Ticks, Lice, Sheep
Keds, Mites

E. F. Knipling

Lice, ticks, and mites annoy—and sometimes kill—animals and poultry. These external parasites are present the year around. They lower production of meat, milk, eggs, fiber, and leather. New insecticides can control them. There is little excuse any more for allowing some of them to exist.

Ticks must get blood from an animal in order to exist. Several species are important pests of farm stock—the cattle tick, Gulf Coast tick, lone star tick, fowl tick, and others. Some, like the cattle tick and winter tick, get on the animal in the seed-tick stage and remain on it until they mature in 2 weeks or longer. The mature tick drops to the ground and lays several thousand eggs, which hatch into the seed tick and start the life cycle all over. The Gulf Coast, lone star, and other ticks may feed on several hosts before they mature. The Gulf Coast tick usually gets on wild birds, such as meadowlarks and quail, in the seed-tick stage. The next stage, called the nymph, may again get on birds or on small animals such as rats and squirrels. The adult tick usually attacks larger animals, including cattle, sheep, and hogs.

The cattle tick, the worst of the ticks that affect livestock, has been eliminated from the United States except possibly in the extreme southern tip of Texas. It saps the strength of cattle. More important, it transmits the disease known as cattle fever or Texas fever. Early in this century scientists of the Department of Agriculture developed sufficient information about the life history and control of the parasite to attempt its complete elimination.

Men in the Bureau of Animal Industry, cooperating with State workers, accomplished their objective, a great achievement.

The cattle tick and the disease it transmits still exist in South and Central America and other parts of the Tropics and take a heavy toll from the livestock industry there.

The elimination of the cattle tick from the United States was achieved by dipping in arsenical materials. The new tick-killing agents now available have been found to be more effective than the older arsenical dips. The new materials, which I describe later, can improve the livestock industry and over-all economy in Central and South America and in other parts of the world where the cattle tick is prevalent.

The Gulf Coast tick occurs along the Gulf of Mexico. It attacks all farm animals but is most serious on cattle. The tick usually attaches itself in and around the ears. Sometimes during July to September 100 ticks may be present on an animal. The bites cause severe inflammation and swelling of the ears. The annoyance due to the tick alone justifies efforts to eliminate it, but an even greater loss comes from the lesions caused by tick feeding, which are apt to become infested with the screwworm, a destructive pest of livestock.

The newer insecticide sprays give the most effective and practical control. Sprays containing 0.5 percent of toxaphene destroy the ticks and protect animals from further serious attack for 2 to 3 weeks. A spray made of 0.025 percent of lindane (or gamma benzene hexachloride) and 0.5 percent of DDT is equally effective. Those treatments are also effective against flies and lice. Sprays containing DDT are not recommended for treatment of dairy cattle because the DDT will appear in the milk. Neither are toxaphene sprays recommended for dairy animals because of possible contamination of milk.

The lone star tick gets its name from the white spot on the back of the adult.
This tick attacks all kinds of livestock and many wild animals, especially deer. It may attach itself to any part of the animal. It is most abundant in the Southern and lower Midwestern States. It can be controlled with the same treatments used against the Gulf Coast tick.

The ear tick attaches itself deep in the ears of cattle, horses, sheep, and goats. A preparation of 5 parts of benzene hexachloride (12 percent gamma isomer), 10 parts of xylene, and 85 parts of steam-distilled pine oil will control it when applied in the ears of infested animals with a spring-bottom oiler. The toxaphene or lindane-DDT sprays described for use against the Gulf Coast tick are useful also against the ear tick. They should be applied inside and outside the ears and on the head and neck of the animal. To avoid possible injury to the ears, spray equipment developing low pressures of 30 to 50 pounds per square inch is recommended.

The winter tick is common in the Southwest, Midwest, and North Central States. It prefers to feed on horses but also attacks cattle. The sprays I have mentioned are effective against it. A single treatment in fall or winter often will protect animals against further attack for the season. Two treatments at intervals of 6 to 8 weeks may be necessary if the ticks are very numerous.

The fowl tick, also called the blue-bug, is one of the most injurious of the poultry parasites. It occurs in some Southern States, particularly in the Southwest. The blue-bug, light blue in color, remains well hidden in cracks in poultry houses or roosting places. If the farmer suspects infestations, he should examine cracks, loose boards, and boxes and other objects near the roosts.

Because the ticks may live for months or years, waiting for a chance to get blood, it is hard to control them once they infest the premises. Several chemicals may be used against them, but success depends on how thoroughly the materials are applied. Chickens and other poultry should not be permitted to roost in trees, livestock sheds, and other places, as they frequently do if good poultry houses are not provided. The houses should be kept clean and thoroughly treated with sprays about twice a year. All cracks, crevices, and other possible hiding places should be carefully treated. Creosote or carbolineum oils have been used successfully. Also effective are sprays containing 0.25 to 0.5 percent of lindane. Until more is known about the effects of lindane on poultry, I recommend that it not be used to treat the floors or litter where poultry, especially chicks, may have to remain in close contact with it for some time. Oil sprays containing 2.5 to 5 percent of DDT have given good results.

Every farm animal may become infested with one or more kinds of lice. Flies, ticks, and some other pests may attack various animals, but lice of a particular species usually live only on one kind of animal or fowl. There are two types of lice—those that suck blood (bloodsucking lice) and the kind that chew (biting lice). Sometimes lice may become so numerous that they kill animals or weaken them so much they die of exposure or become susceptible to other parasites and diseases.

Cattle in this country are attacked by four kinds of bloodsucking lice and one kind of biting louse. Horses can become infested with one bloodsucking louse and one or two species of biting lice. Two bloodsucking and three or four biting lice attack goats. Sheep may be attacked by two kinds of bloodsucking lice and one kind of biting louse. At least seven biting lice infest chickens. Hogs are subject to attack by only one kind, a bloodsucking species. The hog louse, the largest of all lice, measures about one-fourth inch in length and almost as broad.

All lice have a similar life history. The adult female lays its eggs on the animal, gluing them to the hair or feathers. The lice and eggs or nits may
be present in unbelievable numbers on heavily infested animals. The eggs hatch in a few days to 2 weeks, depending somewhat on air temperatures. The young lice mature in about 2 weeks.

Although large numbers of lice plague livestock and poultry, research on methods for their control has been so successful that there is no longer any excuse for a lousy farm animal.

If all cattle, sheep, goats, horses, and hogs were treated three or four times at intervals of about 2 weeks with good insecticides, I believe all species of lice on our farm animals and the sheep-tick and sheep scab mite could be eradicated. The same treatment might also eradicate certain mange mites on hogs and cattle. Even the horn fly might be eliminated. Livestock men and organizations, I think, would do well to consider seriously the values of starting a coordinated program to accomplish this worthwhile objective.

Sprays or dips containing 1 pound of cube or derris (having 5 percent of rotenone) to each 100 gallons of water may be used for lice on dairy and beef cattle. Two treatments with an interval of about 2 weeks should be given. Pyrethrum sprays containing 0.025 percent of pyrethrins and 0.25 percent of another chemical called piperonyl butoxide, or other related materials, also are effective and safe for lice on dairy or beef cattle. Methoxychlor, used at a concentration of 0.5 to 1 percent, also is an excellent and safe spray for use on dairy or beef cattle.

On beef cattle, DDT, TDE, toxaphene, and chlordane can be safely used. Toxaphene and chlordane should be used at concentrations not exceeding 0.5 percent. DDT or TDE are also recommended for use at a concentration of 0.5 percent. Some stockmen, however, may prefer to use 1 to 1.5 percent of DDT or TDE and apply smaller amounts of spray than required when the 0.5-percent concentration is used. One thorough treatment with any of the four insecticides named, or with methoxychlor, will usually provide satisfactory control of lice, but a second treatment may be required about 14 to 18 days after the first.

In winter, especially on dairy animals, dusts may be preferred to sprays. Derris or cube dusts containing 1 percent of rotenone may be used. A dust containing 10 percent of methoxychlor or 1 percent of lindane may also be used. At least two thorough dust treatments with an interval of 14 to 18 days will be necessary to get satisfactory control of the lice.

Dipping goats in water containing 0.25 percent of DDT, toxaphene, methoxychlor, TDE, or chlordane will eliminate all lice that attack those animals. The same treatments will also rid sheep of lice, except that for the foot louse on sheep, double the concentration is recommended. Derris or cube containing 5 percent of rotenone, used in dips at the rate of 1 pound per 100 gallons of water, are also effective against lice on sheep and goats. Lindane at a strength of 0.025 percent has also given good results in certain areas. Two treatments with lindane dips may be required or the strength of the dip may have to be doubled, especially when dipping is done immediately after shearing.

Many livestock men apply sprays to combat lice on sheep and goats. Dips are preferred because they assure the thorough treatment of the animals that is necessary to eliminate lice from the herds; sprays properly applied and containing a sufficient concentration of insecticide will give good results, however. If sprays are used it is recommended that twice the minimum strength recommended for dips be used. Animals should be sprayed thoroughly when the wool or hair is short. The best time for treatment usually is immediately after or within a few weeks after shearing.

The hog louse may be controlled by DDT dips or by thorough treatment with DDT sprays. Complete eradica-
tion is often obtained with 0.5 percent DDT dips or sprays, but 0.75 percent is more likely to assure elimination of the parasite. Toxaphene, chlordane, methoxychlor, and TDE used as sprays at 0.5-percent strengths, and lindane at 0.05 to 0.06 percent, are also excellent against hog lice. One thorough treatment should give excellent results, but a second treatment 14 days after the first may be necessary.

To rid horses of lice, DDT has given good results. It should be used in the same way as for lice on cattle.

The sheep-tick, also called sheep ked, is not a true tick; it is a wingless fly. It is a common pest of sheep and will also attack Angora goats. It spends its whole life on the animal. The adult female deposits a round, whitish "egg," which is really the resting stage or pupa. It is glued lightly to the wool and turns to a dark brown in a day or so. The adult sheep-tick emerges in 2 or 3 weeks and begins to suck blood at regular intervals. It is controlled by insecticides. I think sheep-ticks could be completely eliminated by coordinated treatments of all sheep and Angora goats. Derris or cube dips are highly effective. As little as 8 ounces of a material containing 5 percent of rotenone used in 100 gallons of water makes a good dip. DDT, toxaphene, chlordane, TDE, methoxychlor, and lindane, used as described for controlling lice on sheep and goats, are equally as good. Sprays, if used, should be applied thoroughly at double the dip strength, preferably immediately or within a few weeks after shearing, when the wool is short.

Poultry are often seriously affected by lice, mites, and fleas, as well as by the fowl tick, which has already been discussed. Heavy infestations of lice alone may reduce egg production of chickens by as much as 10 percent. A close examination of cracks, crevices, and other hiding places in poultry houses may reveal thousands of small red objects less than one-twenty-fifth inch in diameter—the red color is evidence that mites can sap a great deal of blood from the flocks. It is not unusual among neglected poultry flocks to see black rings around the eyes of young chicks or black spots on wattles and combs of chicks and older poultry. Close examination reveals that the rings and spots actually are hundreds of shining black fleas, engorged with blood. The chickens may be found to harbor hundreds of lice around the head, wing feathers, or vent. One may even note feathers on the vent glued together by literally thousands of small nits or eggs laid by one of the most common species, the body louse.

No longer need poultrymen tolerate infestations of these parasites on their poultry.

Thorough treatments of poultry houses with sprays containing 0.5 percent of lindane will usually control the mites. Sometimes DDT has given good results when used as a 5-percent emulsion or as a 5-percent oil solution. Creosote and carbolineum sprays, although somewhat objectionable to use because of the odor, have been used successfully. Whatever the material, however, it must be applied thoroughly. Proper clean-up to prevent accumulations of droppings, feathers, straw, and other refuse will eliminate some hiding places for the insects and mites and will make possible more thorough and effective treatments with insecticides.

Ordinary lard put on the heads of the fowls will destroy the fleas, but the aim should be to clean up and treat the infested places with a DDT dust or spray. Good results will be obtained if an emulsion, wettable powder, or oil spray containing from 2.5 to 5 percent of DDT is applied to the infested areas at the rate of about 2 gallons for each 1,000 square feet. Lindane sprays containing 0.5 percent of the insecticide can also be used with good success. Lice on poultry can be destroyed by applying a pinch of sodium fluoride as a dust to various parts of the chicken, especially the head, back, under sides
of wings, and the vent region. A 5 percent DDT dust can also be used with good results. Good control can be obtained without disturbing the chickens by applying a 1 percent lindane spray to the roosts or by painting it on with a brush. The lindane gives off sufficient vapor to kill the lice when the chickens perch on the roosts. Nicotine sulfate roost paint has also been used in that way.

E. F. Knipling is in charge of the division of insects affecting man and animals, Bureau of Entomology and Plant Quarantine. Since 1931 he has conducted research on insects that attack livestock and man.

Information on the role of insects in transmitting diseases and worm parasites to livestock will be found in the chapters "Carriers of Animal Diseases," page 161, and "Insects and Helminths," page 169. Some statistics on the losses caused by livestock pests will be found on page 144.

Screw-worms

W. G. Bruce

Screw-worms, if they are not controlled, can wipe out entire herds of cattle, hogs, sheep, and goats. Good livestock management and prompt treatment of all infestations with an approved remedy are the ways to combat the parasites.

Screw-worms have been known in Texas since about 1842. Frequently in summer they have spread to adjoining States. Localized outbreaks have occurred occasionally in the Central and North Central States mainly because of the shipment of infested livestock into the areas. Screw-worms were unknown in the Southeastern States until 1933, when the first infestation was reported near Boston, Ga. By the end of 1933, infestations were reported in 30 counties in southern Georgia and in 18 or 20 counties in northern Florida. Infestations spread rapidly in Florida. By early 1935 screw-worms were found in every county of that State, and heavy losses of livestock were reported by hundreds of stockmen.

An extensive program was started in all Southern States in May 1935 by the Department of Agriculture and State agencies. The aim was to disseminate information on the control of screw-worms and to demonstrate the proper methods and materials for treatment. The program was discontinued in 1937 when it was believed the purpose had been served. Cases of screw-worms, all of them in Florida and southern Texas, were reduced then to a small number.

Severe screw-worm outbreaks occurred in Florida, Georgia, Alabama, and southern South Carolina. Less serious outbreaks occurred in Mississippi, Tennessee, northern South Carolina, and North Carolina. Infestations