

Further work showed that by passing the cotton in the form of a bat between heavy steel rollers held together by heavy springs just before it entered the press box and as part of the ginning operations, the same results could be accomplished. That is, sufficient pressure was applied to the cotton to crush any seed which might be therein and destroy any pink bollworm. This process had the advantage of being applied at little added cost, the operating cost being estimated at about 1 cent per bale. By this method, all the cotton was subjected to a uniformly high pressure, and the entire bale was free from possible infestation when it left the gin press. It was thus possible without decreasing the effectiveness of the treatment to substitute in certain areas a process which cost 1 cent per bale for application for one which had cost \$1.50 per bale.

A method of sterilizing cottonseed for planting, in which the seed, preheated by steam, was held for 1 hour at 145° F. in a steam-jacketed container, was developed. The apparatus was designed to operate continuously with a capacity of about 8 tons of seed per day. Careful tests showed that this treatment would sterilize seed without injuring the viability. This made possible the shipment of special varieties of cottonseed from the lightly infested area for planting, and made this seed available over a wider area, thereby benefiting the producer in that he received a higher price for his seed.

The object in this work is to make the treatments as simple and economical as possible, reduce interference with the commercial movement of the commodity to a minimum, and, at the same time, prevent the spread of the pest against which the regulations are directed.

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PORK of Good Quality Grown Efficiently on Corn-Soybean Ration

Rapid expansion in the production of soybeans during the last decade has led to increased utilization of the crop in feeding livestock. Because of its high protein content, the soybean has become popular as a supplement to corn and other starchy feeds in the production of hogs. This often makes unnecessary the purchase of concentrated protein feeds. Soybeans contain about 36 percent of protein and vary in oil content from 12.7 to 20.5 percent depending upon the variety, the more common varieties used in hog feed averaging approximately 18 percent. Because of their high oil content, soybeans fed in large quantities produce soft or oily carcasses of unsatisfactory market quality. Another consideration in feeding soybeans is their deficiency in certain mineral elements; hence hog rations containing soybeans should include a good mineral mixture.

Rations of Corn and Soybeans

In cooperation with the Purdue (Ind.) University Agricultural Experiment Station, the Department has conducted a series of tests to determine the maximum proportion of soybeans that may be fed to hogs with corn without serious detriment to the quality of carcass. The plan of this series of experiments provided for a study of the effect of mixtures of ground corn and ground soybeans when fed to fattening hogs in the proportions 3:1, 6:1, 9:1, and 12:1, as compared with the effect, on a control lot, of a mixture of corn and tankage in the proportion of 12:1. The Purdue investigators also used another lot in which

one third part tankage was an added protein supplement to the 12:1 corn-soybean ration.

The Manchu variety of soybeans was fed in the Indiana experiments, whereas the Virginia variety was fed in the Department experiments, which were conducted at the United States Animal Husbandry Experiment Farm, Beltsville, Md. Three experiments were conducted at Purdue and two at Beltsville. All hogs were slaughtered and carcass observations made at Beltsville. The carcass-grading committee was composed of 3 members, 1 representing the Bureau of Animal Industry, United States Department of Agriculture; 1 representing the State agricultural experiment stations cooperating with the Bureau in soft-pork investigations; and 1 representing the Institute of American Meat Packers. In all the experiments the mixtures of ground corn and ground soybeans were self-fed, free choice, in dry lot, with mineral mixture. The mineral mixture was composed of 10 parts wood ashes, 10 parts 16-percent superphosphate, and 1 part common salt. The hogs also had access to pressed block salt. The principal results of these experiments are shown in summarized form in table 6.

TABLE 6.—*Summary of data from hogs fed various rations in dry lot*

Ration and proportion	Hogs fed	Period of feeding	Average weight		Average gain		Feed per 100 pounds gain	Average grading of carcass for firmness
			Initial	Final	Total	Daily		
Corn and soybeans:	<i>Number</i>	<i>Days</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	
3:1-----	38	77	115	222	107	1.39	468	Soft.
6:1-----	46	87	113	232	119	1.38	477	Medium soft.
9:1-----	47	83	113	231	118	1.42	444	Do.
12:1-----	37	87	118	236	118	1.36	501	Medium hard.
Corn, soybeans, and tankage:								
12:1:1/3-----	17	65	124	240	116	1.77	458	Do.
Corn and tankage:								
12:1-----	45	72	116	242	126	1.76	435	Hard.

In all cases the gain produced on the corn-soybean ration averaged over 100 pounds, with a variation in the finished weight of the hogs ranging from 205 to 243 pounds as the lot average.

Feed Consumption and Carcass Quality

From the standpoint of feed consumption per 100 pounds of gain the results were consistent at the two stations in favor of the 9:1 ration, when soybeans made up the sole protein supplement. The 12:1 ration was consistently the high-cost ration at both stations, an average of about 57 pounds more feed per 100 pounds of gain being consumed with this ration than with the 9:1 combination. The addition of one third part tankage to the 12:1 ration not only increased the rate of gain, but the pigs required on an average about 43 pounds less feed per 100 pounds of gain than with the straight 12:1 mixture. In no instance, however, did any of the feed combinations at either station equal in efficiency, so far as low feed consumption per 100 pounds of gain was concerned, the feed utilization of the control lots receiving corn and tankage in the proportion of 12:1.

The conclusion reached by the investigators in consultation with other specialists cooperating in the soft-pork investigations were as follows:⁹

⁹ Agricultural experiment stations of the following States have cooperated with the Department in soft-pork investigations and in the interpretation of results: Alabama, Arkansas, Georgia, Kentucky, Mississippi, North Carolina, Ohio, Oklahoma, Pennsylvania, Indiana (Purdue), South Carolina, Tennessee, Texas, and Virginia. The Institute of American Meat Packers has also cooperated.

Hogs with initial weights up to 130 pounds, when fed a corn-soybean ration in the ratio of 3:1, will not usually produce firm carcasses if slaughtered after a gain of approximately 100 pounds or more has been made on this ration. Only 8 percent were in the medium-hard class, the remainder being medium soft or soft.

Thirty-six percent of the carcasses of hogs fed the 6:1 corn-soybean ration were firm (hard or medium hard). However, heavier hogs having initial weights of 115 pounds or more and gaining at least 1.5 pounds per day when fed for a period of 10 weeks or longer usually produce firm carcasses.

Approximately 50 percent of the carcasses of the hogs fed the 9:1 corn-soybean ration were firm, whereas 65 percent of the carcasses of those fed the 12:1 ration were firm. With these two rations also, the heavier, faster gaining pigs normally produced firm carcasses. When one third part tankage was added to the 12:1 ration, 88 percent of the carcasses were firm, whereas 91 percent of the carcasses of the control group fed the 12:1 corn and tankage rations were firm.

From these results it appears that initial weight, ration, and rate of gain are important factors that influence firmness in the carcass. In general, hogs well grown on nonssoftening feeds to a weight of approximately 115 pounds or more and making subsequent gains of approximately 100 pounds on a corn-soybean ration with gains of 1.5 pounds or more daily, produce firm carcasses when the proportion of soybeans in the ration is not greater than 1 part of soybeans to 6 parts of corn. Of the corn-soybean rations, the 9:1 combination produced the most economical gain.

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POTATO Losses in Handling Reduced by Simple Equipment

In the Aroostook area of Maine, the bulk of the potatoes grown must be stored either on the farm or at the trackside, because the existing transportation facilities cannot handle more than a tenth of the crop during the harvest season.

Current harvesting and handling methods in that area cause injuries to potatoes averaging about as shown in table 7. The minor bruises prior to storage, affecting about 40 percent of the potatoes harvested, result in grade injuries in storage amounting to 3 percent of the crop stored. Respiration of the potatoes in storage causes a loss of about 5 percent.

TABLE 7.—*Injuries to potatoes caused by harvesting and handling methods, in Aroostook County, Maine*¹

Operation	Grade injury	Minor injury	Total injury
	Percent	Percent	Percent
Digging.....	2.15	16.16	18.31
Picking into baskets.....	.36	1.86	2.22
Emptying into barrels.....	1.94	6.22	8.16
Placing in storage.....	2.65	16.47	19.12
Moving to grader.....	1.14	12.13	13.27
Grading.....	1.75	18.48	20.23
Bagging or barreling.....	4.41	5.65	10.06
Total.....	14.40	76.97	91.37

¹ Prepared by William E. Schrupf, Maine Agricultural Experiment Station.