4-1-1947

Spraying Cattle Insects

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Ext. Leaf. 102 Reprint April 1947

Spraying CATTLE INSECTS

GRUBS
STABLE FLIES
HORN FLIES
LICE

Extension Service
SOUTH DAKOTA STATE COLLEGE
United States Department of Agriculture
Cooperating

AT TOP: The belly of the animal must be sprayed for complete control. Most power sprayers are equipped with nozzles which lie on the ground. As the animal passes over them, the operator trips the trigger at the left, starting the spray.

AT BOTTOM: Using the power sprayer on cattle. These sprayers develop 400 to 600 pounds pressure, enough to do a thorough job. The nozzle should be held about 15 inches from the animal.

SPRAYING CATTLE INSECTS

By Dr. G. S. Weaver, James J. O'Connell, George I. Gilbertson*

Parasites on cattle are the cause of extensive losses to the livestock industry. The more important of these parasites are lice, grubs and flies. When cattle are constantly irritated by these parasites they do not do well. In fact, the loss runs into millions of dollars.

Cattle do not gain in weight as they should and in some cases even lose weight. There is a decrease in milk flow and now and then a complication such as edema, that may cause death.

The control of these parasites requires considerable effort but most people are willing to make that effort if information is available on practical and economical methods.

The purpose of this circular is to give the best information available on the various insecticides and the methods of application.

Rotenone and DDT Best for Cattle Lice

As far as lice are concerned any of the common coal tar dips will kill lice as they have done for years. Rotenone spray and DDT have been the more recent insecticides and are very effective. In regard to cattle and sheep scab all control methods are under the official supervision of the South Dakota Livestock Sanitary Board and the U. S. Bureau of Animal Industry. Coal tar dip, derris powder (contains rotenone) or DDT are not official dips for cattle and sheep scab.

In recent years considerable experimental work has been done with derris powder containing 5 percent rotenone and this has been found to be effective on grubs and lice and may be applied as a spray, powder or wash. DDT has received an immense amount of publicity as "the wonder insecticide" of the age. Without detracting from its useful qualities the fact remains that it is highly poisonous to animals as well as insects and is not without danger when it is used on or about animals.

The advantage of DDT when applied to animals as a water suspension spray or as a powder is that the residue is retained on the hair and is effective for 10 to 15 days against flies and lice. It has no effect on grubs or mites.

Extension Veterinarian, Animal Husbandman and Director, respectively.

Derris Powder (5 percent Rotenone)

Cube powder and derris powder are made from certain tropical roots ground very fine. The active principle in these powders is "rotenone" and the powders will vary from 2 to 6 percent rotenone. A powder that contains 5 percent rotenone is recommended. There are various methods of applying this powder to cattle, but the easiest, quickest and most economical method for treating a large number of cattle is to use a power-operated, high-pressure sprayer (400 to 600 pounds pressure).

DDT *(dichloro-diphenyl-trichlorethane)*

DDT was first discovered in 1874 but its insecticidal properties were not recognized until 1941. It came into prominence in the United States by being widely used by the Armed Forces for the control of typhus and malaria. It is a white crystalline powder and is very poisonous. It is poisonous to man and animals and affects the nervous system. Like some other poisons it is cumulative (contin-

ues to build up in body as more is added) and if applied to the skin too frequently, enough of the product is absorbed to poison the animal. Experiments show that it may be given off in the milk. Dusts and water suspensions are effective. Oil emulsions or oil solutions should not be used on animals because of the greater absorption through the skin. DDT is effective on stable flies, horn flies, house flies, lice and ticks, but has no effect on grubs or mites.

The common water suspension solutions of DDT for spraying cattle with a power sprayer for different external parasites are listed on the back page and are also listed under each parasite control outline.

Cattle Grubs or Heel Flies

Grubs Ruin Hide Which Is 11% of Value

The annual loss caused by cattle grubs can be estimated at $50,000,000 or more. About 11 percent of the value of a steer on the market is in the hide. When these hides are full of grubs, there is a deduction of at least $1 per hundred weight when the steers are sold. Not only is there damage to the hide, but millions of pounds of spoiled meat must necessarily be trimmed from the backs of the carcasses. When these grubs develop on the backs of the cattle there is a constant irritation, and cattle do not take on the flesh they should.

When the grubs fall to the ground from the backs of the cattle they develop into the common heel fly. These flies hatch out during the first warm days of spring and their activity increases as the season advances for about six weeks. One of these heel flies can deposit 300 eggs on the hair of an animal.

The name "heel fly" indicates that they lay most of these eggs on the hind legs, particularly just above the hoofs. These grubs have a very perculiar life history. After the eggs are deposited they hatch within three to five days into small larvae. These larvae force their way through the skin and in some cases may be swallowed. They are harbored in the animal for about nine months; finally working their way to the back just under the skin. Here they develop into grubs. Since they produce an irritation, there is a pus formation and the grubs live on the pus. Soon a hole is developed in the hide, and the grub finally emerges through this hole and drops to the ground. In this stage the grub becomes a pupa and if the weather is reasonably warm, the grubs will hatch out into flies in 6 to 10 weeks.

Heel Flies Frighten, Stampede Cattle Herd

The activity of these heel flies is sometimes sufficient to stampede a herd of cattle. The flies do not sting, but the buzzing noise seems to scare the cattle and they run to get away from the flies. Frequently cattle run to mud holes where some may become bogged down. Cows will run away from their calves so that the calves do not have sufficient milk; furthermore, milk production declines.

CONTROL

Many different methods have been tried for the control of cattle grubs. Various repellents have been sprayed on cattle with an idea of keeping the flies away, but they have not been very effective. There is a general conclusion that the best way to control grubs is to break the life cycle just before or at the time the grubs are emerging from the back. The grubs emerge in January and February.

For many years it was recommended that the grubs be squeezed out by hand and then destroyed. Another method was to inject kerosene or some other agent directly into the holes by means of an oil can or a syringe. These methods may be sufficient for a few animals, but when considering a range herd they are entirely impracticable.

A more practical treatment for a small number of cattle would be to use a dusting powder. This powder is made by mixing one pound of cube or derris powder (5%

rotenone content) with two ounces pyrophyllite. This powder may be shaken from a can with holes in the top, and should be thoroughly rubbed in on the backs of the cattle. It is also possible to wash a few cattle by hand with a solution made from ¾ pound of cube or derris to one gallon of water. This may be improved by the addition of a small amount of soap. It will be necessary to repeat either of these treatments in about 30 days with the possibility of a third and fourth treatment.

For the treatment of grubs a dipping tank is not as economical or as practicable as a power spraying machine. Power operated spray machines are now available and their effectiveness has been thoroughly demonstrated. The spraying of cattle is the best method of controlling grubs. These power sprayers develop a pressure of from 400 to 600 pounds, and when the spray is placed on the backs of the cattle, holding the spray gun nozzle about 15 inches from the animal's back, the small scabs on the openings are knocked off and the insecticide goes into these air holes. Since these grubs do not all develop at the same time, it may be necessary to spray the cattle at least twice and possibly three or four times. These sprayings should take place at intervals of 24 to 30 days. The first spraying should be made shortly after Christmas and the second about February 1.

When using a pressure spray machine the following formula should be used:

Cube or derris powder (containing 5% rotenone)	**7½ pounds**
Water	**100 gallons**

When dipping use the following formula:

Cube or derris powder (containing 5% rotenone)	**100 pounds**
Wettable sulphur	**100 pounds**
Water	**1000 gallons**

The Stable Fly

Fly Is Disease Carrier As Well as Serious Pest

The stable fly lives on cattle by biting and sucking blood. It has long piercing mouth parts that penetrate the skin. Cattle will not thrive when fighting flies. This fly may also carry livestock diseases, such as anthrax. The milk production of dairy herds is lowered by the irritation of these stable flies. There have been instances where milk production was reduced 50 percent.

The life cycle of the stable fly is as usual, starting with the egg, then larva, pupa and adult flies. The adult female lays eggs in manure piles or straw stack bottoms or in any fermenting vegetation. The eggs hatch in about three days producing a maggot or larva. During the warmest weather this maggot may grow to maturity in six to seven days and then change to a pupa in about 20 days. This pupa will change into an adult fly.

The flies usually feed once a day, but may in some instances feed twice a day. After feeding they usually fly to stable walls and remain there until food is digested. They begin mating in two or three days. The female will start laying eggs in about 5 days after mating. Probably the stable fly lives not longer than a month, but during that time it may lay as many as 600 eggs. These flies may follow the cattle for many miles. Some that have been colored have been found 52 miles from where they were released. The flies seem to collect more on the lower part of the animals and particularly on the legs.

CONTROL

Elimination of breeding places is the most effective in the control of stable flies. Proper disposal of manure and the elimination of old straw pile bottoms will help to prevent development. Any piles of decaying vegetation matter wherever located may act as a breeding place for stable flies. It is impossible to prevent all breeding, but large populations of flies can be avoided by removing the common breeding places, mainly by the use of insecticides on breeding places.

The application of various fly repellents has not been very satisfactory. A power sprayer may be used to apply an insecticide on manure piles and straw bottoms. Experience has shown that when cattle are sprayed with water suspension .25 percent DDT spray, and the inside of the cattle barns, and outside where flies take shelter are sprayed at the same time with the same solution that there will be little difficulty with stable flies.

Spraying Walls with DDT Is Effective

Recent experiments on treating of the inside walls, stanchions and other inside woodwork about the barn with DDT has been very effective in combating the stable fly. Spraying the barns with .25 percent DDT every time the cattle are treated will be effective. However, it is recommended that residue spray (one which will stick to the wall) containing 2½ to 5 percent of DDT be used and should be applied at the rate of three gallons per 1,000 square feet, using 100-200 pounds of pressure. A mixture of this type should remain on the wall 90 days or longer.

When spraying it is important to apply the spray solution in a manner so as to avoid washing. Spraying walls that have been covered with whitewash is of little or no value. The lime affects the value of the DDT.

It must be remembered that DDT is a poison and to avoid poisoning, livestock, feed and water should not be sprayed to the extent that they become saturated. Small quantities of spray containing a low percentage of DDT would not be considered dangerous unless it was taken in large quantities by the animal.

Horn Fly

Cattle Protected Gain 50 Pounds Above Unprotected

Probably no fly causes greater irritation to cattle than the blood-sucking horn fly. The damage is done largely on the back, shoulders and sides of the cattle. Throughout the summer months these flies congregate by the thousands on cattle and will continuously stab the skin and suck blood. Cattle will refuse to eat under such conditions and try to get away from the flies by flocking together or hiding in brush or standing in water holes. It has been shown from experiments that cattle which have been protected may gain at least 50 pounds more during the summer months than cattle which are not protected. It is difficult to estimate the loss due to the horn flies, but in all probability it will run into millions of dollars annually.

The horn fly is only about half the size of the stable fly, but is more irritating because it stays on the cattle all of the time. Warm, damp, cloudy weather is favorable for these horn flies. The flies leave the cattle only to lay eggs. The eggs are laid in the fresh droppings of the cattle and some hatch into maggots within 16 to 18 hours. These maggots become full-grown in about four days, then the pupa is developed and after about six days more the adult fly comes out. Within three days the adult female may start laying eggs and is capable of producing 300 to 400 eggs.

CONTROL

The horn fly can be controlled very effectively by using DDT as a spray at a concentration of .25 of one percent which is made up by adding four pounds of 50 percent wettable DDT powder to 100 gallons of water. This solution should be sprayed on, using 400-600 pounds of pressure, and about one-half gallon of the solution applied to the animal's back, sides, and head. This concentration will be effective from 15-20 days after

DDT should never be used in oil soluble form for livestock because it is much more readily absorbed in the skin and may cause death to the animal.

the first spraying and from 15-30 days after the second spraying.

For animal dipping, use DDT, 50 percent wettable powder, at the rate of 2½ pounds to each 100 gallons of water. Fill the vat with water, then scatter over the entire surface of the water the calculated quantity of DDT—50 percent powder. Mix thoroughly, stirring from bottom upwards for five minutes or longer, until completely mixed. Whenever dipping is stopped longer than 30 minutes, the contents of the vat must be agitated or stirred thoroughly before dipping is resumed. The animal's body should be completely submerged, ducking the head at least twice.

By watching the cattle carefully 10 days or more after they are sprayed or dipped is the best method to determine when the DDT becomes ineffective. If it is observed when flies alight on treated animals that they feed for only a few minutes and then fall to the ground, the DDT is still effective. If the flies remain and feed for hours and accumulate in large numbers, then it is apparent that the DDT is no longer effective and it is time for the next spraying or dipping.

In that the horn fly rides on the backs of cattle at all times, they come in contact with the fine DDT particles that remain on the hair after the water has evaporated, and after a short time will drop to the ground. Cattle which have been treated in pens and pastures are quiet and feed throughout the day.

Cattle Lice

Spray or Dip for Lice Control in Fall

There are several species of lice that infest cattle. They are always more prevalent in the winter time and it is important to control these lice in the fall of the year before winter sets in. Lice interfere with the growth of the animals and sometimes even cause a loss in weight. Certainly the vitality of cattle is greatly lowered when infested with lice. Cattle will rub against posts, and in some instances cause a sore to develop. The life cycle of lice is direct, as the lice do not leave the animal. The female will lay eggs and in 8 to 12 days the eggs will hatch. In about 15 days more the young louse reaches maturity. One female louse may lay 30 to 40 eggs during her life time. The blood-sucking lice are commonly referred to as the blue lice. Two types are known as the short nose and the long nose. Other types suck blood, but do not stay attached to the animal as long as the blue lice.

CONTROL

Lice can be controlled by dipping, spraying, or dusting. Dipping is considered the best method; however, there is the disadvantage in the cost of construction of a vat and the necessity of driving cattle long distances to the tank. As a result there are few dipping tanks and consequently only a small percentage of cattle producers have been doing anything to control the lice. The power sprayer has taken its place in the role of controlling the lice. If care is taken in applying the spray, effective control can be obtained with a sprayer. Also, more cattlemen will take advantage of the control methods.

Can Be Applied by Hand on Small Herds

If the herd is small, the insecticide may be applied with a hand sprayer or with a brush. Various powders can be used during winter months when it is not advisable to wash, spray, or dip the cattle. A dust consisting of one part 5 percent rotenone dust and nine parts of "325-mesh" wettable sulphur will give good control of lice. It is necessary to rub the dust in by hand and cover all parts of the animal's body. Using a dust gun for this purpose has not proved satisfactory. Hand dusting must be repeated in 16-20 days, the same as dipping, to get good control.

It is important to treat cattle in the fall of the year in order to prevent the lice developing during the winter months, and it is important to keep in mind that when cattle are being treated for lice that entire body must be covered. During the early fall they begin to increase rapidly, and by mid-winter the population reaches a point of great injury. There is a continuous increase in number until spring and warm weather; they then decrease rapidly.

In spraying cattle the animals must be well drenched, 400 to 600 pounds of pressure, and a special belly spray should be used in chute or crowding pen. A spray formula consisting of three pounds of 5 percent rotenone to 100 gallons of water, making two to three treatments 15 days apart.

A spray formula of 8 pounds of DDT 50 percent wettable powder to 100 gallons water gives complete control with one treatment. This formula is recommended for both short and long nosed lice.

When winter treating for cattle grubs with rotenone spray add 8 pounds of 50% wettable DDT powder to 100 gallons of rotenone solution in the first treatment. Thoroughly wet the animal. This will give control.

A rotenone-DDT combination will last longer than other treatments. Neither treatment will kill lice eggs.

The dip formulas that can be used are as follows:

No. 1
1 pound 5% rotenone dust.....100 gallons water
10 pounds wettable sulphur

No. 2
3½ pounds 50% wettable DDT..100 gallons water

To mix the spray formulas add the powder to the supply tank with the agitator going either during the filling process or after the tank has been filled.

To mix the dip formula: First put the water in the vat; mix dry rotenone dust with an equal amount of wettable sulphur; then add enough water to the mixture to make a thin paste, free of lumps, that will pour readily. Pour the rotenone-sulphur mixture into the water vat. It should be poured in a thin stream along the entire length of the vat to get uniform mixture. Add the remaining dry wettable sulphur directly to the vat and stir to get a uinform suspension.

For making the DDT dip formula, follow the instructions given under horn fly control.

Recommendations When Using Power Sprayer

It has been demonstrated that the power spraying equipment which will develop a pressure from 400 to 600 pounds has revolutionized the methods of controlling external parasites of cattle and other livestock. It must be remembered when this method of treating cattle is used that the equipment must be constructed so it will be safe for the persons operating the machine. Most of the holding pens on farms and ranches were not constructed with spraying in mind; consequently, the majority of them are not suitable for holding cattle so that they can be properly sprayed.

Following are a few sound recommendations:

1. Build good strong pens in which to handle cattle.

2. Build pens in the corner of the pastures if in range area or some convenient place. Use 2″ x 8″ timber spiked to heavy posts. Place boards inside for strength. Wings of holding pens may be of lighter timber.

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3. Build good, safe catwalks on each side of the handling pen.

4. Finish the pen with a dehorning chute and a loading chute.

5. Be sure to have the agitator going when adding the powders to the water.

6. In spraying for horn fly treat head, back and sides, applying about one-half gallon to large animals with 400 to 600 pounds pressure using .25 percent DDT mixtures (refer to table below for amount of powder to add), spraying three to four times during the season.

7. When spraying for stable flies, use .25 percent DDT mixture in spraying cattle, and spray the barns each time the cattle are sprayed. Use 2.5 percent to 5 percent for spraying the barns and sheds.

8. When spraying for lice, use three pounds 5 percent rotenone dust to 100 gallons of water, making two or three treatments; or use 8 pounds of DDT-50 per cent wettable powder to 100 gallons of water. A combination of both can also be used.

9. For grubs use 7½ pounds 5 percent rotenone to 100 gallons of water. Apply to back with gun type sprayer at 400 to 600 pounds pressure holding nozzle about 15 inches back. Make three to four treatments at intervals of 24 to 30 days apart.

10. Use of oil emulsions and oil soluble types of DDT are not recommended at this time.

AMOUNT OF 50% WETTABLE DDT POWDER TO MAKE SOLUTIONS

Concentration of active DDT (Pct.)	Lbs. of 50% Wettable DDT to make 25 Gallons	Lbs. of 50% Wettable DDT to make 100 Gallons	Concentration used for treating for:
.20	¾	3⅓	
.25	1	4	Horn and Stable fly
.30	1¼	4¾	
.35	1½	5¾	
.40	1⅗	6⅕	
.45	1¾	7¼	
.50	2	8	Long nose and short nose louse
1.00	4	16	
2.00	8	32	Surface of bldgs., barns, sheds,
3.00	12	48	etc., for stable fly
4.00	16	64	
5.00	20	80	

This table has been added to assist in making up DDT Spray solutions at the different percentage concentrations.

EXTENSION SERVICE—SOUTH DAKOTA STATE COLLEGE
OF AGRICULTURE AND MECHANIC ARTS
BROOKINGS, SOUTH DAKOTA

Published and distributed under Acts of Congress, May 8 and June 30, 1914, by the Agricultural Extension Service of the South Dakota State College of Agriculture and Mechanic Arts, Brookings, G. I. GILBERTSON, *Director*, U. S. Department of Agriculture cooperating