing age of the broilers. Tibial strength and mineralization were higher in male than in female broilers at 40 days of age. Dyschondroplasia was higher in broilers hatched from heavier breeder hens, but was not influenced by breeder feed intake. The incidence of varus and valgu

198 NAL Call. No.: QL750.A6
Measuring aversion in domestic fowl using passive avoidance. Rutter, S.M.; Duncan, I.J.H.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Mar. Applied animal behaviour science v. 33 (1): p. 53-61; 1992 Mar. Includes references.

Language: English

Descriptors: Hens; Avoidance conditioning; Stimuli; Fearfulness; Animal welfare

199 NAL Call. No.: 47.8 AM33P
Measuring preferences and the strength of preferences. Duncan, I.J.H.
Champaign, Ill. : Poultry Science Association; 1992 Apr. Poultry science v. 71 (4): p. 658-663; 1992 Apr. Paper contributed to the Symposium on Quantifying the Behavior of Poultry. Literature review. Includes references.

Language: English

Descriptors: Poultry; Animal behavior; Testing; Animal welfare; Duration; Training of animals; Literature reviews

Abstract: In this review, it is argued that welfare concerns what animals feel. Preference tests give a good first indication of how animals feel and are therefore extremely valuable in animal welfare studies. Methods of overcoming the shortcomings of preference tests are discussed. In order that the results from preference tests be interpreted properly, they should be followed up with appropriate tests to measure the strength of preference. Examples of research in this area that have focused on poultry are given.

200 NAL Call. No.: 47.8 AM33P
Measuring social behavior in poultry.
Craig, J.V.
Champaign, Ill. : Poultry Science Association; 1992 Apr.
Poultry science v. 71 (4): p. 650-657; 1992 Apr. Paper contributed to the Symposium on Quantifying the Behavior of Poultry. Literature review. Includes references.

Language: English

Descriptors: Fowls; Animal behavior; Selection responses; Stress response; Social dominance; Poultry housing; Sexual maturity; Literature reviews

Abstract: Social behavior of poultry is discussed in general terms, variables having major effects are indicated, and frequently used techniques of measurement are presented and compared. Studies in which different variables and methods were described are presented as examples, with primary emphasis on the behavior of chickens.

201 NAL Call. No.: S671.A66
Mechanical backup systems for electronic environmental controllers. Gates, R.S.; Overhults, D.G.; Turner, L.W.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Jul. Applied engineering in agriculture v. 8 (4): p. 491-497; 1992 Jul. Includes references.

Language: English

Descriptors: Environmental control; Controllers; Pig housing; Poultry housing

Abstract: A series of mechanical backup systems for electronic environmental controllers is presented for a typical finishing swine barn and a typical tunnel ventilated broiler house. The systems consist of mechanical thermostats and timers used in parallel with the electronic controller, designed to ensure animal survival in the event of controller or related hardware failure. For swine housing, three distinct mechanical backup functions are identified; for broiler housing, four distinct mechanical backup functions are identified. Schematic diagrams of the mechanical backup functions are provided and their implementation is described.

202 NAL Call. No.: QH540.S8
A minimum-cost biofilter for reducing aerial emissions from a broiler chicken house.
Pearson, C.C.; Phillips, V.R.; Green, G.; Scotford, I.M. Amsterdam : Elsevier Science Publishing B.V.; 1992.
Studies in environmental science (51): p. 245-254; 1992. In the series analytic: Biotechniques for air pollution abatement and odour control policies / edited by A.J. Dragt and J. van Ham. Proceedings of an International Symposium, October 27-29, 1991, Maastricht, The Netherlands. Includes references.

Language: English

Descriptors: Chicken housing; Poultry droppings; Odor abatement; Odor emission; Biological treatment; Microbial degradation; Bioreactors

203 NAL Call. No.: 290.9 AM32T
A model for the heat pump brooding of broilers.
Ibrahim, M.H.; Stewart, L.E.; Carr, L.E.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jul. Transactions of the ASAE v. 34 (4): p. 1873-1878; 1991 Jul. Literature review. Includes references.

Language: English

Descriptors: Broilers; Brood rearing; Floor husbandry; Heat pumps; Poultry housing; Simulation models

Abstract: A mathematical model was developed to describe air-to-air heat pump performance for floor raised broilers inside a 20,000 bird house (122 X 12.2 m) (Ibrahim, 1988). A subroutine was used to predict the performance of air-to-air heat pumps used to supply the supplemental heat for the broiler house in a January flock. Three heat pump sizes were studied in these simulations (61.53, 82.63, and 94.93 kW). From the simulations, the most economical combination of heat pump size and its auxiliary electrical resistance was chosen based on minimum total cost. The 61.53 kW heat pump was the most economical of the three sizes studied. The cost was 1.1 times greater for heat pump brooding compared to the conventional LP-gas brooding system. The 61.53 kW heat pump would be economically viable when the price of LP-gas is greater than $0.89/gallon.

204 NAL Call. No.: 410 B77
Modification of fear in domestic chicks, Gallus gallus domesticus, via regular handling and early environmental enrichment.
Jones, R.B.; Waddington, D.
London : Academic Press; 1992 Jun.
Animal behaviour v. 43 (pt.6): p. 1021-1033; 1992 Jun. Includes references.

Language: English

Descriptors: Chicks; Fearfulness; Behavior modification; Handling; Environment; Enrichment; Animal welfare

Abstract: Although its adaptive properties are recognized, fear can harm the welfare and performance of intensively housed poultry. Its alleviation in individually caged domestic chicks via the independent or integrated application of regular handling and environmental enrichment regimes was investigated. The test situations incorporated varying degrees of exposure to novel, inanimate stimuli and of human involvement. Enrichment reduced freezing and avoidance of a novel object introduced into the home cage, accelerated emergence from a sheltered area into an exposed unfamiliar one and increased vocalization, ambulation and pecking in an open field or novel environment. It also reduced the chicks' avoidance of a nearby, visible experimenter and attenuated their tonic immobility reaction to manual restraint. Such wide-ranging effects suggest that environmental enrichment may have modified general, non-specific fearfulness. Regular handling also attenuated the chicks' tonic immobility responses and their avoidance of the experimenter but it exerted few other detectable effects and there was no demonstrable effect of handling in the presence of enrichment. These findings are consistent with the suggestion that repeated gentle handling may exert its strongest influence by facilitating habituation to human beings rather than by, reducing underlying fearfulness. The implications of reduced fearfulness and other potential benefits of handling and enrichment procedures are discussed.

205 NAL Call. No.: 47.8 AM33P
Modification of the ethidium bromide exclusion procedure for evaluation of turkey semen.
Bakst, M.R.; Cech, H.C.; Sexton, T.J.
Champaign, Ill. : Poultry Science Association; 1991 Feb.
Poultry science v. 70 (2): p. 366-370; 1991 Feb. Includes references.

Language: English

Descriptors: Turkeys; Semen; Spermatozoa; Viability; Osmotic pressure; Solutions; Quality; Evaluation; Turkey egg fertility; Artificial insemination; Homidium bromide

Abstract: The objective of the present study was to modify the ethidium bromide exclusion procedure in order to detect dead and labile turkey spermatozoa after 24 h storage at 7 C. In Experiment 1, fresh and stored spermatozoa were suspended in phosphate-buffered saline (PBS) ranging in osmolarity from 296 to 3 mOsm/ kg H2O, each solution containing the same concentration of the nuclear fluorochrome ethidium bromide. In the 3

mOsm/kg H2O PBS, nearly all the fresh (98.3%) and stored (96.7%) spermatozoa were stained with ethidium bromide, indicating they were nonviable. Fresh spermatozoa revealed minor variation in the precentage of nonviable spermatozoa in the ethidium bromide exclusion procedure (ethidium bromide in PBS at 296 mOsm/kg H2O) (20.9%) and the remaining hypotonic PBS solutions (range 20.4 to 18.9%). In the stored semen samples a previously undetected subpopulation of more labile spermatozoa became apparent in hypotonic solutions with osmolarities of 122 and 56 mOsm/kg H2O. In Experiment 2, hen fertility was determined using fresh and stored semen. All hens were inseminated with 100 X 10(6) viable spermatozoa. Viability of stored semen was determined either by the original ethidium bromide exclusion procedure or using the sperm-stress test (ethidium bromide in PBS at 56 mOsm/kg H2O). The observations showed that adjusting the number of viable spermatozoa inseminated based on the percentage of viable sperm estimated from the sperm-stress test did not improve hen fertility over a 15-wk egg production period.

206 NAL Call. No.: 47.8 AM33P
Multivariate epidemiological approach to coccidiosis in broilers. Henken, A.M.; Goelema, J.O.; Neijenhuis, F. Champaign, Ill. : Poultry Science Association; 1992 Nov. Poultry science v. 71 (11): p. 1849-1856; 1992 Nov. Includes references.

Language: English

Descriptors: Netherlands; Broilers; Coccidiosis; Lesions; Epidemiology; Risk; Light regime; Environmental temperature; Ammonia; Carbon dioxide; Air quality; Litter; Chicken housing; Size

Abstract: A retrospective, case-control study into risk factors of coccidiosis was undertaken using data from 189 broiler flocks. A case flock was defined as a flock in which at least one bird had intestinal lesions on 1 of 6 wk in a 42-day cycle. Flocks wherein such birds could not be detected were defined as controls. There were 187 variables, measured or derived. These were assigned to subsets of data, each subset being a group of variables representing related information. Uni- and bivariate analyses were performed in each subset. Variables and interactions that were significant in these analyses were entered into a multivariate model across subsets. In the final model, seven variables appeared to be significantly associated with detecting lesions in birds of a flock. Differences among breeds covered a range of about an 80-fold change in risk of being a case. At intermittent lighting, the risk of being a case increased about sevenfold compared with continuous lighting. A higher initial (Week 1) environmental temperature decreased the risk of finding lesions in a flock (about .8-fold per degree Celsius). This risk was also lower at a lower average aerial ammonia content (below versus above 14 ppm) and higher maximum carbon dioxide content (above versus below .4 vol%) changing the risk about .3- and .4 -fold, respectively. The risk of being among cases increased with more litter (about twofold per kilogram of litter per square meter). Flocks in houses of 600 to 800 m(2) were about 9.8 times more at risk of being scored as lesion-positive than those in smaller houses. It is concluded that quantitative epidemiological methods may be used to identify and quantify relevant risk factors to control losses from impaired health and productivity.

207 NAL Call. No.: 47.8 AM33P
Multivariate epidemiological approach to salmonellosis in broiler breeder flocks.
Henken, A.M.; Frankena, K.; Goelema, J.O.; Graat, E.A.M.; Noordhuizen, J.P.T.M.
Champaign, Ill. : Poultry Science Association; 1992 May.
Poultry science v. 71 (5): p. 838-843; 1992 May. Includes references.

Language: English

Descriptors: Broilers; Salmonellosis; Salmonella; Hygiene; Chicken housing; Disease surveys; Multivariate analysis; Risk; Epidemiology; Intensive husbandry

Abstract: A retrospective, case-control study into risk factors of salmonellosis was undertaken using data from 111 broiler breeder flocks assembled during a 5-yr period. The results of both univariate and multivariate analyses are presented. Many different Salmonella species were detected. Multivariate models were created based on the outcome of univariate analyses. The following variables appeared to be the most relevant: disinfection tubs, hygiene barriers, the interaction of disinfection tubs by hygiene barriers, and feed mills. The

final model indicated that flocks housed at farms without a disinfection tub, with poor hygiene barriers, and receiving their feed from a small feed mill had a 46.1 times greater risk of being Salmonella-positive than flocks housed at farms with a disinfection tub, with good hygiene barriers, and receiving their feed from a large feed mill. It is concluded that the application of quantitative epidemiological methods can be valuable not only to identify potential risk factors but also to quantify their contributory effect on the disease outcome. Hence, it may be a useful tool for application in "integrated food chain quality control programs".

208 NAL Call. No.: 41.8 AV5
Mycoplasma synoviae in a release pen-raised wild turkey. Luttrell, M.P.; Kleven, S.H.; Mahnke, G.M.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jan. Avian diseases v. 36 (1): p. 169-171; 1992 Jan. Includes references.

Language: English

Descriptors: North Carolina; Turkeys; Mycoplasma synoviae; Symptoms; Case reports; Wild birds; Mycoplasmosis

Abstract: Mycoplasma synoviae (MS) was isolated from the sinus of an adult female "wild-type" turkey found feeding with backyard chickens at a private residence in Randolph County, N.C. Clinical signs included sinusitis, dyspnea, emaciation, diarrhea, and nasal discharge. The bird was seropositive for MS and M. gallisepticum (MG) on the rapid plate agglutination test and had titers of 1:160 for MS and 1:20 for MG on the hemagglutination-inhibition test. Isolations of MS and M. galloparvonis were confirmed by the fluorescent antibody test. This case represents the first and only, report of MS in a free ranging "wild-type" turkey in the eastern United States. Behavioral and other evidence suggests that the bird was a released pen-raised turkey.

209 NAL Call. No.: 472 N42
The myth of the barn egg.
Harrison, R.
London, Eng. : New Science Publications; 1991 Nov30.
New scientist v. 132 (1797): p. 40-43; 1991 Nov30.

Language: English

Descriptors: Europe; Animal welfare; Hens; Stocking density; Regulations; European communities; Eggs

210 NAL Call. No.: QL750.A6
The nature of handling immediately prior to test affects tonic immobility fear reactions in laying hens and broilers.
Jones, R.B.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Aug.
Applied animal behaviour science v. 34 (3): p. 247-254; 1992 Aug. Includes references.

Language: English

Descriptors: Hens; Broilers; Fearfulness; Handling; Immobilization

211 NAL Call. No.: S1.S68
New biologically based technique for keeping poultry in cages. Khoshabov, G.D.; Kalyuzhnov, V.T.; Sukhova, N.O.
New York, N.Y. : Allerton Press; 1991.
Soviet agricultural sciences (7): p. 45-48; 1991. Translated from: Vsesoiuznaia akademiia sel'skokhoziaistvennykh nauk. Doklady, (7), p. 48-52. (20 AK1). Includes references.

Language: English; Russian

Descriptors: Siberia; Poultry housing; Hens; Battery cages; Maintenance; Equipment; Cage density; Animal physiology; Productivity; Improvement

212 NAL Call. No.: 290.9 AM32T
Numerical optimization of evaporative misting systems. Gates, R.S.; Timmons, M.B.; Bottcher, R.W.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Jan. Transactions of the ASAE v. 34 (1): p. 275-280; 1991 Jan. Includes references.

Language: English

Descriptors: Mist sprayers; Poultry housing; Relative humidity; Temperature; Ventilation; Evaporative cooling; Broilers; Mathematical models

Abstract: A new method for implementing evaporative misting of broiler houses was developed and investigated. The method consisted of a nonlinear optimization of an objective function for bird comfort, subject to a set of constraints defining a thermal balance on the building. The method predicted the interior state point of the air, the ventilation rate and evaporative efficiency. The misting evaporation rate was specified at different values. The objective function utilized was a temperature-humidity index (THI). Minimizing THI with specified evaporation rates resulted in surprisingly low ventilation rates over an extremely wide range for outside conditions. Comparison of these results with conventional misting operations showed substantial reductions in THI (2 degrees C for a typical case). Application of the proposed new method is discussed.

213 NAL Call. No.: 41.8 AV5
Occurrence of Salmonella enteritidis in the U.S. commercial egg industry: report on a national spent hen survey. Ebel, E.D.; David, M.J.; Mason, J.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 646-654; 1992 Jul. Includes references.

Language: English

Descriptors: U.S.A.; Hens; Salmonella enteritidis; Salmonella; Incidence; Cecum; Geographical distribution; Flocks; Regional surveys

Abstract: In order to estimate the prevalence and distribution of Salmonella enteritidis in U.S. commercial egg-production flocks, a survey of spent laying hens was conducted over a 3-month period. Seven of the 10 largest spent hen processing plants in the United States participated. Ceca were sampled twice weekly from birds presented for slaughter at these plants. Simples were cultured for Salmonella and S. enteritidis and S. enteritidis isolates were phage-typed. Overall, 23,431 pooled cecal samples were collected from a total of 406 layer houses. Salmonella (any serotype) and S enteritidis were recovered from 24% and 3% of the pooled samples, respectively. The distribution of S enteritidis phage types was consistent with data reported by others. Regionally, the estimated prevalence of S. enteritidis positive houses (i.e., at least one positive sample found in a house) for the Northern, Southeastern. and Central/Western regions was 45%, 3%, and 17%, respectively. Overall, the prevalence of Salmonella-positive positive houses was 86%.

214 NAL Call. No.: 47.8 AM33P
Oocytes of Eimeria in the litter of broilers reared to eight weeks of age before and after withdrawal of lasalocid or salinomycin. Chapman, H.D.; Johnson, Z.B.
Champaign, Ill. : Poultry Science Association; 1992 Aug. Poultry science v. 71 (8): p. 1342-1347; 1992 Aug. Includes references.

Language: English

Descriptors: Broilers; Litter; Eimeria; Oocytes; Moisture content; Lasalocid; Salinomycin; Body weight; Feed conversion efficiency; Liveweight gain

Abstract: Forty-six broiler houses were examined for the presence of oocysts of Eimeria in the litter before and after withdrawal of lasalocid or salinomycin from the feed. A decrease in number of small oocysts (Eimeria acervulina or Eimeria mitis) was observed following withdrawal of medication. Numbers of medium-sized oocysts (probably Eimeria tenella) remained the same, but an increase in large oocysts (Eimeria maxima) was recorded. No lesions attributable to Eimeria tenella were found in the ceca of birds after withdrawal of the drug. More small-and medium-sized oocysts were found at sites with new litter than at sites where the litter had been employed for previous flocks. No difference in the number of oocysts was found, whether birds were reared on oak shavings or a mixture of pine shavings and rice hulls. The number of oocysts was positively correlated with the moisture content of the litter, but there was no correlation between oocysts present and the final BW or feed conversion of the birds. Moisture levels were highest (after withdrawal of drug) for new litter or oak shavings. There was no correlation between moisture content of the litter and BW or feed conversion.

215 NAL Call. No.: 47.8 AM33P
Optimum ventilation capacity for layer houses.
Aho, P.W.; Timmons, M.B.
Champaign, Ill. : Poultry Science Association; 1991 Nov.
Poultry science v. 70 (11): p. 2237-2245; 1991 Nov. Includes references.

Language: English

Descriptors: Egg production; Simulation models; Environmental temperature; Artificial ventilation; Cost benefit analysis; Economic impact; Risk; Chicken housing; Egg weight

Abstract: A stochastic weather model was used in conjunction with a deterministic performance model of egg production. These two models were used to determine optimum ventilation rate capacities for layer houses, given four different climates (as reflected by monthly maximum outside temperatures), and two egg price scenarios. Stochastic simulations were conducted for 200 yr at expected maximum monthly average temperatures of 21, 23, 25, and 27 C. Optimum ventilation rates ranged from 3.75 m3/h per kilogram to at least 9.4 m3/h per kilogram depending upon flock placement date or confidence level desired. Net economic return increased by as much as $.263 per layer per year when 7.5 m3/h per kilogram was used instead of 3.75 m3/h per kilogram, in a warm climate. In addition, optimum ventilation capacity was reduced by 1.9 m3 h per kilogram if the price differential that existed between extra large and large eggs was eliminated. These findings suggest that optimal ventilation capacities are higher than those currently in common use, particularly in areas with a moderate climate.

216 NAL Call. No.: NBULD3656.5 1991 N684
Ovarian responses of the laying hen to heat stress.. University of Nebraska--Lincoln thesis : Animal Science
Novero, Ruben P.
1991; 1991.
138 leaves : ill. ; 28 cm. Includes bibliographical references.

Language: English

217 NAL Call. No.: 290.9 AM32T
Partitioned ventilation control for broilers.
Flood, C.A. Jr; Trumbull, R.D.; Koon, J.L.; Brewer, R.N. St. Joseph, Mich. : American Society of Agricultural Engineers; 1991 Nov. Transactions of the ASAE v. 34 (6): p. 2541-2549; 1991 Nov. Includes references.

Language: English

Descriptors: Poultry housing; Psychrometers; Ventilation; Air temperature; Broilers; Heat conservation; Microcomputers; Relative humidity

Abstract: A partitioned ventilation control strategy was developed for broiler house environmental control. In the strategy, ventilation to remove moisture produced by broilers is partitioned into two daily time periods. The

protocol calls for 50 to 60% of the moisture to be removed by ventilation at a high rate during the warmest seven to nine hours of the day. The remaining moisture, is removed by ventilating at a lower rate during the remainder of the 24-hour period. The strategy was implemented in a small-scale, commercial-style broiler house using a low-cost microcomputer and associated input/output components. Over five growouts, a brooding gas savings of approximately 19% was realized compared to an identical house using a conventional control strategy and electromechanical controls. House temperature and bird performance were essentially the same for the two control schemes.

218 NAL Call. No.: 47.8 AM33P
Performance and immunity of heat-stressed broilers fed vitamin- and electrolyte-supplemented drinking water.
Ferket, P.R.; Qureshi, M.A.
Champaign, Ill. : Poultry Science Association; 1992 Jan.
Poultry science v. 71 (1): p. 88-97; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Drinking water; Vitamin supplements; Electrolytes; Environmental temperature; Liveweight gain; Feed conversion efficiency; Immune response; Mortality

Abstract: The efficacy of different vitamin and electrolyte treatments of drinking water for heat-stressed broilers was studied in two experiments. In Experiment 1, commercial broilers (50% male, 50% female, sexed), were subjected to four drinking water treatments: 1) unsupplemented water (control); 2) B-vitamins plus electrolytes (B+El); 3) vitamins A, D, and E, B-vitamins plus electrolytes (ADEB+El); and 4) vitamins A, D, and E and B-vitamins (ADEB). Each treatment group was replicated in eight pens containing 70 birds. All birds were provided ad libitum access to feed through to 43 days of age and subjected to the water treatment from 16 to 21 days and 38 to 43 days. The birds were exposed to the 35 C ambient temperature during the last 72 h of each period. Immune function was tested on the males in each pen while they received the water treatments from 24 to 34 days of age. In comparison with the control, feed conversion was improved 5.6% by ADEB+El and ADEB, and body weight gain was improved 6.7% by ADEB (P<.05). Total and IgG antibody response against SRBC after primary immunization was improved by B+El; whereas, B+El and ADEB treatments improved IgG after secondary immunization. The highest numbers of Sephadex-elicited peritoneal macrophages were found among ADEB-treated birds, but neither adherence nor phagocytic ability of macrophages from either group was affected. Natural killer cells from all except ADEB+El-treated birds exhibited comparably high tumoricidal activity. In Experiment 2, commercial male broilers were given either unsupplemented water or vitamin-supplemented water (ADEB treatment) at 22 to 30 days, 37 to 41 days, and 52 to 55 days. The birds were exposed to 35 C at 38 to 41 days and 53 to 55 days of age. The two water treatments were replicated in 16 pens of 40 birds. Vitamin treatment increased 1- to 63-day body weight gain and feed conversion by 3 and 5%, respectively (P<.1), and it reduced mortality related to heat stress by 63% (P<.05). Vitamin

219 NAL Call. No.: 47.8 AM33P
Performance evaluation of heat-stressed commercial broilers provided water-cooled floor perches.
Reilly, W.M.; Koelkebeck, K.W.; Harrison, P.C.
Champaign, Ill. : Poultry Science Association; 1991 Aug.
Poultry science v. 70 (8): p. 1699-1703; 1991 Aug. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Perches; Liveweight gain; Chicken housing; Feed conversion; Feed intake; Adaptation; Environmental factors

Abstract: A study was conducted to determine whether water-cooled floor perches would be utilized by commercial broilers exposed to a constant hot ambient environment; and subsequently, whether utilization of these perches would improve performance beyond those provided uncooled floor perches. A total of 330 day-old commercial broiler chicks were randomly allocated to six pens (2.44 m2) in an environmentally controlled facility and maintained in a thermoneutral brooding environment for 16 days. Following this period, 240 birds

were selected on a body weight basis and randomly assigned to the six pens. A perch constructed from steel pipe (2.44 m length, 5.0 cm diameter) was then placed diagonally on the litter covered floor of each pen. The birds were first exposed to a thermoneutral period (27.7 C), during which time cooling of the perches in three replicate pens was initiated by circulating tap water. The other three experimental pens received ambient perches. Ambient temperature was then raised to 32.6 C for the following 4 wk. The results of present study showed that utilization of water-cooled perches by broilers was greater (P less than or equal to.01) than ambient perch utilization throughout the 32.6 C period. Average daily gain was greatest (P less than or equal to .01) for broilers exposed to cool perches. Additionally, they consume more feed (P less than or equal to .05), on a daily basis, than those given ambient perches during the heat-stress period. Broilers exposed to water-cooled perches also had a more efficient gain to feed ratio (P less than or equal to .01). At the completion of the study, final body weight and total body weight gain were greater (P less than or equal to .05) for broilers given water-cooled perches compared with those exposed to ambient perches. Total amount of feed consumed and total food efficiency were only moderately affected (P less than or equal to .10) by perch treatments. These results indicated that water-cooled perches were bene

220 NAL Call. No.: SF481.J68
Performance of turkeys subjected to day and night feeding programs during heat stress.
Mamputu, M.; Cunningham, D.L.; Buhr, R.J.
Athens, Ga. : Applied Poultry Science, Inc; 1992.
Journal of applied poultry research v. 1 (3): p. 296-299; 1992. Includes references.

Language: English

Descriptors: Georgia; Turkeys; Heat stress; Restricted feeding

221 NAL Call. No.: 47.8 AM33P
Performance of two male broiler breeder strains raised and maintained on various constant photoschedules.
Renden, J.A.; Oates, S.S.; West, M.S.
Champaign, Ill. : Poultry Science Association; 1991 Jul.
Poultry science v. 70 (7): p. 1602-1609; 1991 Jul. Includes references.

Language: English

Descriptors: Broilers; Cocks; Photoperiod; Strain differences; Body weight; Semen production; Sexual maturity; Age; Testes; Weight; Spermatozoa; Blood plasma; Testosterone

Abstract: The purpose of the present study was to examine the interaction of constant photoschedules and genetic background on performance of male broiler breeders. Day-old cockerels from two BW strains were placed on litter floors in light-controlled chambers. Light treatments (LT) (60 lx) consisted of 2, 4, 8, 16, and 24 h light/day. At 9 wk of age, birds were individually caged and evaluated biweekly for semen production. Venous blood samples were collected at 16, 32, 48, and 64 wk of age. Data for testes weight, histology, and morphometry were obtained at 64 wk. Age at first semen production showed a cubic response in the levels of LT with earliest semen production from 4 and 8 h light (187.0 and 188.2 days, respectively). The BW was linear in the levels of LT within week; average BW was generally greater for birds on short LT than for birds on longer LT. Semen concentration was also linear in the levels of LT within week; increased semen concentration occurred with short LT. Changes in semen weight and spermatozoa count per ejaculate across the levels of LT differed for strain. A larger percentage of males produced semen in the less than or equal to 8 h LT than in the 16 or 24 h LT. Plasma testosterone was lower at 16 wk compared with later ages, and a positive linear relationship existed between testosterone level and hours of light. There was a cubic LT effect for testes weight per BW with larger values for less than or equal to 8 h LT compared with 16 or 24 h LT.

222 NAL Call. No.: 47.8 AM33P
Photoperiodic control of reproduction in the domestic hen. Sharp, P.J.
Champaign, Ill. : Poultry Science Association; 1993 May. Poultry science v. 72 (5): p. 897-905; 1993 May.

Paper presented at the symposium "Current Advances in Reproduction", August 3, 1992 at the 81st Annual Meeting of the Poultry Science Association. Includes references.

Language: English

Descriptors: Hens; Photoperiod; Lh; Hormone secretion; Egg production; Blood plasma; Gnrh

Abstract: Egg laying in domestic hens exposed to natural lighting begins shortly after the winter solstice, peaks in early spring, begins to decrease before the fall equinox, and is at its lowest during the late fall and early winter. The seasonal cycle of egg production phase-leads that of the changes in day length. This seeming anomaly can be explained if it is accepted that 1) short days are photoperiodically neutral and do not actively inhibit gonadotropin-releasing hormone (GnRH)-I neurons; and 2) long days are photoperiodically active, transducing both stimulatory and inhibitory inputs to GnRH-I neurons. The development of a long day-induced inhibitory input results in a form of photorefractoriness. Around the winter solstice, photorefractoriness is dissipated by prolonged exposure to short days, allowing GnRH-I neurons to express a photoperiodic-independent, genotype-dependent, level of activity. This is sufficient to stimulate egg laying before the minimum photoperiod for photoinduced gonadotropin release is reached in early spring. When day length begins to decrease after the summer solstice, the photoinduced stimulatory input to GnRH-I neurons is reduced, unmasking the photoinduced inhibitory input. As a consequence, the activity of GnRH-I neurons decreases rapidly and the intensity of egg laying decreases. The minimum and maximum day lengths required to stimulate reproductive function in short-day hens, calculated from the photoperiodic response curves (PRC) for luteinizing hormone release are about 10 and 13 h, respectively, depending on genotype. Practical lighting programs in photoperiodically controlled poultry houses can make use of PRC to "light up" hens using photoperiods on the linear portion of the appropriate PRC and subsequently increasing the photoperiod during the laying year to counter the progressive development of photorefractoriness.

223 NAL Call. No.: 444.8 G28
Plasma adrenocorticotropin in domestic geese: effects of ether stress and endocrine manipulations.
Kovacs, K.J.; Peczely, P.
Orlando, Fla. : Academic Press; 1991 Nov.
General and comparative endocrinology v. 84 (2): p. 192-198; 1991 Nov. Includes references.

Language: English

Descriptors: Geese; Corticotropin; Corticosterone; Hormone secretion; Stress; Ethers; Gonadectomy; Thyroidectomy; Blood plasma; Sex differences; Radioimmunoassay

Abstract: A direct radioimmunoassay for the determination of avian adrenocorticotropin (ACTH) in a small volume of plasma was developed using an antiserum specific for N-terminal region of the ACTH molecule. The sensitivity of the two stage assay is 0.1 fmol ACTH/tube. The specificity of the antiserum was tested by its cross reactions with synthetic ACTH fragments and by comparing curves obtained by dilution of different plasma specimens to that of ACTH(1-39) reference standard. Adrenocorticotropin responses of chronically cannulated geese to ether stress were evaluated and compared to changes of plasma corticosterone (B) concentration over a 2-hr period. ACTH showed a maximum between 5 and 10 min after ether exposure, while B peak appeared 10-15 min later. Thirty minutes after ether inhalation plasma ACTH returned to the baseline, while B response was longer-lasting and decreased to the resting level between 60 and 120 min. Basal and stress-induced ACTH plasma levels were also investigated in male and female gonadectomized and thyroidectomized geese. Castration increased, while thyroidectomy decreased the basal ACTH concentration. These endocrine manipulations did not, however, markedly affect the stress-induced ACTH hypersecretion except in thyroidectomized ganders, where the increment of plasma ACTH 10 min after ether inhalation was significantly lower than in sham operated control geese.

224 NAL Call. No.: 47.8 AM33P
Plasma progesterone, luteinizing hormone concentrations, and granulosa cell responsiveness in heat-stressed hens.

Novero, R.P.; Beck, M.M.; Gleaves, E.W.; Johnson, A.L.; Deshazer, J.A. Champaign, Ill. : Poultry Science Association; 1991 Nov. Poultry science v. 70 (11): p. 2335-2339; 1991 Nov. Includes references.

Language: English

Descriptors: Hens; Heat stress; Blood plasma; Progesterone; Lh; Laying performance; Granulosa cells; Ovaries; Ovulation; Biosynthesis; Timing

Abstract: Plasma progesterone and luteinizing hormone (LH) profiles were obtained during the first ovulatory cycle of heat-stressed (HS, 35 C; n = 24) and unstressed (US, 17 to 27 C; n = 24) hens using 30-min sampling intervals beginning approximately 6 h prior to ovulation. Progesterone levels from HS hens were lower from 6 h [.07 +/- 0.1 (SE) versus 1.66 +/- .25 ng/mL; P = .008] to predicted ovulation (.06 +/-.006 versus .70 +/- .18 ng/mL; P = .07). Likewise, LH levels from hens were lower from 6 h (1.55 +/- 16 versus 3.86 +/- .34 ng/mL; P =.007) to predicted ovulation (1.63 +/- .18 versus 2.50 +/- .27 ng/mL; P = .01). Eggs from HS hens were more often laid early (< 24 h) than eggs from US hens (71.42 versus 13.33%, respectively; P = .01), but US hens more often laid eggs of a normal oviposition interval length (24 to 26 h) compared with HS hens (73.34 versus 14.29%; P =.0005). The percentage of delayed eggs (> 26 h) was not different (US, 14.29 versus HS, 13.37%; P = .75) between the two treatment groups. Basal production of progesterone by dispersed granulosa cells from US hens was 97.62 +/- 16.01 ng/mL. Challenge by LH increased this to 417.50 +/- 53.38 ng/mL (P = .001). In contrast, basal progesterone secretion by cells from HS hens was 40.25 +/- 6.60 ng/mL (P = .0001) and LH challenge failed to increase progesterone production. The results indicate possible direct HS effects on ovarian tissue, perhaps in addition to other indirect effects, as a contributing factor to the decline in egg production.

225 NAL Call. No.: SB950.A1V4
Population dynamics of Rattus rattus in poultry and implications for control. Sridhara, S.; Krishnamurthy, T.R.
Davis, Calif. : University of California; 1992 Aug.
Proceedings ... Vertebrate Pest Conference (15): p. 224-228; 1992 Aug. Meeting held March 3-5, 1992, Newport Beach, CA. Includes references.

Language: English

Descriptors: India; Rattus rattus; Poultry housing; Poultry; Population dynamics; Population structure; Rodent control

226 NAL Call. No.: S1.M57
Portable housing for poultry and hogs.
Klober, K.
Columbia, Mo. : Missouri Farm Publishing Inc; 1993 Jun.
Small Farm Today v. 10 (3): p. 38-42; 1993 Jun.

Language: English

Descriptors: Poultry housing; Pig housing; Free range husbandry

227 NAL Call. No.: 47.8 AM33P
Posthatch carbohydrate feeding and subsequent performance of turkey poults. Donaldson, W.E.; Brewer, C.E.; Ferket, P.R.; Christensen, V.L. Champaign, Ill. : Poultry Science Association; 1992 Jan. Poultry science v. 71 (1): p. 128-132; 1992 Jan. Includes references.

Language: English

Descriptors: Poults; Dietary carbohydrate; Dietary protein; Glycogen; Liver; Body weight; Feed conversion efficiency; Mortality; Blood sugar

Abstract: In two floor pen trials, day-old poults were fed a low-protein (18.6%) diet for the first 24 or 48 h compared with control poults fed a 28% protein diet. Beyond these initial treatments, all poults were treated identically and were fed the normal progression of starter, grower, and finisher diets to market weight. The treatments did not alter market age body weight or feed conversion. Early mortality and feed intake during the first 48 h were unaffected by the treatments. Feeding the low-protein diet for 24 h enhanced liver glycogen reserves compared with the control. In a battery cage trial, diets containing 50, 33, or 15% available carbohydrate (20, 28, or 35% crude protein, respectively) were fed for 24 h posthatch. The diets had no effect on blood glucose level, but liver glycogen concentration increased with increasing dietary carbohydrate. The results clearly indicate that carbohydrate metabolism is altered by posthatch dietary carbohydrate level. The results also suggest that the dietary protein requirement during the first 24 or 48 h posthatch may not be as high as it is currently thought to be.

228 NAL Call. No.: SF995.W4
Postmortem monitoring of flock mortality. 1. Animal welfare aspects. McMartin, D.A.
Davis, Calif. : University of California; 1992.
Proceedings - Western Poultry Disease Conference (41st): p. 14; 1992. Meeting held on March 1-3, 1992, Sacramento, California. Includes references.

Language: English

Descriptors: Poultry; Animal welfare; Mortality

229 NAL Call. No.: SF487.A77 1992
Poultry production systems behaviour, management and welfare. Appleby, Michael C.; Hughes, B. O.; Elson, H. A.
Oxon, U.K. : C.A.B International,; 1992.
xvi, 238 p. : ill., map ; 24 cm. Includes bibliographical references (p. 210-227) and index.

Language: English

Descriptors: Poultry; Poultry

230 NAL Call. No.: 47.8 AM33P
Poultry production's environmental impact on water quality. Pope, C.W.
Champaign, Ill. : Poultry Science Association; 1991 May. Poultry science v. 70 (5): p. 1123-1125; 1991 May. Includes references.

Language: English

Descriptors: Poultry industry; Waste treatment; Waste disposal; Water quality; Environmental impact

Abstract: Poultry meat and eggs are rapidly becoming the major source of animal protein in the diets of American consumer's. Such expansion has resulted in a similar increase in waste management problems. The national production of broilers and mature chickens was 5.68 billion, 242 million turkeys, 31 million ducks, and 69 billion table eggs in 1989 based on the USDA National Statistics Survey. Annual production of fecal waste from poultry flocks was 8.8 million tons on a dry weight basis plus more than 106,000 metric tons of broiler hatchery waste. Add to this 37 million dead birds and condemnations at processing plants (figures are also from USDA for 1989 based on USDA National Statistics Survey). When all this waste is added together, the task of keeping the environment clean becomes monumental. The following waste management practices can and must take care of these poultry industry waste products: sanitary land fill, rendering facilities, extrusion machinery, compost plants, lagoons or holding tanks, and land application techniques.

231 NAL Call. No.: 47.8 AM33P
Poultry research and the contract payment-net return paradox. Aho, P.W.; Reid, D.W.

Champaign, Ill. : Poultry Science Association; 1991 Feb. Poultry science v. 70 (2): p. 250-253; 1991 Feb. Includes references.

Language: English

Descriptors: Georgia; Broilers; Research support; Contract farming; Returns; Poultry housing; Costs; Agricultural research; Productivity

Abstract: The purpose of the study was to illustrate the effects of the expenditure of public and private funds on basic and applied poultry research using the experience of broiler growers as an example. The cost of broiler housing was calculated for a 30-yr period from 1958 to 1987. Contract payments and net returns were calculated for 1958, 1973, and 1987. The results document a paradox. In 1987 dollars, over the period studied, contract payment per kilogram declined and cost per square meter of broiler housing increased, but return on invested capital grew. Specifically, grower contract payments declined from 14.1 cents to 8.8 cents/kg of broiler in 1987 dollar, and the cost per square meter for broiler houses and equipment increased from $22.94 to $47.52, also in 1987 dollar but the cash flow rate of return on invested capital over the low-risk government long-term bond rate increased from 2.4 to 7.2%. This apparent paradox was created by the effect of technological advances driven by public and private research expenditures during the last several decades.

232 NAL Call. No.: SF55.A78A7
Poultry wastes as foods for ruminants and asociated aspects of animal welfare. Roothaert, R.L.; Matthewman, R.W.
Suweon, Korea : Asian-Australasian Association of Animal Production Societies; 1992 Dec.
Asian-Australasian journal of animal sciences v. 5 (4): p. 593-600; 1992 Dec. Literature review. Includes references.

Language: English

Descriptors: Ruminant feeding; Poultry manure; Litter; Nonprotein nitrogen

233 NAL Call. No.: 47.8 AM33P
Precocious semen production in turkeys.
Etches, R.J.; Uribe, H.A.; Bagley, L.G.
Champaign, Ill. : Poultry Science Association; 1993 Jan.
Poultry science v. 72 (1): p. 193-201; 1993 Jan. Includes references.

Language: English

Descriptors: Turkeys; Semen production; Semen characters; Light relations; Restricted feeding; Sexual maturity; Growth rate; Diet; Egg fertility

Abstract: Turkey toms were reared under short days [either 8 h light (L): 16 h dark (D) or 12L:12D] and photostimulated by transfer to 14L:10D between 7 and 22 wk of age. Photostimulation between 12 and 15 wk of age initiates semen production at 18 to 20 wk of age. The fertilizing capacity of semen produced by these males is normal and the output of spermatozoa is unaffected when semen production is initiated precociously. Daylengths of 8L:16D or 12L:12D during the rearing period had no influence on subsequent reproductive performance. Semen production and fertilizing capacity were unaffected by nutritional regimens that reduced energy intake and maintained adequate protein consumption by toms. These programs reduced body weight of the mature tom by 10 to 30% and substantially increased the general fitness of the birds. Prevention of obesity improved feathering, facilitated handling of the birds, and reduced the incidence of ambulatory perturbations.

234 NAL Call. No.: 389.8 J82
Prevention of immunologic stress contributes to the growth-permitting ability of dietary antibiotics in chicks.
Roura, E.; Homedes, J.; Klasing, K.C.

Bethesda, Md. : American Institute of Nutrition; 1992 Dec.
The Journal of nutrition v. 122 (12): p. 2383-2390; 1992 Dec. Includes references.

Language: English

Descriptors: Chicks; Diet; Streptomycin; Penicillins; Sanitation; Immunology; Stress; Interleukin 1; Growth rate; Mode of action

Abstract: The growth-permitting ability of antibiotics fed to broiler chicks was studied as it relates to the state of activation of the immune system. in Experiment 1, chicks were fed two levels of antibiotics (0 or 100 mg streptomycin + 100 mg penicillin/kg diet) and were raised either in an environment with poor sanitation to create a chronic immune stress or in a clean environment. Chicks raised in the unsanitary environment and not fed antibiotics had significantly lower ($P < 0.05$) rates of weight gain and efficiencies of feed utilization, and higher levels of plasma interleukin-1, compared with chicks raised in the clean environment or chicks raised in the unsanitary environment and fed antibiotics. Adding antibiotics to the diet of birds in the clean environment did not affect any variable. In Experiment 2, chicks were raised in a conventional environment and fed two levels of an antibiotic (0 or 100 mg tetracycline/kg diet). After a 15-d feeding period, half of the chicks were injected with Salmonella typhimurium lipopolysaccharide to create an acute immunologic stress. Feeding antibiotic resulted in improved weight gain, feed consumption and efficiency of feed utilization. Lipopolysaccharide-injected birds developed heavier livers, spleens and intestines relative to body weights and higher rectal temperatures and hepatic metallothionein concentrations, presumably due to an immunologic stress. Omitting antibiotic from the diet resulted in similar changes. These results indicate that feeding antibiotics may permit growth by preventing immunologic stress and associated metabolic changes brought about by monokines including interleukin-1.

235 NAL Call. No.: SF481.2.P68
Priorities for welfare research.
Perrins, A.J.
Oxfordshire : Carfax Publishing Company; 1992.
Poultry Science Symposium v. 23: p. 345-348; 1992. In the series analytic: Bone biology and skeletal disorders in poultry / edited by C.C. Whitehead. Meeting held September 18-20, 1991, Edinburgh.

Language: English

Descriptors: Uk; Poultry; Animal welfare

236 NAL Call. No.: QR115.I57
Problems of Salmonella sampling.
Aho, M.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Mar.
International journal of food microbiology v. 15 (3/4): p. 225-235; 1992 Mar. Includes references.

Language: English

Descriptors: Salmonella; Poultry meat; Poultry industry; Sampling; Microbial flora; Bacterial count

Abstract: Modern husbandry practices, regional concentration of the industry, high stocking densities, uniform age-distribution of birds and continuous feeding promote the spread of poultry diseases. Moreover, the immature state of the intestinal microflora or disturbance of the developing flora by antibiotics increases susceptibility of chicks to salmonellas. If an estimate of the number of salmonella-positive birds in a flock is needed, then the required number of samples can be assessed by using the binomial distribution function. Whenever a qualitative result is sufficient, the samples can be pooled or the flock litter can be sampled using an 'overshoe method', which is a novel, low-cost and rapid technique. An optimal pooling factor can be assessed at low prevalence levels (< 10%). Serological methods will only detect the presence of antibodies to invasive strains of Salmonella. The sampling interval depends on the strategy of the Salmonella Control Programme. Breeder flocks should be sampled more frequently than meat flocks and laying flocks. The new salmonella standard, ISO

6579-1990, is applicable in the poultry industry. When bacterial numbers are likely to be low, or the organisms in a stressed condition, a pre-enrichment step should be included. In the case of faecal samples, however, pre-enrichment should be omitted. A whole carcass rinsing and massaging method is preferred for the examination of finished carcasses.

237 NAL Call. No.: 47.8 B77
Prophylactic and therapeutic treatment of ascites in broiler chickens. Shlosberg, A.; Pano, G.; Handji, V.; Berman, E.
Oxfordshire : Carfax Publishing Company; 1992 Mar.
British poultry science v. 33 (1): p. 141-148; 1992 Mar. Includes references.

Language: English

Descriptors: Broilers; Ascites; Cold stress; Feeds; Diet; Prophylaxis

238 NAL Call. No.: S544.3.K2K3
Raising pigeons.
Adams, A.W.; Cartmill, M.
Manhattan, Kan. : The Service; 1991 Jul.
MF - Cooperative Extension Service, Kansas State University, Manhattan (987): 2 p.; 1991 Jul. Includes references.

Language: English

Descriptors: Pigeons; Poultry housing; Poultry feeding; Breeding

239 NAL Call. No.: QL750.A6
Rearing conditions and needs for space and litter in laying hens. Faure, J.M.
Amsterdam : Elsevier Science Publishers, B.V.; 1991 Jul. Applied animal behaviour science v. 31 (1/2): p. 111-117; 1991 Jul. Includes references.

Language: English

Descriptors: Hens; Battery cages; Floor pens; Space requirements; Litter; Cage size; Animal welfare; Adaptation

240 NAL Call. No.: 41.8 AV5
Recurrent transient paresis in a turkey flock.
Jeffrey, J.S.; Droual, R.; Meteyer C.U.; Galey, F.D.; Kinde, H.; Medina, H. Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 760-765; 1992 Jul. Includes references.

Language: English

Descriptors: Turkeys; Paresis; Leg weakness; Mortality; Case reports; Botulism

Abstract: Recurring episodes of extreme leg weakness and associated mortality were documented in a turkey flock at 8 to 15 weeks of age. Flock mortality attributed to posterior paresis was approximately 12%, or 4800 of 40,000 turkeys. Four of six open-confinement units were affected. Gross and histological examinations revealed no significant lesions. Immunology and virology were uninformative. There were no significant differences in serum chemistry between clinically affected and normal turkeys. Testing of feed, water, soil, and tissues revealed no common toxicants. Isolation and supportive care for affected turkeys, both in the laboratory and in the field, frequently resulted in full recovery. Injection of a test group of affected turkeys with Type C botulism antitoxin appeared to enhance recovery. However, repeated attempts to detect botulism toxin in serum, liver, or cecal contents using mouse bioassay procedures were unsuccessful.

241 NAL Call. No.: 47.8 AM33P
Relationship of hen age and egg sequence position with fertility, hatchability, viability, and preincubation

embryonic development in broiler breeders.
Fasenko, G.M.; Hardin, R.T.; Robinson, F.E.
Champaign, Ill. : Poultry Science Association; 1992 Aug.
Poultry science v. 71 (8): p. 1374-1383; 1992 Aug. Includes references.

Language: English

Descriptors: Hens; Age; Egg fertility; Egg hatchability; Embryonic development; Chick embryos; Preincubation period; Body weight; Egg weight; Egg shell quality

Abstract: Indian River broiler breeder hens (n = 29) were caged individually to investigate whether hen age and egg sequence position were related significantly to the dependent variables fertility, hatchability, viability (hatch of fertile eggs), and preincubation embryonic development. Hens were artificially inseminated once per week. All eggs laid during the period of 31 to 54 wk of age were stored at 16 to 17 C for .5 to 7 days. Time of oviposition records were used to assign eggs to sequence position ("first" or "subsequent"). Eggs laid on odd-numbered weeks were broken open, fertility determined, and embryonic development staged. Eggs laid on even-numbered weeks were sent to a commercial hatchery to assess hatchability. Unhatched eggs were opened to determine fertility and embryonic mortality. In addition, hen weight, number of days since insemination, time of oviposition, and egg weight were recorded to determine their relationship to the dependent variables. Fertility (n = 3,240 eggs) and hatchability (n = 1,653 eggs) were not significantly related to egg sequence position, but were related to hen age (P = .0001 and P = .0002, respectively). Older hens demonstrated lower fertility and hatchability. In contrast, embryo viability (n = 1,487 eggs) and preincubation embryonic development (n = 1,200 eggs) were not significantly related to hen age, but were related to egg sequence position (P = .0026 and P = .0001, respectively). First-of-sequence eggs had lower viability, and embryos of these eggs were more developed than embryos of subsequent eggs. These data indicate that the reduction in chick production observed as the hen ages may be due to the increased incidence of first-of-sequence eggs.

242 NAL Call. No.: 47.8 Am33P
Relationship of sex, age, and body weight to broiler carcass yield and offal production.
Brake, J.; Havenstein, G.B.; Scheideler, S.E.; Ferket, P.R.; Rives, D.V. Champaign, IL : Poultry Science Association, 1921-; 1993 Jun. Poultry science v. 72 (6): p. 1137-1145; 1993 Jun. Includes references.

Language: English

Descriptors: Broilers; Carcass yield; Sex differences; Age differences; Body weight; Carcass composition; Offal

Abstract: Male and female broilers (feather-sexable strain) at 28, 35, 42, and 49 days of age were utilized to determine the effect of sex, age, and BW on yield of various offal and edible carcass components. Individual bird BW ranged from 756 to 2,970 g. During processing, weight of blood, feathers, head, neck, feet, preen gland, heart, liver, gizzard, gastrointestinal tract, fat pad, hind half (legs, thighs, and saddle), wings, Pectoralis major, breast skin, Pectoralis minor, back with lungs, rib cage, water uptake, and whole dressed carcass were determined. Regression analyses were used to generate equations describing the relationship between carcass components and BW for each sex and with the sexes combined. The data were also subjected to analysis of variance to determine age and sex effects on an absolute weight and percentage of live BW basis. Yields of body components changed with increasing age and BW. In general, the percentage of edible components increased, and the percentage of offal decreased with increasing age and BW. When expressed on a percentage of live BW basis, significant sex effects existed for feathers, head, neck, feet, heart, liver, fat pad, hind half, breast skin, and Pectoralis minor. Thus, the yield of offal components vary more by sex than does yield of edible carcass components.

243 NAL Call. No.: SF494.5.R47 1991
Report on the welfare of laying hens in colony systems. Farm Animal Welfare Council (Great Britain),Great Britain, Ministry of Agriculture, Fisheries and Food
London : MAFF Publications,; 1991.
iv, 44 p. : ill. ; 30 cm. December 1991.

Language: English

Descriptors: Poultry; Animal welfare

244 NAL Call. No.: 47.8 AM33P
Reproductive performance of artificially inseminated hens receiving saline drinking water.
Zhang, D.; Moreng, R.E.; Balnave, D.
Champaign, Ill. : Poultry Science Association; 1991 Apr.
Poultry science v. 70 (4): p. 776-779; 1991 Apr. Includes references.

Language: English

Descriptors: Hens; Female fertility; Saline water; Drinking water; Egg hatchability; Egg shell defects; Chicks

Abstract: Laying hens were selected at random and placed in individual cages in a commercial type layer shed. One hundred hens received town water and one hundred received town water supplemented with 2 g NaCl/L. Half the hens on each water treatment were inseminated every 7 days with mixed semen collected from six cockerels of a commercial table egg strain maintained on town water. The remaining hens were inseminated with semen from six cockerels receiving town water supplemented with 2 g NaCl/L. Eggs were collected and stored at 12 C over a 7-day period before eggs with defective shells were identified and removed. All remaining eggs were incubated and candled at 7 and 18 days of incubation to detect infertile eggs and embryonic deaths. Data from six consecutive hatches were analyzed. The incidence of eggs with defective shells doubled in hens receiving the saline drinking water. These hens had a significantly (twofold) higher incidence of embryonic deaths and a significantly lower (13%) hatchability of fertile eggs. For every 100 eggs laid the numbers of settable eggs and chicks hatched were significantly reduced in hens receiving the saline drinking water. The saline water reduced the numbers hatched by 20% for every 100 eggs laid. The water treatment given to the cockerels had little effect on reproductive performance.

245 NAL Call. No.: 47.8 AM33P
Research note: body surface area, a reference for space allowance in confinement.
Hurnik, J.F.; Lewis, N.J.
Champaign, Ill. : Poultry Science Association; 1991 Feb.
Poultry science v. 70 (2): p. 412-415; 1991 Feb. Includes references.

Language: English

Descriptors: Poultry; Body surface area; Space requirements; Body measurements; Poultry housing

Abstract: One of the most important welfare concerns in relationship to poultry production is the restriction, both physical and social, imposed by close and long-lasting confinement. The bird's body-surface area was considered as a reference base for the determination of a minimum space allowance in the present study. The formula for surface area was based on body weight, which is a well-known and easily measured parameter. As the bird grows, its surface area changes in proportion to its weight gain, and, therefore, surface area provides a continuous estimate of the space requirement. The floor space allowance can be easily visualized from body surface area and estimated without extensive measurements of birds and floor areas. It is recommended that the minimum space requirement for poultry should be no less than the equivalent of 50% of the bird's body surface area. This recommendation was based on the principle that all birds in an enclosure should be able to rest simultaneously without contacting another bird or the walls of the enclosure.

246 NAL Call. No.: 47.8 AM33P
Research Note: broiler acclimation to heat distress and feed intake effects on body temperature in birds exposed to thermoneutral and high ambient temperatures.
Teeter, R.G.; Smith, M.O.; Wiernusz, C.J.
Champaign, Ill. : Poultry Science Association; 1992 Jun.
Poultry science v. 71 (6): p. 1101-1104; 1992 Jun. Includes references.

Language: English

Descriptors: Broilers; Heat stress; Body temperature; Acclimatization; Environmental temperature; Feed intake; Restricted feeding

Abstract: Relationships between ambient temperature, bird acclimation to cycling temperature, heat distress, and feed consumption were evaluated in two experiments. In the first experiment, birds previously acclimated to cycling temperature heat distress (24 to 35 C) for two 24-h cycles were observed to have 24% lower (P < .O1) feed consumption than birds previously housed at 24 C and experiencing their first heat distress exposure. A significant (P < .01) acclimation history by ambient temperature interaction was detected, with acclimated birds having a higher rectal temperature (42.3 versus 41.2 C) when housed at 24 C and a lower rectal temperature (44.2 versus 44.6 C) when exposed to 35 C than did the unacclimated controls. In the second experiment, feed intake and acclimation effects were separated by precision-feeding birds 0, 5, and 10% of body weight. Rectal temperature m the 24 C and 35 C environments increased linearly (P < .01) as feeding level increased for both acclimated and unacclimated birds. Similar to the first experiment, an ambient temperature by acclimation history interaction was detected (P < .01), with acclimated birds exhibiting increased body temperature when housed in thermoneutral environments and lower body temperature when exposed to high ambient temperature distress. Data also indicate that feed intake plays a significant role in the acclimation process; that bird acclimation to heat distress has metabolic effects independent of feed consumption; and that either 1) the heat-distressed acclimation bird has the capacity to shift exothermic processes from the heat-distressed to cooler time periods; 2) that heat dissipation mechanisms require greater than 12 h to restore normal body temperature; or 3) the birds' set point is elevated when exposed to cycling high ambient temperature distress.

247 NAL Call. No.: 47.8 AM33P
Research note: Detection of Salmonella serogroup D-specific antibodies in the yolks of eggs laid by hens infected with Salmonella enteritidis. Gast, R.K.; Beard, C.W.
Champaign, Ill. : Poultry Science Association; 1991 May. Poultry science v. 70 (5): p. 1273-1276; 1991 May. Includes references.

Language: English

Descriptors: Eggs; Salmonella enteritidis; Egg yolk; Antibodies; Hens; Experimental infections; Serotypes; Immunoassay

Abstract: Eggs laid by hens experimentally infected with Salmonella enteritidis were assayed for the presence of Serogroup D-specific yolk antibodies. Yolk antibodies were detected with S. enteritidis and Salmonella pullorum antigens in the microantiglobulin test as early as 9 days after incubation of hens with S. enteritidis. Yolk antibody titers reached peak levels at 3 to 5 wk postinoculation and remained at detectable levels for at least 7 wk postinoculation in eggs from both orally inoculated and horizontally contact-exposed hens. Eggs laid by hens from commercial flocks implicated in epidemiological investigations of human S. enteritidis outbreaks were also tested. Serogroup D-specific yolk antibodies were detected in 5 to 22% of eggs from hens in houses identified as infected by bacteriological culturing of internal organs of hens for S. enteritidis.

248 NAL Call. No.: 47.8 AM33P
Research note: does compensatory growth occur following withdrawal of salinomycin from the diet of broilers?. Chapman, H.D.; Skinner, J.T.; Waldroup, P.W.; Schleifer, J.H. Champaign, Ill. : Poultry Science Association; 1993 Feb. Poultry science v. 72 (2): p. 383-386; 1993 Feb. Includes references.

Language: English

Descriptors: Broilers; Salinomycin; Feed intake; Compensatory growth; Liveweight gain; Feed conversion efficiency

Abstract: Two floor pen studies were conducted to determine whether compensatory growth occurs following withdrawal of the anticoccidial drug salinomycin from the feed of broilers reared to 46 days of age. There were

no significant differences in weight gain or feed conversion between medicated and unmedicated birds whether overall performance or performance during the 1-wk withdrawal period was measured. Feed intake of birds given salinomycin, however, was significantly lower than that of unmedicated birds, and feed intake following withdrawal was greater than that of birds still receiving the drug.

249 NAL Call. No.: 47.8 AM33P
Research note: effect of electronic treatment of drinking water on growth performance of broiler chickens.
Zimmermann, N.G.; Wyatt, C.L.; Dhillon, A.S.
Champaign, Ill. : Poultry Science Association; 1991 Sep.
Poultry science v. 70 (9): p. 2002-2005; 1991 Sep. Includes references.

Language: English

Descriptors: Broilers; Growth; Drinking water; Feed conversion; Water purification; Dissolved oxygen; Ph; Mortality; Coliform count; Water quality

Abstract: Three electronic devices used to treat drinking water were compared with untreated city well water in a broiler growth performance trial. In each treatment feed conversion and BW were measured in 16 replicate pens of 60 female broilers at 29, 42, and 49 days of age. Two of the devices increased dissolved oxygen content of the water and reduced conductivity and microorganism count. One of these reduced broiler mortality (P = .065), decreased pH (P = .062), and increased Fe and Mn concentration in the water. Mr other increased water temperature, Ti, and Mn but reduced the concentration of Cl Al, Ca, Cr. Mg, and Sr in the water. Neither the third device, an electrostatic water treatment, nor the other devices affected BW (P = .586) or feed conversion (P = .564) at 49 days of age. No significant treatment differences (P < .05) in hematocrit, bursa of Fabricius weight, or tibial ash weight were observed at 21 days of age.

250 NAL Call. No.: 47.8 AM33P
Research note: effect of feeding garlic oil on performance and egg yolk cholesterol concentration.
Reddy, R.V.; Lightsey, S.F.; Maurice, D.V.
Champaign, Ill. : Poultry Science Association; 1991 Sep.
Poultry science v. 70 (9): p. 2006-2009; 1991 Sep. Includes references.

Language: English

Descriptors: Hens; Laying performance; Garlic; Egg yolk; Cholesterol; Blood lipids

Abstract: Twenty 26-wk-old Single Comb White Leghorn pullets were divided into two groups of 10 birds. The birds were individually caged in a naturally ventilated poultry house and fed a corn and soybean meal diet with or without .02% garlic oil for two 28-day periods. Dietary garlic oil did not affect egg production, egg weight, and feed efficiency. Total plasma lipids, plasma cholesterol, and yolk cholesterol were not affected by the dietary treatment.

251 NAL Call. No.: 47.8 AM33P
Research note: Effects of agitation and temperature changes on turkey sperm viability after twenty-four hour storage.
Bakst, M.R.; Cecil, H.C.
Champaign, Ill. : Poultry Science Association; 1992 Feb.
Poultry science v. 71 (2): p. 395-397; 1992 Feb. Includes references.

Language: English

Descriptors: Turkeys; Frozen semen; Spermatozoa; Viability; Storage quality; Semen preservation; Temperature; Agitation

Abstract: The effects of agitation and temperature changes on turkey sperm viability were estimated before and after 14 h storage at 7 C using the ethidium bromide (EB) procedure and a sperm stress test. The stress test is identical to the EB procedure except the buffer is hypotonic. Labile sperm lyse and are then stained with the EB. Treatments consisted of semen diluted 1:1 and subjected to one of the following procedures: agitation (pipetting up and down 25 times, repeated 4 times at 15-min intervals); temperature changes (semen moved from 7 to 26 C and back to 7 C 3 times at 30-min intervals); or control semen procedures (diluted semen is placed on an orbital shaker at 7 C). Each semen treatment was evaluated within 3 h of dilution and after 24 h storage. Agitation and temperature changes did not affect viability of sperm. Regardless of treatment, the EB procedure revealed no differences in sperm viability before or after 24 h storage. In contrast, the same samples subjected to the stress test revealed significant increases in nonviable sperm after 24 h storage. However, there was no treatment by test interaction. These data indicate that mixing semen with diluent and mild changes in semen temperature associated with the transport of semen between the interval of semen collection to insemination, even up to 24 h storage, have minor effects on sperm viability.

252 NAL Call. No.: 47.8 AM33P
Research note: feeding various levels of ground Sesbania macrocarpa Muhl. seed to bobwhite quail.
Flunker, L.K.; Damron, B.L.; Wilson, H.R.
Champaign, Ill. : Poultry Science Association; 1991 Mar.
Poultry science v. 70 (3): p. 658-660; 1991 Mar. Includes references.

Language: English

Descriptors: Colinus Virginianus; Sesbania; Poultry feeding; Toxicity; Seeds; Laying performance; Weight losses

Abstract: Two 28-day experiments were conducted to determine the effects of various levels of ground Sesbania macrocarpa Muhl. seed on mature bobwhite quail. In Experiment 1, S. macrocarpa Muhl. seed levels of 0, 1, 2, 3, 4, and 5% were added to a basal diet at the expense of filler and fed to five replicate groups of six 58-wk-old paired quail (one male and one female). Average daily feed consumption, hen-day egg production, average BW change. mortality, fertility, and hatchability were monitored. Four groups of eight individually caged females, 63 wk of age, were each given a diet containing 0, 2, 4, 6, 8, or 10% ground S. macrocarpa Muhl. seed in Experiment 2. A seventh treatment was added that consisted of 10% ground S. macrocarpa Muhl. from an older seed shipment used previously in work with White Leghorn hens. Increasing S. macrocarpa Muhl. seed levels in Experiment 1 did not cause significant deviations from the control treatment for average daily feed consumption, BW change, hen-day egg production, fertility, total hatchability, or hatchability of fertile eggs. In Experiment 2 neither average daily feed consumption nor hen-day egg production were affected by seed level or source. Quail given the 10% seed level using the older seed shipment had a significantly greater weight loss than the control birds. With the exception of this greater weight loss and in contrast with work involving chickens, dietary levels of ground S. macrocarpa Muhl. seed of up to 10% were acceptable to bobwhite quail.

253 NAL Call. No.: 47.8 AM33P
Research note: open-field behavior of Japanese quail chicks genetically selected for low or high plasma corticosterone response to immobilization stress.
Jones, R.B.; Satterlee, D.G.; Ryder, F.H.
Champaign, Ill. : Poultry Science Association; 1992 Aug.
Poultry science v. 71 (8): p. 1403-1407; 1992 Aug. Includes references.

Language: English

Descriptors: Japanese quails; Selection criteria; Strain differences; Blood plasma; Corticosterone; Stress; Immobilization; Fearfulness

Abstract: Open-field behavior was examined in Japanese quail chicks genetically selected for either reduced (LS, low stress) or exaggerated (HS, high stress) plasma corticosterone response to immobilization stress. Chicks of the LS line showed less freezing and ambulated sooner than did their HS counterparts. These findings

suggest that exposure to an open-field or novel environment elicited less fear in LS than in HS chicks. They also support the suggestion that fearfulness and adrenocortical activation are positively associated and indicate that selection for differential adrenocortical responsiveness exerted concomitant effects on fear-related behavior.

254 NAL Call. No.: 47.8 AM33P
Research note: relationship of comb color to liver appearance and fat content in Single Comb White Leghorn laying hens.
Grimes, J.L.; Maurice, D.V.; Lightsey, S.F.; Bridges, W.C. Jr Champaign, Ill. : Poultry Science Association; 1991 Dec. Poultry science v. 70 (12): p. 2544-2546; 1991 Dec. Includes references.

Language: English

Descriptors: Hens; Combs; Fatty liver hemorrhagic syndrome; Color; Liver; Weight; Fatty degeneration; Symptoms

Abstract: A flock of commercial Single Comb White Leghorn laying hens, diagnosed as having Fatty Liver Hemorrhagic Syndrome (FLHS), was surveyed to ascertain the relationship between comb color and selected FLHS characteristics. Twenty-eight hens with and without pale combs were selected from 14 cages for paired comparisons. Hens with pale combs had a higher (P less than or equal to .05) liver score and relative liver weight than hens with normal combs. Differences were not detected in BW, comb weight, relative comb weight, liver fat, and plasma estrogen concentration. In flocks diagnosed with FLHS, comb appearance is associated with a higher incidence of FLHS.

255 NAL Call. No.: 47.8 AM33P
Research note: sodium and potassium chloride drinking water supplementation effects on acid-base balance and plasma corticosterone in broilers reared in thermoneutral and heat-distressed environments.
Deyhim, F.; Teeter, R.G.
Champaign, Ill. : Poultry Science Association; 1991 Dec.
Poultry science v. 70 (12): p. 2551-2553; 1991 Dec. Includes references.

Language: English

Descriptors: Broilers; Sodium chloride; Potassium chloride; Drinking water; Acid base equilibrium; Heat stress; Blood plasma; Corticosterone; Body temperature; Water intake; Survival

Abstract: One experiment utilizing 188 Vantress X Arbor Acres broilers was conducted to evaluate the effects of isomolar KCl (.5%) and NaCl (.39%) drinking water supplementation on venous pH, PO2, PCO2, HCO3(-), hematocrit, and plasma corticosterone as well as rectal temperature and water consumption of broilers reared in heat-distressed and thermoneutral environments. Birds were allotted at 5 wk posthatch into either a thermoneutral (TN; 24 C) or cycling temperature (24 to 35 C) environmental chamber. Heat-distressed (HD) controls had elevated (P<.05) body temperature (42.9 versus 41.7 C) and PO2 (144.5 versus 108.4 mm Hg). Blood pH, PCO2, and HCO3(-) (P>.1) were not affected by high ambient temperature, but hematocrit (31 versus 32%) for HD controls was reduced (P = .07) compared with TN control birds. At 35 C, drinking water NaCl supplementation decreased (P<.05) venous PCO2 and HCO3(-), increased (P<.05) PO2, and had no effect on venous pH and water consumption relative to HD controls. Potassium chloride lowered (P = .07) venous pH, decreased (P<.05) HCO3(-), and increased water consumption at 35 C, but PO2 and PCO2 were unaffected relative to HD controls. Heat distress increased (P<.05) plasma corticosterone by 53%. Sodium chloride failed to impact (P>.1) plasma corticosterone but KCl reduced (P<.05) its concentration during heat distress and increased (P<.05) bird survivability as compared with heat-distressed controls. The data reported herein suggests that KCl and to a lesser extent NaCl reduces HD consequences by a mechanism as yet undefined.

256 NAL Call. No.: 47.8 AM33P
Research note: the behavior of young layers during the first two weeks in aviary and battery cages.
Tanaka, T.; Hurnik, J.F.

Champaign, Ill. : Poultry Science Association; 1991 Feb.
Poultry science v. 70 (2): p. 404-407; 1991 Feb. Includes references.

Language: English

Descriptors: Hens; Aviaries; Battery cages; Animal behavior; Animal welfare; Space requirements

Abstract: Observations were collected from young layers housed in an aviary (437 birds) and in battery cages (8 out of 112 cages per day, 3 birds in each). Direct visual observations using scanning techniques were conducted for the first 2 wk, 2 h/day (1000 to 1200 h or 1300 to 1500 h on alternate days). In the aviary, a significant positive correlation was detected between the number of birds occupying the central part of the pen equipped with feeders and waterers, and number of birds engaged in eating and drinking (P<.001). There were no significant differences between morning and afternoon in the numbers of birds located at each position of the aviary. However, comfort behaviors were more frequent in the afternoon. Feather pecking in the aviary was rare (<.1%) and did not appear to be stereotypic. In the battery cages feather pecking was more (4.1 %). Comfort behaviors in the cages were rare (.4%), and the range of activities was also limited. These results indicate that the aviary provides a more comfortable environment for the birds than cages, even when the cage housing density was lower than recommended for general commercial units.

257 NAL Call. No.: 47.8 AM33P
Research note: the hide beetle, Dermestes maculatus DeGeer (Dermestidae), feeds on live turkeys.
Samish, M.; Argaman, Q.; Perelman, D.
Champaign, Ill. : Poultry Science Association; 1992 Feb.
Poultry science v. 71 (2): p. 388-390; 1992 Feb. Includes references.

Language: English

Descriptors: Israel; Turkeys; Dermestes maculatus; Lesions; Feeding habits; Permethrin; Sex differences; Animal behavior

Abstract: The beetle Dermestes maculatus, which is known to feed on dry, protein-rich, stored materials, has lately become a pest of wood and insulating polymers of poultry houses. Its carnivorous attack on live birds is recorded in this paper for the first time. These attacks resulted in deep wounds to adult male turkeys. When beetle larvae were offered simultaneously calf meat, chicken meat, and pellet feed for rodents, no clear preference was noted.

258 NAL Call. No.: 47.8 AM33P
Research note: the utilization of recycled sheetrock (refined gypsum) as a litter material for broiler houses.
Wyatt, C.L.; Goodman, T.N.
Champaign, Ill. : Poultry Science Association; 1992 Sep.
Poultry science v. 71 (9): p. 1572-1576; 1992 Sep. Includes references.

Language: English

Descriptors: Broilers; Litter; Gypsum; Liveweight gain; Moisture content; Dust; Feed conversion efficiency; Carcasses; Defects

Abstract: A study was conducted to evaluate the utilization of refined gypsum (recycled sheetrock) as a fitter material on the growth performance and mortality of broiler chicks grown to market age. Broilers were placed in pens with either 13 cm fir wood shavings, 13 cm refined gypsum, or 9 cm refined gypsum topped with 4 cm fir shavings, and grown to 41 days of age. Litter material had no significant influence on chick mortality, feed conversion, condemnations, and incidences of leg abnormalities. Body weight gain was significantly lower for chicks reared on refined gypsum compared with the other litter treatments at 21 days of age, but by Day 41 no differences were observed between litter treatments. Percentage litter moisture of refined gypsum was significantly lower than either wood shaving treatments at both 21 and 41 days, although on a weight basis, the

gypsum contained equal or more water. Litter material had no influence on room or brooding temperatures. Although it is quite dusty initially when placed in the house, refined gypsum may be an alternative bedding material to be utilized as a base and top-dressed with wood shavings.

259 NAL Call. No.: 47.8 AM33P
Research note: utilizing hazelnut kernel oil meal in layer diets. Ozen, N.; Erener, G.
Champaign, Ill. : Poultry Science Association; 1992 Mar. Poultry science v. 71 (3): p. 570-573; 1992 Mar.
Includes references.

Language: English

Descriptors: Hens; Diet; Hazelnuts; Oilmeals; Nut products; Soybean oilmeal; Laying performance; Feed intake; Feed conversion efficiency; Egg weight; Egg yolk color; Egg shell thickness; Egg albumen

Abstract: The present study was conducted in order to investigate the possibility of utilizing hazelnut kernel oil meal (HKOM) in layer diets as a replacement for soybean oil meal (SBM). Two hundred and sixteen brown egg layers raised in contiguous wire cages were used. The duration of the experiment was 24 wk consisting of six periods of 4 wk. In the trial, six diets containing different levels of HKOM replacing 0, 20, 40, 60, 80, and 100% of SBM protein, respectively, were utilized as the treatments. Differences among the diets in terms of egg yield, feed consumption, feed efficiency ratio, egg weight, egg yolk and albumen ratios, shell thickness, shell weight, and Roche color values of the yolk were not statistically significant ($P > .01$). Results indicated that SBM could be replaced totally by HKOM in layer diets. However, replacement of more than 40% of SBM with HKOM is not recommended.

260 NAL Call. No.: 47.8 AM33P
Research note: Variability in preincubation embryonic development in domestic fowl. 2. Effects of duration of egg storage period.
Fasenko, G.M.; Robinson, F.E.; Hardin, R.T.
Champaign, Ill. : Poultry Science Association; 1992 Dec. Poultry science v. 71 (12): p. 2129-2132; 1992 Dec.
Includes references.

Language: English

Descriptors: Chick embryos; Embryonic development; Egg weight; Weight losses; Storage losses; Embryo mortality; Cold storage; Duration

Abstract: Embryos of eggs from Single Comb White Leghorn hens were analyzed to determine whether duration of egg storage significantly affects embryonic development prior to incubation. Eggs were gathered over a period of 5 days from 25-wk-old hens that were naturally inseminated and housed in floor pens. Within 1 h of oviposition the eggs were collected and assigned randomly to one of five storage treatment groups of 0, 4, 7, 14, or 21 days. Fresh egg weight was recorded and the eggs were placed on plastic egg flats and stored at 14 C. Weight of each egg was measured after storage to determine amount of weight lost during storage. A total of 500 embryos were examined after storage. Viable embryos were staged for development using a modified Eyal-Giladi and Kochav classification. The incidence of embryonic mortality was noted. Duration of storage ($P = .5815$) collection date ($P = .5815$), and fresh egg weight ($P = .3789$) did not affect embryonic development significantly. A significant linear relationship was observed between duration of the storage period and loss of egg weight ($P = .0001$). Embryonic mortality was significantly related to loss of egg weight ($P = .0001$). Mortality was highest in eggs that were stored for a longer period of time. The data from the current study indicate that storing fertile eggs below physiological zero inhibits embryonic development. One of the reasons for the increased incidence of embryonic mortality in eggs that were stored for longer periods may be related to the increased egg weight loss in these eggs.

261 NAL Call. No.: 47.8 AM33P
Research note: A lack of response to pantothenic acid supplementation to a corn and soybean meal broiler diet.
Harms, R.H.; Nelson, D.S.

Champaign, Ill. : Poultry Science Association; 1992 Nov.
Poultry science v. 71 (11): p. 1952-1954; 1992 Nov. Includes references.

Language: English

Descriptors: Broilers; Fowl feeding; Diet; Maize; Soybean oilmeal; Pantothenic acid; Body weight; Feed conversion efficiency

Abstract: Two 21-day battery studies were conducted to determine whether a corn and soybean meal diet without pantothenic acid supplementation was adequate for growth and feed efficiency of broilers. In each experiment, 64 1-day-old broiler chicks (32 male and 32 female) were assigned to each of six dietary treatments. The basal diet was supplemented with 0, .3, .6, 2.4, 4.8, and 14.4 mg of supplemental pantothenic acid/kg of diet. Each diet in both experiments was fed to eight pens containing four females and four male day-old Arbor Acres broiler chicks. The basal diet contained 22.3% protein and 4.74 mg/kg pantothenic acid by analysis. No improvement in growth or feed efficiency was obtained from any level of pantothenic acid supplementation.

262 NAL Call. No.: 47.8 Am33P
Research to understand and control Salmonella enteritidis in chickens and eggs.
Gast, R.K.; Beard, C.W.
Champaign, IL : Poultry Science Association, 1921-; 1993 Jun.
Poultry science v. 72 (6): p. 1157-1163; 1993 Jun. From the symposium "Microbial Safety of Poultry Products", August 4, 1992. Includes references.

Language: English

Descriptors: Eggs; Salmonella enteritidis; Salmonellosis; Outbreaks; Food safety; Foodborne diseases; Chickens; Epidemiology

Abstract: When it became evident that the association of human Salmonella enteritidis (SE) outbreaks with the consumption of contaminated Grade A eggs posed a threat to public health and to the economic viability of the egg industry, research programs were rapidly initiated to investigate the many unanswered questions about SE in eggs and chickens. Research efforts have focused on the dynamics of deposition, survival, and growth of SE in eggs, the pathogenesis of SE in chickens, strategies for detecting SE-infected flocks, opportunities for intervening to prevent infection, the sources of SE in laying flocks, options for effectively cleaning poultry houses, and the epidemiology of SE infections of humans and chickens. This research has provided a substantially better understanding of the SE problem in poultry, but many further questions about the basis for and the prevention of eggborne transmission of SE remain to be answered.

263 NAL Call. No.: 47.8 AM33P
Resolving land use conflicts.
Voris, J.C.
Champaign, Ill. : Poultry Science Association; 1992 Jul.
Poultry science v. 71 (7): p. 1123-1129; 1992 Jul. Includes references.

Language: English

Descriptors: Poultry; Land use planning; Site selection; Guidelines; Litter

Abstract: The rapid increase in the population of the United States and the expansion of the poultry industry to meet the increased demand has put the poultry industry and their neighbors on a collision course involving land use conflicts. The proper siting of poultry facilities resolves land use conflicts before they arise. A cooperative program involving industry, the public, and representatives of local government for the development of siting and management guidelines is outlined. Siting and management guidelines were developed that can be adapted to poultry producing areas nationwide.

264 NAL Call. No.: 47.8 AM33P
Response of broiler breeder females to feed restriction below recommended levels. 2. Economic analysis.
Fattori, T.R.; Hildebrand, P.E.; Wilson, H.R.
Champaign, Ill. : Poultry Science Association; 1991 Mar.
Poultry science v. 70 (3): p. 489-498; 1991 Mar. Includes references.

Language: English

Descriptors: Hens; Broilers; Restricted feeding; Cost analysis; Body weight; Chicken housing; Density; Economic analysis; Growth; Laying performance

Abstract: An economic analysis of the growth and production response to feed restriction was made for broiler breeder females. Experimental response data were used 1) to examine the effect of feed restriction on pullet (TCB) breeder hen, and hatching egg cost components, 2) to evaluate the effect of feeding program on the average total cost of rearing a pullet (TCP), maintaining a breeder hen (TCB) and producing a dozen hatching eggs (TCE), 3) to test the sensitivity of the TCP to changes in component costs, and 4) to estimate the change in TCP and TCE, to changes in pullet rearing density. Each week of delayed maturity increased TCP by approximately 1%. Reduced pullet feed costs resulting from feed restriction did not offset increased service and grower payment costs at 5% production. Increased pullet rearing costs were offset by breeder feed savings and increased production by approximately 67 wk of age. Projected TCE beyond 67 wk indicates severe feed restriction to be more economical (lower TCE) than standard feeding practices. The TCP was most sensitive to changes in chick, feed, and grower payment costs. Projected increased pullet housing density lowered TCP, which lowered the TCE even further for the more restricted feeding programs.

265 NAL Call. No.: 47.8 Am33P
Response of layer breeders to dietary acetylsalicylic acid. 3. Effects of fertility and hatchability of embryos exposed to control and elevated incubation temperatures.
McDaniel, C.D.; Balog, J.M.; Freed, M.; Elkin, R.G.; Wellenreiter, R.H.; Kuczek, T.; Hester, P.Y.
Champaign, IL : Poultry Science Association, 1921-; 1993 Jun.
Poultry science v. 72 (6): p. 1100-1108; 1993 Jun. Includes references.

Language: English

Descriptors: Hens; Aspirin; Egg hatchability; Embryo mortality; Incubation; Temperature; Hyperthermia; Hatching weight

Abstract: Because acetylsalicylic acid (ASA, aspirin) is a common antipyretic drug, there has been considerable research on the effects of ASA on mammalian embryonic development. However, very limited research has been conducted on the effects of ASA on avian development and hatchability. The present study investigated the effect of dietary ASA on fertility and hatchability and whether embryos of breeder hens fed ASA, as compared with embryos of hens fed a control diet, would survive elevated temperatures during incubation. White Leghorn layer breeders were fed 0, .025, .050, .100, .200, and .400% ASA for the first 13 mo of egg production. When averaged over 13 mo, hens fed .40% dietary ASA demonstrated a decline in fertility ($P < .03$), hatchability of fertile eggs ($P < .04$), and hatchability of eggs set ($P < .02$). Chicks from hens fed .10% ASA weighed more than chicks from hens receiving 0, .025, .20, or .40% ASA ($P < .01$). When embryos were incubated at elevated temperatures of 42.8 or 43.3 degrees C for 5.5 to 12 h on Day 16 of incubation, hatchability declined. Also, ASA fed to layer breeders did not improve hatchability of embryos exposed to elevated incubation temperatures when compared with embryos exposed to a control incubation temperature (37.2 degrees C). During Month 9 of production, chicks from hens fed .05 and .10% ASA and exposed to an elevated temperature of 42.8 degrees C for 9 h on Day 16 of incubation weighed more than similarly heat-stressed chicks of hens fed 0, .20, or .40% ASA (temperature by diet interaction, $P < .03$). Among diets, there were no differences in chick weight at hatching when eggs were incubated under control conditions during Month 9.

266 NAL Call. No.: 47.8 AM33P
Response of laying hens to supplemental niacin.

Leeson, S.; Caston, L.J.; Summers, J.D.
Champaign, Ill. : Poultry Science Association; 1991 May.
Poultry science v. 70 (5): p. 1231-1235; 1991 May. Includes references.

Language: English

Descriptors: Hens; Laying performance; Nicotinic acid; Eggs; Cholesterol; Liver; Fat; Egg yolk composition; Egg shell quality

Abstract: Two experiments were conducted to investigate the effect of supplemental niacin on laying hen performance and liver fat and egg cholesterol content. In Experiment 1, 16 replicate groups of four adjacently caged birds were fed corn add soybean med diets calculated to contain 22, 44, 66, or 132 mg supplemental niacin/kg (23.2, 38.7, 57.0, and 143 mg/kg niacin by analysis). Egg production, egg weight, feed intake, and eggshell quality were assessed each 28 days through a 364-day trial period. After 280 days, cholesterol content on three eggs per replicate was measured. At the end of the study, one bird per replicate was killed for subjective scoring of liver fat content. In Experiment 2, 24 birds from the control treatment (22 mg/kg supplemental niacin) of Experiment 1 were retained and fed for a subsequent 28-day period. Over this time, eight birds were each fed diets containing 22, 522, or 1,022 mg/kg supplemental niacin Egg cholesterol content was measured in eggs collected on the last 3 days of the study. In Experiment 1, bird fed 66 or 132 mg/kg supplemental niacin/kg produced more eggs (P<.05) than birds fed 22 mg/kg. Niacin supplementation affected shell quality (P<.05). Dietary niacin level had no effect on ca cholesterol content of liver lipid evaluation. In Experiment 2, supplementary niacin levels up to 1,022 mg/kg, which more closely simulates therapeutic levels used for humans, again failed to affect egg cholesterol content.

267 NAL Call. No.: 47.8 AM33P
Response of two strains of turkey hens to various protein and energy feeding programs.
Leeson, S.; Caston, L.J.
Champaign, Ill. : Poultry Science Association; 1991 Aug.
Poultry science v. 70 (8): p. 1739-1747; 1991 Aug. Includes references.

Language: English

Descriptors: Turkeys; Body weight; Growth rate; Strain differences; Turkey hen feeding; Feed conversion; Feed intake; Mortality; Carcass weight; Protein content; Amino acids

Abstract: Two experiments were conducted to note the response of Nicholas and British United Turkey (BUT) strains of turkey hens to so-called North American and European feeding programs. The European program involved increased quantities of protein and essential amino acids relative to energy level of the diet. In Experiment 1, the two feeding programs were each tested with four replicate groups of 40 commercial hens of both strain. Each feed was allocated by weight and allotment continually adjusted for mortality. At 105 days of age, eight hens per replicate pen were sampled for various carcass characteristics. Nicholas hens were most often heavier (P<.01) to 56 days, although after this time the BUT strain showed increased growth. At 105 days, BUT hens fed the high-protein diet were the heaviest group, being significantly (P<.05) heavier than comparable birds fed low-protein diets. There was no difference (P<.05) in feed efficiency from 0 to 105 days or in any of the carcass traits measured. In Experiment 2, the two strain of hens were grown to broiler weight at 70 days, again with conventional versus high-protein diets. Each treatment was tested with six replicate floor pens each containing 50 poults. At 70 days of age both strains of hen were heavier when fed the high-protein diets (P<.05), although the Nicholas hens were heavier than the BUT birds (P<.05). The BUT hens ate less feed than Nicholas birds (P<.01) and also exhibited superior feed efficiency (P<.01). The mortality rate of BUT hens was greater than that of Nicholas hens when the high-protein diet was used (P<.05). There were obvious differences in growth rate of the two strain of after hen used in the present trials. Depending upon market age, the BUT hen seemed to respond favorably to diets of higher protein-amino acid content relative to energy concentration.

268 NAL Call. No.: QL750.A6
Responses of pair-housed male and female domestic chicks to the removal of a companion.

Jones, R.B.; Williams, J.B.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Jan.
Applied animal behaviour science v. 32 (4): p. 375-380; 1992 Jan. Includes references.

Language: English

Descriptors: Chicks; Sex differences; Isolation; Stress; Animal behavior; Social behavior; Corticosterone; Blood plasma

269 NAL Call. No.: 290.9 AM32T
Responses of pre-fasted growing turkeys to acute heat exposure. Xin, H.; DeShazer, J.A.; Beck, M.M.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Jan. Transactions of the ASAE v. 35 (1): p. 315-318; 1992 Jan. Includes references.

Language: English

Descriptors: Turkeys; Fasting; Feed intake; Heat stress; Poultry farming; Relative humidity; Environmental temperature

Abstract: Nicholas turkeys at the age of 15 to 16 weeks were fasted for 24 hours in a moderate environment and then subjected to acute heat exposures of various dry-bulb and wet-bulb temperatures (Tdb and Twb). Total feed intake was not influenced by Tdb of 32 degrees C, 36 degrees C or 40 degrees C (P > 0.10), although differences existed in dynamic feeding profiles. Total heat production rate (THP) varied quadratically with Tdb and respiratory quotient (RQ) decreased linearly with Tdb. The lower RQ values at the higher Tdb levels may have resulted from reduced feed assimilation. No differences were detected on feed intake, THP, and RQ between the two Twb levels at each Tdb. A THP-based temperature-humidity index, 0.74Tdb + 0.26Twb, was derived for the turkeys. In addition, Tdb and Twb had 56% and -44% relative importance on latent heat loss, but -32% and 68% relative importance on sensible heat loss.

270 NAL Call. No.: 47.8 AM33P
Responses of turkey poults to virginiamycin as influenced by litter condition and experimentally induced stunting syndrome.
Al-Batshan, H.A.; Sell, J.L.; Piquer, J.; Mallarino, E.; Soto-Salanova, M.F.; Angel, C.R.
Champaign, Ill. : Poultry Science Association; 1992 May.
Poultry science v. 71 (5): p. 894-904; 1992 May. Includes references.

Language: English

Descriptors: Turkeys; Poults; Virginiamycin; Growth promoters; Infectious diseases; Intestinal diseases; Jejunum; Weight; Body weight; Feed intake; Feed conversion; Diet; Litter; Age differences; Alpha-glucosidase; Enzyme activity; Beta-fructofuranosidase

Abstract: Two experiments were conducted to evaluate the effect of virginiamycin (VM, 22 mg/kg of diet) on performance of uninfected (CON) turkey poults and those infected (INO) with stunting syndrome and reared on used woodshavings (Experiment 1) or on dean or used woodshavings (Experiment 2). Virginiamycin improved BW (P<.001) and feed efficiency (FE) (P<.05) from 1 to 29 days of age, irrespective of type of litter or disease condition. The increase in BW induced by VM, however, was greatest when poults were kept on used litter, resulting in significant (P < .05) VM by fitter interaction. Induced stunting syndrome depressed BW (P < .01) to 29 days of age and impaired FE from 1 to 9 days of age (P < .05) and from 5 to 9 days of age (P < .01) in Experiments 1 and 2, respectively. Virgimamycin did not prevent early adverse effects of INO on BW and FE, but facilitated notable recovery of INO poults relative to INO poults not fed VM. Virginiamycin increased specific activities of maltase and sucrase of the jejunum of CON poults in Experiments 1 and 2; in Experiment 2, this VM effect was evident irrespective of type of fitter. Maltase-specific activity and sucrase were reduced by INO (P less than or equal to .05 and P less than or equal to .01 in Experiments 1 and 2, respectively) and VM did not modify this effect. The maltase and sucrase data suggest that VM improved BW and FE of CON poults, in

part, by helping to maintain digestive and absorptive functions of the small intestine during the early growth period, but, in the instance of INO poults, VM was not effective in this regard.

271 NAL Call. No.: SF487.8.A1P68
Rodent control in poultry houses.
Bokhari, S.A.
Oakland, Calif. : The Service; 1991.
Poultry fact sheet - Cooperative Extension Service, University of California (4): 2 p.; 1991.

Language: English

Descriptors: Poultry housing; Rodent control

272 NAL Call. No.: 41.8 AV5
The role of mice in the epizootiology of Salmonella enteritidis infection on chicken layer farms.
Henzler, D.J.; Opitz, H.M.
Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 625-631; 1992 Jul. Includes references.

Language: English

Descriptors: Fowls; Farms; Salmonella enteritidis; Disease vectors; Mice; Epizootiology

Abstract: A microbiological survey of 10 mice-infested poultry farms was conducted to determine the role of mice in the epizootiology of S. enteritidis infection. Five of the farms were rated as clean of S. enteritidis and five as contaminated based on culture results of environmental samples for S. enteritidis. Of 2103 environmental samples and 715 mice and rats tested, 5.1% and 16.2%, respectively, were culture-positive for S. enteritidis. On contaminated farms, S. enteritidis was isolated from 24.0% of the mice and 7.5% of the environmental samples, which represented 75.3% of all Salmonella isolations from mice but only 18.0% of Salmonella isolations from environmental samples on these farms. S. enteritidis was not detected in mice on clean farms. Phage types 13a and 14b were the two most frequently isolated phage types from mice and environmental samples. Although only a single phage type was isolated from single free standing poultry houses, multiple phage types were isolated from multi-house complexes. A bacterial count from the feces of one mouse yielded 2.3 X 10(5) S. enteritidis bacteria per fecal pellet. S. enteritidis persisted at least for 10 months in an infected mouse population.

273 NAL Call. No.: SF601.A47
Role of socialization, stress and sex of chickens on response to anesthesia and on response to an organophosphate neurotoxicant.
Odom, A.; Gross, W.B.; Ehrich, M.
Manhattan, Kan. : Kansas State University; 1992 Apr.
Veterinary and human toxicology v. 34 (2): p. 134-137; 1992 Apr. Includes references.

Language: English

Descriptors: Fowls; Stress; Pentobarbital; Neurotoxins

274 NAL Call. No.: 100 AL1H
Rotational application of chemical disinfectants enhances sanitation of poultry hatcheries.
Conner, D.E.; Eckman, M.K.
Auburn University, Ala. : The Station; 1992.
Highlights of agricultural research - Alabama Agricultural Experiment Station v. 39 (3): p. 7; 1992.

Language: English

Descriptors: Alabama; Poultry housing; Hatcheries; Sanitation; Disinfectants; Application methods

275 NAL Call. No.: 41.8 AV5
Scoliosis and tibiotarsal deformities in broiler chickens. Droual, R.; Bickford, A.A.; Farver, T.B.
Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Jan. Avian diseases v. 35 (1): p. 23-30; 1991 Jan. Includes references.

Language: English

Descriptors: Broilers; Scoliosis; Tibia; Tarsus; Deformities; Tendons; Incidence; Stresses

Abstract: The incidence and degree of scoliosis were investigated in broiler chickens with and without intertarsal deformities associated with slipped gastrocnemius tendons. In both groups, the incidence of scoliosis was similar and there was a significant tendency for scoliosis to be convex on the right side. However, scoliosis was significantly greater in birds with intertarsal deformities, and in a significant proportion of these the joint with a slipped tendon was on the convex side of scoliosis. In birds with deformities, inequalities between right and left tibiotarsi were significantly greater, and tibiotarsi with greater length, narrower condyles and trochleae, and shallower trochlear grooves were significantly more often on the convex side of scoliosis. Significant positive correlations were found between scoliosis and rotational and bending deformities of the distal tibiotarsus on the convex side of scoliosis. These findings suggest a cause-and-effect relationship between scoliosis and tibiotarsal deformities associated with slipped tendons.

276 NAL Call. No.: 47.8 AM33P
Selection for reduction of beak-inflicted injuries among caged hens. Craig, J.V.; Muir, W.M.
Champaign, Ill. : Poultry Science Association; 1993 Mar. Poultry science v. 72 (3): p. 411-420; 1993 Mar. Includes references.

Language: English

Descriptors: Hens; Cannibalism; Debeaking; Beak; Cages; Selection criteria; Trauma; Selection responses; Strain differences; Animal welfare; Heritability; Egg production; Correlated responses

Abstract: The effectiveness of selection for hen-days without beak-inflicted injuries was studied. The base population was known to have a high incidence of beak-inflicted injuries when pullets' beaks were intact. Data from the foundation stock yielded nonsignificant family heritability estimates ranging from .05 to .17, depending on length of the test period (varying from 16 to 28 to 16 to 40 wk of age) and number of six-hen cages per family (one to three). Selection was practiced on sire family groups of either 30 or 36 pullets. Birds used for selection were housed six birds per cage and had intact beaks. The criterion of selection was mean hen-days without beak-inflicted injuries from 16 to 40 wk of age. Three selected and three unselected strains were involved. After two generations, mean hen-days without beak-inflicted injuries from 16 to 40 wk of age were 164.8 and 155.3 for selected and unselected stocks, respectively, yielding a realized family heritability of .65 +/- .13 (SE). Selection did not appear to alter the relative frequency of beak-inflicted injuries by body regions affected; about 30% of all injuries involved the vent-cloacal area. Egg production traits were measured also. No differences were detected in Generation 1, but selected pullets had higher hen-housed rates of lay and egg mass in Generation 2. It is tentatively concluded that stocks having high levels of cannibalism when kept with intact beaks can benefit from selection against beak-inflicted injuries when evaluated by techniques similar to those used in the present study.

277 NAL Call. No.: QP1.C6
Serum corticosterone concentrations in developing shell-less and shelled turkey embryos.
McMurtry, J.; Richards, M.; Brocht, D.
Oxford: Pergamon Press Ltd; 1991.
Comparative biochemistry and physiology : A : Comparative physiology v. 100A (1): p. 135-137; 1991.
Corrects ID number IND92013676 which was entered with incorrect descriptors, category codes, and pagination. Includes references.

Language: English

Descriptors: Turkeys; Embryos; Corticoids; Embryonic development; Embryo culture; Incubation

Abstract: 1. Turkey embryos grown in shell-less culture (EO) display normal development to day 14 of incubation, after which growth rate is reduced and mortality increases, compared to age-matched in ovo (IO) embryos (Richards 1982. Long term shell-less culture of turkey embryos. Poultry Sci. 61, 2089-2096). 2. In this study serum corticosterone concentrations were monitored in normally incubated embryos and embryos maintained in shell-less culture. 3. On days 14 and 16 of incubation, corticosterone levels were greater ($P < 0.05$) in EO than IO embryos, whereas during the later stages corticosterone increased dramatically in the shelled embryos, and remained relatively constant in the EO embryos. 4. EO embryos do not exhibit a pattern of adrenal hormonal secretion that would indicated a stressful condition. 5. The absence of a normal increase in corticosterone in shell-less embryos may contribute to the abnormal embryological development in the later stages of incubation.

278 NAL Call. No.: 41.8 AV5
Severe mortality in broiler chickens associated with Mycoplasma synoviae and Pasteurella gallinarum.
Droual, R.; Shivaprasad, H.L.; Meteyer, C.U.; Shapiro, D.P.; Walker, R.L. Kennett Square, Pa. : American Association of Avian Pathologists; 1992 Jul. Avian diseases v. 36 (3): p. 803-807; 1992 Jul. Includes references.

Language: English

Descriptors: California; Broilers; Mortality; Mycoplasma synoviae; Pasteurella; Flocks; Outbreaks; Case reports

Abstract: Severe economic loss due to high mortality and condemnation rates occurred on two commercial broiler facilities. Chickens had moderate-to-severe airsacculitis, pericarditis, perihepatitis, tracheitis, and synovitis. Pasteurella gallinarium was isolated from 16 of 18 pericardia, four of 14 livers, 11 of 16 air sacs, six of seven joints and one of 28 tracheas in pure culture. In addition, Mycoplasma synoviae was isolated from trachea and air sac. Lesions were suggestive of an Escherichia coli septicemia, but E. coli was isolated from only four of 28 tracheas and one of 14 livers in pure culture. A coronavirus was isolated from trachea and lung. Whether this coronavirus represented a vaccine or field strain of infectious bronchitis was not determined. These findings suggested that the severe lesions were due to a concomitant infection with an atypical strain of P. gallinarum.

279 NAL Call. No.: QL750.A6
Shuttle and one-way avoidance as measures of aversion in the domestic fowl. Rutter, S.M.; Duncan, I.J.H. Amsterdam : Elsevier Science Publishers, B.V.; 1991 Apr. Applied animal behaviour science v. 30 (1/2): p. 117-124; 1991 Apr. Includes references.

Language: English

Descriptors: Hens; Animal welfare; Animal housing; Animal behavior

280 NAL Call. No.: 286.81 F322
Simple sponge may be best for sampling for salmonella. Jones, F.T.
Minnetonka, Minn. : Miller Publishing Co; 1993 Jan18.
Feedstuffs v. 65 (3): p. 28, 33; 1993 Jan18. Includes references.

Language: English

Descriptors: Poultry housing; Salmonella; Sampling; Cleaning

281 NAL Call. No.: HD1.A3
Simulation of a turkey house environment.
Parmar, R.S.; Diehl, K.C.; Collins, E.R. Jr; Hulet, R.M. Essex : Elsevier Applied Science Publishers; 1992.
Agricultural systems v. 38 (4): p. 425-445; 1992. Includes references.

Language: English

Descriptors: Virginia; Turkeys; Poultry housing; Environmental temperature; Humidity; Simulation models; Broiler production; Weather; Mathematical models; Validity

282 NAL Call. No.: HD1.A3
Simulation of weight gain and feed consumption of turkeys. Parmar, R.S.; Diehl, K.C.; Hulet, R.M.; Collins, E.R. Jr Essex : Elsevier Applied Science Publishers; 1992.
Agricultural systems v. 39 (1): p. 67-82; 1992. Includes references.

Language: English

Descriptors: Turkeys; Broiler production; Decision making; Simulation models; Body weight; Liveweight gain; Feed intake; Environment; Poultry housing; Sex; Age

283 NAL Call. No.: S67.P82
Small poultry flocks.
Holleman, K.A.
Baton Rouge, La.? : The Service; 1991 Mar.
Publication - Louisiana Cooperative Extension Service (2250): 30 p.; 1991 Mar.

Language: English

Descriptors: Fowls; Chicken housing; Poultry farming

284 NAL Call. No.: SF1.F64 no.98
Small-scale poultry processing.
Silverside, D.; Jones, M.
Food and Agriculture Organization of the United Nations
Rome : Food and Agriculture Organization of the United Nations,; 1992. iv, 109 p. : ill. ; 30 cm. (FAO animal production and health paper ; 98). Includes bibliographical references (p. 109).

Language: English

Descriptors: Slaughtering and slaughter-houses; Chicken industry; Chickens

285 NAL Call. No.: QP1.C6
Social stress and atherosclerosis in roosters.
Wong, H.Y.C.; Cheng, K.K.S.; Nightingale, T.E.
Elmsford, N.Y.: Pergamon Press; 1992 Mar.
Comparative biochemistry and physiology : A : Comparative physiology v. 101 (3): p. 625-629; 1992 Mar. Includes references.

Language: English

Descriptors: Atherogenic diet; Stress; Hypercholesterolemia; Atherogenesis; Atheroma; Atherosclerosis; Incidence; Cholesterol; Triacylglycerols; Blood lipids; Blood plasma; Aorta; Hemodynamics; Body weight; Cocks

Abstract: 1. Socially stressed roosters fed either plain mash or an atherogenic diet had a greater incidence and severity of aortic atherogenesis than similarly fed non-stressed birds. 2. Results demonstrated a significant atherogenic effect of stress in chickens even in the absence of hyperlipidaemia. 3. Lack of appreciable differences in plasma lipids between stressed and non-stressed birds suggested that the atherogenic effects of stress may be attributable to neuroendocrine responses. 4. Levels of HDLc of plain mash groups were significantly higher than in the atherogenic fed groups. 5. Haemodynamic data showed no treatment-related differences.

286 NAL Call. No.: QL750.A6
Stereotyped behaviour in broiler breeders in relation to husbandry and opioid receptor blockade.
Savory, C.J.; Seawright, E.; Watson, A.
Amsterdam : Elsevier Science Publishers, B.V.; 1992 Jan.
Applied animal behaviour science v. 32 (4): p. 349-360; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Animal behavior; Restricted feeding; Unrestricted feeding; Opioids; Stress

287 NAL Call. No.: S671.I84 no.29
Stovmalinger og arbeidsstudier i honehus med kompaktbur og aviarier = Dust measurements and work studies in building with compact cages and aviaries for laying hens.. Dust measurements and work studies in building with compact cages and aviaries for laying hens
Lyngtveit, Torgeir
As, Norway : Norges Landbrukshogskole, Institutt for Tekniske Fag,; 1992. 40 p. : ill. ; 30 cm. (ITF report, 29).
Summary in Norwegian and English. Includes bibliographical references (p. 40).

Language: Norwegian; English

288 NAL Call. No.: 47.8 AM33P
Strain-cross response of heavy male broilers to dietary lysine in the finisher feed: live performance and further-processing yields.
Bilgili, S.F.; Moran, E.T. Jr; Acar, N.
Champaign, Ill. : Poultry Science Association; 1992 May. Poultry science v. 71 (5): p. 850-858; 1992 May.
Includes references.

Language: English

Descriptors: Broilers; Lysine; Strain differences; Crossbreds; Broiler performance; Diet; Body weight; Liveweight gain; Feed conversion efficiency; Mortality; Carcass yield; Processing losses; Meat cuts

Abstract: A total of 2,560 male broilers from eight commercial strain-crosses were grown to 42 days of age on common starter (1 to 21 days; 23.06% CP, 3,217 kcal ME/kg) and grower (21 to 42 days; 20.14% CP, 3,224 kcal ME/kg) rations. All strain-crosses subsequently received finisher diets (17.95% CP; 3,186 kcal ME/kg) containing either .85 or .95% lysine from 42 to 53 days of age. Further-processing yields were determined on 12 birds per pen, selected within +/- 10% of the replicated pen (8 pens per strain-cross, 40 birds per pen) average weight. The strain-crosses differed significantly (P<.05) in BW (1, 21,42, and 53 days), weight gain (WG), feed:gain ratio (1 to 21 and 21 to 42 days), and mortality rate (1 to 21 days). The lysine effect during the finisher period was significant for 53-day BW and WG from 1 to 53 days. Chilled carcass (CC) and abdominal fat (AF) weights, CC yield (percentage, excluding AF), AF yield (percentage of CC weight), Pectoralis major, Pectoralis minor, total deboned breast (TDB), drumstick, thigh, wing and residual "cage" and skin yields varied among the strain-crosses. A significant weight and yield response to lysine was observed for TDB. Variation observed among strain-cross in live performance, further-processing yields, and response to additional lysine is attributed to differences in rate of growth and degree of maturity at market age. Furthermore, the lysine requirement during the finisher period for optimum breast meat yield may be higher than that recommended by the National Research Council in 1984.

289 NAL Call. No.: SF481.J68
Strategies for weighing broilers, broiler breeder pullets and broiler breeder hens: 2. Scale type weighing time and in-house location. Fattori, T.R.; Wilson, H.R.; Mather, F.B.; Bootwalla, S.M. Athens, Ga. : Applied Poultry Science, Inc; 1992 Mar.
Journal of applied poultry research v. 1 (1): p. 95-103; 1992 Mar. Includes references.

Language: English

Descriptors: Fowls; Weight determination; Weighers

290 NAL Call. No.: 447.8 AM3
Stress in birds due to routine handling and a technique to avoid it. Le Maho, Y.; Karmann, H.; Briot, D.; Handrich, Y.; Robin, J.P.; Mioskowski, E.; Cherel, Y.; Farni, J.
Bethesda, Md. : American Physiological Society; 1992 Oct. American journal of physiology v. 263 (4,pt.2): p. R775-R781; 1992 Oct. Includes references.

Language: English

Descriptors: Geese; Animal experiments; Stress; Handling; Blood sampling; Lactic acid; Catecholamines; Corticosterone; Ph; Acid base equilibrium

Abstract: The stress that might result in animals from the routine handling that most experimental studies involve, e.g., weighing, injecting, and blood sampling, is usually assumed to be minimal when the animals look quiet. However, the intensity of this stress remains largely ignored. We have developed a system that allows blood samples to be taken from freely behaving geese without entering the animal room. In these entirely undisturbed geese, the humoral indexes of stress, i.e., blood levels of catecholamines, corticosterone, and lactate, were as low or even lower than the lowest values previously reported for birds. Remarkably, the mean basal values for epinephrine and norepinephrine were 90-fold and 5-fold, respectively, below the lowest values in the literature. Stress-induced variations in pH that would have concealed detection of nutrition-induced changes in pH were eliminated. In contrast, even though the birds looked quiet during a short 5-min routine handling procedure, to which they had been accustomed for weeks, there was a dramatic increase in the level of humoral indexes of stress. These increased severalfold within only 2 min, and the return to initial values could take up to 1 h. Acid-base balance was also disrupted. Thus, in studies on animals, the absence of stress cannot be deduced from only behavioral observations. Only a system for taking blood without human interference may enable stress-free investigations.

291 NAL Call. No.: 448.3 AP5
Study on the epidemiology and control of Campylobacter jejuni in poultry broiler flocks.
Giessen, A. van de; Mazurier, S.I.; Jacobs-Reitsma, W.; Wernars, K. Washington, D.C. : American Society for Microbiology; 1992 Jun. Applied and environmental microbiology v. 58 (6): p. 1913-1917; 1992 Jun. Includes references.

Language: English

Descriptors: Broilers; Flocks; Campylobacter jejuni; Disease transmission; Vertical transmission; Epidemiology; Serotypes; Disease control

Abstract: Broiler flocks are frequently infected with Campylobacter jejuni. The origin of the infection is still unclear. The question of whether colonization of flocks results from transmission of C. jejuni from breeder flocks to progeny (vertical transmission) or from environmental sources horizontal transmission) remains to be answered. Therefore, in this study samples were taken from successive broiler flocks in two broiler houses (house A on farm A and house B1 on farm B) as well as from the environment of the houses. All C. jejuni isolates were typed by using the Penner serotyping system, and part of the isolates from farm B were typed by using a randomly amplified polymorphic DNA-typing system. In poultry house A, C. jejuni was isolated from the first flock but not from subsequent flocks. In poultry house B1, C. jejuni strains of the same Penner serotypes and exhibiting identical DNA profiles were isolated from successive flocks. Infection of the flocks from a common source via horizontal pathways is suspected, while a vertical route of infection is not likely to exist. Application of measures to control horizontal transmission of C. jejuni on farm B was successful.

292 NAL Call. No.: 44.8 J824
A survey of Campylobacter jejuni contamination in modern broiler production and processing systems.
Jones, F.T.; Axtell, R.C.; Rives, D.V.; Scheideler, S.E.; Tarver, F.R. Jr; Walker, R.L.; Wineland, M.J.

Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians; 1991 Apr.
Journal of food protection v. 54 (4): p. 259-262. charts; 1991 Apr. Includes references.

Language: English

Descriptors: Broilers; Campylobacter jejuni; Food processing; Sampling; Bacterial count; Epidemiology; Environment; Food sanitation

Abstract: Campylobacter jejuni contamination was surveyed in samples collected from the breeder-multiplier houses, broiler houses, feed mills, hatcheries, and processing plants of two integrated broiler firms. Insects and mice were also trapped at each location. C. jejuni was most frequently found in samples collected from processing plants, followed by samples collected from broiler houses, and breeder-multiplier houses. Samples obtained from feed mills and hatcheries were negative, suggesting that the C. jejuni was not transmitted by either feed or eggs. C. jejuni was also not isolated from insect or mouse samples. However, the external surfaces of insects were sanitized with a chlorine solution, prior to analysis. Thus, these data suggest any contamination of insects with C. jejuni is generally external not internal. Contamination in broilers apparently originated from some unknown source(s) in broiler houses. C. jejuni was isolated from 20% of the cloacal swabs taken as birds entered the plant, 52% of the carcasses sampled following immersion chilling, and 31.6% of whole broiler carcasses sampled at retail outlets. While these data suggest that cross-contamination occurred within processing plants, field control methods would appear to be necessary for control of C. jejuni in modern broiler production and processing systems. The frequent C. jejuni isolations from dead birds in broiler houses suggested the regular collection of normal mortality, as one farm management procedure that might help reduce Campylobacter contamination in broilers.

293 NAL Call. No.: 41.8 AV5
A survey of helminth parasites in backyards flocks in Michigan by litter examination.
Nonaka, N.; Donoghue, A.R.; Manzoni, A.M.; Schillhorn van Veen, T.W. Kennett Square, Pa. : American Association of Avian Pathologists; 1991 Jul. Avian diseases v. 35 (3): p. 554-558; 1991 Jul. Includes references.

Language: English

Descriptors: Michigan; Poultry; Flocks; Disease surveys; Helminths; Disease prevalence; Poultry manure; Sampling

Abstract: The prevalence of parasitic infections in backyard flocks was surveyed using litter samples from 74 pens located on 12 farms in central lower Michigan. Eight species of birds were represented. Two methods of litter examination (a sucrose flotation technique and a multiple washing/ZnCl2 flotation) were compared; the sucrose flotation technique was found to be more useful and was used in the survey. The following parasites eggs/oocysts were observed; ascarid-type eggs (in 34 pens from nine farms), Capillaria eggs (in 30 pens from nine farms), Strongyloides eggs (in nine pens from five farms), Syngamus eggs (in five pens from four farms), and coccidial oocysts (in 40 pens from 10 farms). Contamination of litter with ascarid-type eggs, Capillaria eggs, and coccidial oocysts was commonly found, irrespective of bird species. The contamination level in pens with more than one bird species was lower than in pens with a single species. The relatively high contamination rate may be an indication of the risk of parasitic disease in birds that are not raised under controlled conditions in confinement.

294 NAL Call. No.: 44.8 J824
A survey of Salmonella contamination in modern broiler production. Jones, F.T.; Axtell, R.C.; Rives, D.V.; Scheideler, S.E.; Tarver, F.R. Jr; Walker, R.L.; Wineland, M.J.
Ames, Iowa : International Association of Milk, Food, and Environmental Sanitarians; 1991 Jul.
Journal of food protection v. 54 (7): p. 502-507; 1991 Jul. Includes references.

Language: English

Descriptors: Salmonella; Broilers; Food contamination; Food processing; Feeds; Pelleting; Insects; Mice; Disease transmission; Isolation techniques

Abstract: A survey of contamination with Salmonella was done in the breeder/multiplier and broiler houses, feed mills, hatcheries, and processing plants of two integrated broiler firms. Samples of insects and mice were also collected at each location. Sixty percent (60%) of the meat and bone meat samples collected at feed mills were contaminated. Salmonella was isolated from 35% of the mash feed samples tested. The pelleting process reduced Salmonella isolation rates by 82.0%. Data collected from breeder/multiplier houses suggested that feed was the ultimate source of Salmonella contamination in that environment. Salmonella was found in 9.4% of the yolk sac samples collected from day-old chicks in hatcheries. Fecal dropping samples collected in broiler houses about one week prior to slaughter were contaminated at a rate of 5.2%. Salmonella was found in 33% of the samples collected from live haul trucks and 21.4% of the whole processed broiler carcasses sampled at processing plants. Salmonella typhimurium was the serotype most commonly isolated. The gastrointestinal tract of one of 19 mice sampled was contaminated with Salmonella. Data suggest that insects were primarily mechanical carriers. Results suggest Salmonella contamination in the U.S. broiler production and processing system has changed little since 1969. The data also underline the contention that effective Salmonella control efforts must be comprehensive.

295 NAL Call. No.: 47.8 AM33P
Survey of turkey downgrading at slaughter: carcass defects and associations with transport, toenail trimming, and type of bird.
McEwen, S.A.; Barbut, S.
Champaign, Ill. : Poultry Science Association; 1992 Jul. Poultry science v. 71 (7): p. 1107-1115; 1992 Jul. Includes references.

Language: English

Descriptors: Turkeys; Carcass grading; Carcass quality; Bruises; Broilers; Transport of animals; Stocking density; Defects; Animal husbandry

Abstract: For 18 mo, tom, hen, and broiler turkeys processed in a single abattoir were observed for carcass defects resulting in downgrading. Samples of 100 turkeys per truckload were used to determine the proportion of turkeys requiring wing trim, half wing trim, and trimming for bruised drums, breast blisters, or breast buttons, leg, breast, or back scratches, and leg edema. Bird type (hen, tom, or broiler), truck, time on truck, farm of origin, and trimming of toenails and spurs were also noted. Multiple least squares linear regression was used to assess the associations among truck, time on truck, space per bird on truck, toenail trimming, spur clipping, and proportions of truckloads of turkeys with carcass defects. The effect of farm and bird type were adjusted for in regression models. Overall, downgrading was observed to be a significant problem in turkey production and processing. Among toms, hens, and broilers there were substantial differences in the rates of bruised drums, breast buttons or blisters, back and leg scratches, and leg edema. Toenail trimming was associated with reduced breast and leg scratches and spur clipping was associated with reduced back scratches. Increased time birds were held on trucks was associated with increased half wing trim and bruised drums. Few associations were observed among downgrading defects, the various trucks used during the study, and space available to birds on trucks.

296 NAL Call. No.: SF481.J68
Tunnel--ventilated broiler houses: broiler performance and operating costs. Lacy, M.P.; Czarick, M.
Athens, Ga. : Applied Poultry Science, Inc; 1992 Mar.
Journal of applied poultry research v. 1 (1): p. 104-109; 1992 Mar. Includes references.

Language: English

Descriptors: Broiler production; Chicken housing; Artificial ventilation

297 NAL Call. No.: aTX501.F66
Turkey fundamentals.

Moriarty, P.
Washington, D.C. : U.S. Department of Agriculture; 1992.
Food news for consumers v. 9 (3): p. 4-5; 1992.

Language: English

Descriptors: Turkey meat; Food preparation; Food handling

Abstract: This article gives food safety tips for the handling and cooking of holiday turkeys.

298 NAL Call. No.: 47.8 AM33P
Twenty-four-hour feed withdrawal and limited feeding as alternative methods for induction of molt in laying hens.
Rolon, A.; Buhr, R.J.; Cunningham, D.L.
Champaign, Ill. : Poultry Science Association; 1993 May.
Poultry science v. 72 (5): p. 776-785; 1993 May. Includes references.

Language: English

Descriptors: Hens; Restricted feeding; Diet; Molt; Metabolizable energy; Body weight; Egg weight; Egg production; Mortality; Feed intake; Production costs; Income; Animal welfare

Abstract: Alternative molting methods involving shorter periods of feed withdrawal and feeding a low-density and low-energy "molt diet" were compared to conventionally molted (8-day feed removal) and nonmolted hens. Alternative molt methods consisted of feeding the molt diet for 28 days for ad libitum intake, daily limited, or alternate-day limited (feeding every other day). Egg production, egg weight, specific gravity, body weight, feed intake, and mortality were recorded for 31 wk from the start of the molt (4 wk molt, 1 wk prelay, and 26 wk postmolt). Economic variables (feed cost, egg value, income over feed costs per hen housed) were compared between molting methods. Hens provided ad libitum access to the molt diet produced more eggs during the molt period than hens molted by other methods. Total egg production and income (egg value minus feed cost) were comparable among all molting methods and exceeded the values for nonmolted control hens. Income per hen housed was $2.20 for nonmolted control, $2.87 for the conventional, $2.92 for ad libitum, $2.81 for daily limited, and $2.97 for the alternate-day limited hens. These results indicate that alternative molting methods involving periods of feed withdrawal of 24 h or less can be as economically effective as conventional methods using longer periods of feed withdrawal.

299 NAL Call. No.: 47.8 AM33P
The upper critical ambient temperature in neonatal chicks. Hel, W. van der; Verstegen, M.W.A.; Henken, A.M.; Brandsma, H.A. Champaign, Ill. : Poultry Science Association; 1991 Sep. Poultry science v. 70 (9): p. 1882-1887; 1991 Sep. Includes references.

Language: English

Descriptors: Chicks; Newborn animals; Critical temperature; Environmental temperature; Heat production; Body weight; Weight losses; Water content; Time

Abstract: Heat production, dry matter, and water loss in the body and yolk sac of neonatal broiler chicks were measured during 24 h exposure to constant temperatures from 30.8 to 38.8 C. Average initial body and yolk sac weights were 41.6 and 4.4 g. respectively. Chicks housed at 30.8 C lost 3.5 g/day and chicks housed at 38.8 C lost 5.7 g/day of total body weight. Between 30.8 and 35.1 C. weight loss of the yolk sac was 1.9 g/day. At 38.8 C, weight loss of the yolk sac was 1.4 g/day. Weight lost from the yolk sac consisted of equal amount of dry matter and water. Water loss from the remainder of the chick's body (the total body without yolk sac) increased from 1.8 to 4.4 g as environmental temperature was raised from 30.8 to 38.8 C. This increase occurred mainly above about 35 C. Chick heat production increased with ambient temperature. Heat production as determined per subsequent 3-h period decreased with increasing duration of exposure from 34.6 to 28.2 kJ/kg per hour (1 kJ

=.239 kcal) at 30.8 C and from 44.1 to 35.5 kJ/kg per hour at 38.8 C. The upper critical temperature was derived from regression of heat production on temperature. Results showed that this critical temperature was between 36 and 37 C.

300 NAL Call. No.: 41.8 AM3A
Use of a multivariable indexing score for hygiene variables in relation to egg production.
Mohammed, H.O.; Carpenter, T.E.
Schaumburg, Ill. : American Veterinary Medical Association; 1991 Jun. American journal of veterinary research v. 52 (6): p. 970-973; 1991 Jun. Includes references.

Language: English

Descriptors: California; Fowls; Egg production; Hygiene; Indexes; Ventilation; Cooling systems; Poultry manure; Trucks

Abstract: An indexing system for hygiene variables associated with egg production was developed by use of datacollected from chicken flocks in southern California. The data were analyzed by factor and regression analysis. On the basis of our findings, hygiene index in relation to egg production consists of ventilation system, cooling system, manure removal, and truck movement. Flocks kept under natural ventilation produced, on the average, 2% more hen-day eggs than flocks kept under artificial ventilation. Flocks placed in houses with roof sprinklers produced 3.3% more hen-day eggs, compared with flocks placed in houses with inside foggers and pad. Flocks kept under the system of frequent removal of manure produced 2% more hen-day eggs than flocks kept under the system for which the manure was removed less frequently. Flocks kept in farms that restricted trucks collecting dead birds from entering the premises produced 3.4% more hen-day eggs than those that allowed such trucks to enter the farm.

301 NAL Call. No.: 47.8 AM33P
The use of recycled paper chips as litter material for rearing broiler chickens.
Lien, R.J.; Conner, D.E.; Bilgili, S.F.
Champaign, Ill. : Poultry Science Association; 1992 Jan.
Poultry science v. 71 (1): p. 81-87; 1992 Jan. Includes references.

Language: English

Descriptors: Broilers; Litter; Waste paper; Recycling; Body weight; Feed intake; Feed conversion; Moisture content; Bacterial count; Microbial flora

Abstract: The suitability of recycled paper chips (RPC), formed by completely reprocessing waste newspaper, as litter material for rearing broilers was investigated in two successive trials. In Trial 1, broilers were reared in pens prepared with a 9-cm layer of either unused RPC or pine shavings (PS). In Trial 2, broilers were reared in pens prepared by adding 3 cm of clean RPC or PS to used litter of the same type remaining from Trial 1. Mortality, BW, feed consumption and conversion, carcass yield, and incidences of breast blisters and leg abnormalities were not influenced by litter treatments. Litter moisture was greater in RPC during Week 3 of Trial 1, but did not differ between treatments at other times during either trial. Litter caking was greater in RPC throughout Trial 1, but did not differ between treatments during Trial 2. Populations of aerobic, psychrotrophic, and coliform bacteria, and fungi (yeasts and molds) in the two litter types did not differ during the rearing period of either trial. Populations of aerobic bacteria and fungi were greater in unused PS, and fungi populations were greater in used PS prior to initiation of Trial 2. Populations of psychrotrophic bacteria were greater in used PS 6 days after bird removal in Trial 2. Generally, RPC are comparable to PS and have potential as an alternative litter material for rearing broilers.

302 NAL Call. No.: QL750.A6
The use of water-cooled roosts by hens for thermoregulation. Muiruri, H.K.; Harrison, P.C.; Gonyou, H.W.
Amsterdam : Elsevier Science Publishers, B.V.; 1991 Jan. Applied animal behaviour science v. 28 (4): p. 333-339; 1991 Jan. Includes references.

Language: English

Descriptors: Hens; Perches; Cooling systems; Body temperature regulation; Environmental temperature

303 NAL Call. No.: 47.8 AM33P
The value of supplemental biotin for increasing hatchability of turkey eggs. Robel, E.J.
Champaign, Ill. : Poultry Science Association; 1991 Aug. Poultry science v. 70 (8): p. 1716-1722; 1991 Aug. Includes references.

Language: English

Descriptors: Turkeys; Turkey hen feeding; Biotin; Turkey eggs; Embryo mortality; Turkey egg hatchability; Egg yolk; Egg albumen; Turkey egg production; Incubation; Vitamin supplements

Abstract: Two experiments were conducted with Large White Turkey hens in individual cages to determine the value of supplemental biotin for increasing hatchability. No differences were observed for 7-day embryo deaths between treatments in both experiments. In the last two-thirds of the production cycle in both experiments, eggs from hens fed 520 microgram and 623 microgram/kg had the fewest embryonic deaths during Days 7 to 28 of incubation. Concentrations of biotin in egg albumen increased with incremental dietary biotin levels, but egg yolk concentrations were stable. About 38 microgram of biotin per egg (82 g) produced highest embryo survival. Regression analysis, based on average percentage hatchability at the treatment levels for both experiments, revealed no hatchability response for Period 1 (first third of production cycle) from biotin. However, the dietary biotin level for hatchability increased with maternal age, which ranged from 500 to 800 microgram/kg for period 2 (second third of production cycle) and 3 (last third of production cycle), respectively.

304 NAL Call. No.: 47.8 AM33P
Variability in preincubation embryo development in domestic fowl. 1. Effects of nest holding time and method of egg storage.
Fasenko, G.M.; Robinson, F.E.; Armstrong, J.G.; Church, J.S.; Hardin, R.T.; Petitte, J.N.
Champaign, Ill. : Poultry Science Association; 1991 Sep.
Poultry science v. 70 (9): p. 1876-188; 1991 Sep. Includes references.

Language: English

Descriptors: Eggs; Egg cooling; Embryonic development; Chick embryos; Nests; Time; Storage; Preincubation period; Environmental temperature

Abstract: Embryos of eggs from Single Comb White Leghorn hens were analyzed to determine whether nest holding time and method of storage had a significant effect on postoviposition embryonic growth prior to incubation. Eggs were collected from 38- to 42-wk-old hens naturally inseminated and housed in floor pens. The experiment had a 2 X 2 factorial arrangement of treatments with two nest holding times and two storage methods. Eggs were collected within 1 h of oviposition, placed on cardboard egg flats, and stored unpacked (Treatment 1), or put on flats, and packed in 30-dozen egg cases (Treatment 2). Eggs in Treatments 3 and 4 were marked within 1 h of oviposition, but remained in the nest for 6 to 7 h. These eggs were separated into unpacked (Treatment 3), and packed (Treatment 4) groups. All eggs were stored at 13.8 C for 4 days. A total of 250 embryos were staged after storage for development using the Eyal-Giladi and Kochav classification. Least square means (LSM) for stage of development were: Treatment 1, 10.76; Treatment 2, 11.52; Treatment 3, 12.41; and Treatment 4, 12.36. For the main effects, nest holding time significantly affected stage of development (P = .0001), but storage method (P = .1140) and nest holding time by storage method interaction (P =.0730) did not. Comparison of LSM of Treatment 1 versus 3 (P =.0001), 2 versus 4 (P =.0152), and 1 versus 2 (P =.0214) were significant but Treatment 3 versus 4 (P =.8595) was not The results of the present study indicate that nest holding time significantly affected postoviposition, preincubation embryonic growth. 1% significance of the effects of method of storage varied depending on the nest holding time.

305 NAL Call. No.: 290.9 AM32T
Ventilation of poultry buildings with exhaust fans at one end and continuous slot inlets along the sidewalls.
Bottcher, R.W.; Singletary, I.B.; Baughman, G.R.
St. Joseph, Mich. : American Society of Agricultural Engineers; 1992 Sep. Transactions of the ASAE v. 35 (5): p. 1673-1679. ill; 1992 Sep. Includes references.

Language: English

Descriptors: Poultry housing; Exhaust systems; Fans; Ventilation; Mathematical models; Theory

Abstract: Ventilation of buildings for housing floor-raised poultry, with exhaust fans clustered at one end and continuous slot inlets along the sidewalls, was analyzed using relationships for airflow in manifolds. Air velocities measured along the inlets in two poultry buildings were compared to velocities computed using theoretical relationships. The parameter with the greatest effect on uniformity of airflow along the inlets was the inlet discharge coefficient multiplied by the ratio of total slot inlet area to the flow area in the building cross-section, defined as alpha. For typical poultry buildings without substantial internal obstructions to airflow, variation in air velocity at the slot inlets along the building length was less than 10% when alpha was less than 0.4. Reductions in air velocity along the inlets are developed from manifold relationships for a range of values of alpha and F, a dimensionless friction parameter. An example demonstrates application of results to sizing sidewall inlet openings in buildings designed for tunnel ventilation.

306 NAL Call. No.: SB599.J69
Vertical distribution of dipterous larvae and predatory arthropods in accumulated caged layer poultry manure in southern California. Wills, L.E.; Mullens, B.A.
Clemson, S.C. : South Carolina Entomological Society; 1991 Jan. Journal of agricultural entomology v. 8 (1): p. 59-66; 1991 Jan. Includes references.

Language: English

Descriptors: California; Poultry manure; Musca domestica; Muscina stabulans; Hydrotaea aenescens; Fannia canicularis; Fannia femoralis; Coleoptera; Predatory mites; Pseudoscorpiones; Predators of insect pests

307 NAL Call. No.: 47.8 W89
Welfare of laying hens in cages and alternative systems: environmental, physical and behavioural aspects.
Appleby, M.C.; Hughes, B.O.
London : Butterworth; 1991 Jul.
World's poultry science journal v. 47 (2): p. 109-128; 1991 Jul. Literature review. Includes references.

Language: English

Descriptors: Fowls; Hens; Animal welfare; Cages; Chicken housing; Stocking density; Crowding; Environmental factors; Laying performance; Floor space; Floor type; Body weight; Feather pecking; Animal behavior; Group size; Nests; Cage size; Bone strength; Production costs; Literature reviews

308 NAL Call. No.: QL698.C7
The welfare of poultry in modern production systems.
Mench, J.A.
Essex : Elsevier Publishing Ltd; 1992.
Poultry science reviews v. 4 (2): p. 107-128; 1992. Literature review. Includes references.

Language: English

Descriptors: Poultry; Animal production; Animal welfare; Literature reviews

309 NAL Call. No.: 47.8 AM33P
Wheat middlings as an alternate feedstuff for laying hens. Bai, Y.; Sunde, M.L.; Cook, M.E.
Champaign, Ill. : Poultry Science Association; 1992 Jun. Poultry science v. 71 (6): p. 1007-1014; 1992 Jun. Includes references.

Language: English

Descriptors: Hens; Wheat; Middlings; Egg production; Strain differences; Genetic differences; Maize; Soybean oilmeal; Egg weight; Feed intake; Feed conversion; Survival; Protein intake

Abstract: Three long-term experiments were conducted to evaluate the possibility of using wheat middlings (WM) for laying hens and to study the responses of six strains of commercial laying hens fed WM diet. In Experiment 1, 320 layers maintained in floor pens were fed diets containing 45% WM with .25 or .75% salt, or 89% WM with .25% or 1.5% salt. Salt supplementation did not show any beneficial effect on egg production. Hen-day egg production by hens fed the 45% WM diet was significantly higher for hens fed 45% WM than for those fed the 89% WM diet (79 versus 67.5%, 44-wk period). Feed, limestone, and water intakes were increased by 89% WM diet. Yolk color, Haugh units, hen livability, and reproductive parameters were not different among the dietary treatments. In Experiments 2 and 3, laying hens from six commercial strains (four strains each experiment, 240 hens per strain) were maintained in laying cages in each year, and fed either a corn and soybean meal (CSM) or a 25% WM diet. Results show that neither diet nor strain had effects on hen-day egg production; however, egg weights from Strains A, C, and F were heavier than those from Strains B, D, and E. Feed intakes and feed utilizations were similar among the strains. The 25% WM diet increased egg weight, feed intake, and feed utilization compared with the CSM diet. Livability of hens was 93.8 to 97.5% and was not affected by either strain or diet. It is concluded that commercial strains of laying hens can be fed diets containing 25 to 45% WM and still have normal hen-day egg production although feed utilization will be poorer.

310 NAL Call. No.: 47.8 B77
Whitening of brown shelled eggs: individual variation and relationships with agge, fearfulness, oviposition interval and stress.
Mills, A.D.; Nys, Y.; Gautron, J.; Zawadski, J.
Oxfordshire : Carfax Publishing Company; 1991 Mar.
British poultry science v. 32 (1): p. 117-129; 1991 Mar. Includes references.

Language: English

Descriptors: Eggs; Egg shell; Color; Hens; Fearfulness; Age; Laying performance; Stress; Line differences

311 NAL Call. No.: 47.8 AM33P
Zinc methionine for stressed laying hens.
Kienholz, E.W.; Moreng, R.E.; Flinchum, J.D.
Champaign, Ill. : Poultry Science Association; 1992 May.
Poultry science v. 71 (5): p. 829-832; 1992 May. Includes references.

Language: English

Descriptors: Fowls; Hens; Zinc; Methionine; Feed additives; Calcium; Mineral deficiencies; Stress; Laying performance; Egg weight; Egg shell thickness; Egg albumen; Egg hatchability; Dosage effects

Abstract: The effects of zinc methionine product (ZP) supplementation to Single Comb White Leghorn hens on egg production and quality were measured through three consecutive egg laying cycles. During the first and second lay cycles, ZP had minor or nonsignificant effects upon hen performance. During the third lay cycle, a low dietary Ca (.3% Ca) stress of 1 mo duration was encountered. During this low-Ca stress period, hens fed 1 g ZP/kg produced the greatest number of eggs ($P < .05$), and during recovery from that low-Ca stress, the hens receiving 2 g ZP/kg produced the most eggs ($P < .05$). The ZP appeared to help hens maintain egg size

throughout this stress period. The present results indicate that ZP was beneficial to hens during low-Ca stress and during the recovery period following that stress.

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