

# Cattle Grubs

## spray formula and application method recommended to reduce losses from pests

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**Cattle grubs** cause an annual national loss of \$50,000,000 to \$100,000,000 to the livestock and dairy industry according to estimates of the United States Department of Agriculture.

If the reduced meat and milk production caused by cattle grubs could definitely be determined, the annual loss might even be higher than the larger estimated figure.

California, with a beef cattle population of 1,350,000 head and a dairy population of 903,000, suffers her full share of the national loss.

It is encouraging to note that 326,267 head were treated during the past season in the state, a considerable increase as is indicated in the following table.

### California Cattle Treated for Grubs

1942-1943 . . . . .	Demonstration only
1943-1944 . . . . .	10,000
1944-1945 . . . . .	123,639
1945-1946 . . . . .	215,707
1946-1947 . . . . .	265,661
1947-1948 . . . . .	326,267

### Losses

Unfortunately, only part of the damage caused by grubs is easily seen by the individual cattleman. Normally these parasites do not cause death of the animal, although they do make their presence known in several other ways. Any dairyman can testify to the lowered production of his milking cows during the grub season.

During the period when the adult, bee-like flies approach cattle to attach eggs to the hairs of the legs and abdomen, they cause intense restlessness with a consequently loss in rate of weight gain.

After the grubs have penetrated the skin of the animal and spent about nine months migrating within the body they advertise their presence by lodging under the skin of the back where they form boil-like lumps, surrounded by masses of inedible flesh which must be trimmed. This represents an annual waste of over 12,000,000 pounds of beef.

Up to a hundred or more of these cysts may be found on a single animal. The grubs remain in the cysts for 30 or more days, when they emerge through the skin and drop to the ground where they un-

dergo a period of transformation lasting one to two months before they emerge as adult flies.

A hide with many grub holes is considered worthless for tanning and is commonly sold for by-products. As few as five holes will cause a hide to be degraded since the grubs emerge through the thickest and most valuable part of the hide. It should be remembered that the hide represents 7% of the live weight and 11% of the value of the average steer. Price docks due to grubs average from \$50 to \$150 per carload of market cattle.

### New Northern Type Grub

Until recently only one type of cattle grub—the common cattle grub—was known in California. Now another species—the northern cattle grub—is known to be distributed throughout the state. A survey of the seasonal and geographical occurrence of these two types of grubs has been conducted in California for the past 18 months.

The results of this survey show that when the state is considered as a whole the common cattle grubs are found most abundantly in the backs of cattle in January and February, while the northern cattle grub reaches a peak from February to April. During the current survey, grubs were taken from the backs of animals as early as October and as late as June.

It is well known that in warmer climates grubs appear in the backs of cattle earlier than in cold climates. One might assume, therefore, that grubs would appear earlier in Imperial County than in Ventura County and still earlier than in Shasta County. However, observations made to date do not bear this out too well. The reason seems to lie not only in the fact that the state has numerous distinct climatic zones, but also in the fact that beef stock are brought in as feeders from a wide area, coming in each year already infected with grubs. Consequently, any normal season of grub emergence may be obscured by these repeated introductions.

### Control

The appearance of the northern grub on the California scene has raised an additional problem of control, for in those

herds where both types of grub are abundant treatment may be necessary over a longer period of time to cover the extended period when the grubs are emerging on the backs.

The control method recommended in California consists of the following spray formula: 10 pounds of 5% rotenone-bearing dust, 10 pounds of wettable sulfur, 1 pint of wetting agent, 100 gallons of water.

The spray should be applied at 350 to 400 pounds pressure using a spray nozzle producing a flat, fan-shaped spray. The nozzle of the gun should be held at from six to 12 inches from the animal's back, applying about two quarts of spray per animal.

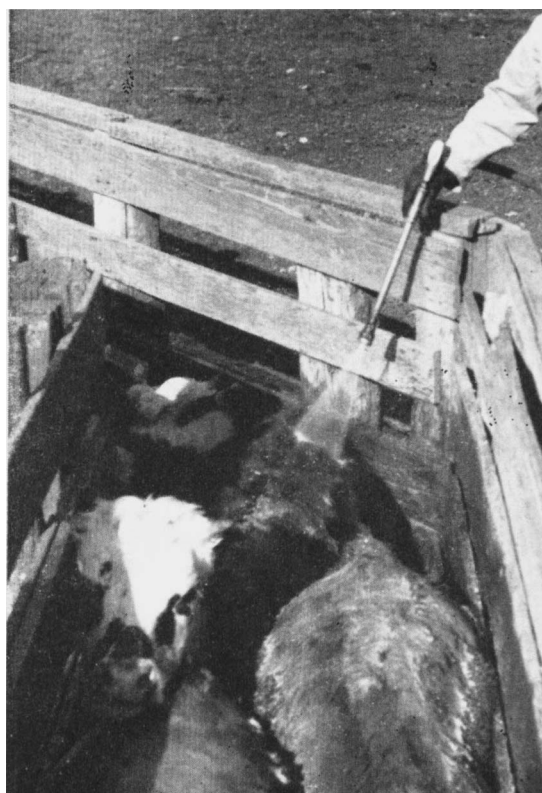
This treatment should be applied within 30 days after the first warbles, or boil-like swellings, appear on the backs, and it should be repeated every 30 days as long as new warbles continue to appear in considerable numbers. In some herds this may mean the first spray should be applied in December and the last in March or April, a total of four or five treatments.

Dipping vats and scrubbing may be resorted to in the absence of a spray rig, but these methods are to be regarded only as substitutes. Records of numerous feeding trials show that rotenone treated cattle made an average daily gain of  $\frac{1}{4}$  pound more per head per day than untreated grubby stock.

An alternative spray formula consisting of the following mixture has been rather widely used in recent years:  $7\frac{1}{2}$  pounds of 5% rotenone-bearing dust to 100 gallons of water. In our experience the results using this formula have been good except in killing the younger stages of the grub in the back, where the

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Spraying for cattle grub. The spray nozzle, giving a flat, fan-shaped pattern, should be held six to 12 inches from the animal's back.



## OLIVES

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With the importation in 1947 and 1948 of about 20 new varieties from France, Italy, Greece, Turkey, Palestine, Egypt, Algeria and Australia, this is now probably one of the most complete collections of table olive varieties in the world.

In connection with this work on varieties, a study has been made of the tree and fruit characteristics of all the available bearing olive varieties in California.

## Rootstocks

To supply some information as to the value of own-rooted olive trees in comparison with grafted trees, a rootstock planting will be set out next spring at the Wolkskill Experimental Orchard. A planting of 10 acres will be made with about five acres used for the rootstock tests. Trees will be grown on a number of different rootstocks, including several different *Olea* species, for comparison with the trees started from cuttings.

In preparing trees for this proposed olive planting, tests were made with various hormone root-forming substances to determine their value in rooting softwood olive cuttings.

It was found that indole-butyric acid at about 50 parts per million gave very good results in inducing root formation.

Last spring a similar test was made using hardwood olive cuttings. The results of this test will be known at the end of the current growing season.

## Fruit Measurement

During the 1946-47 and 1947-48 seasons, growth studies were made of developing olive fruits. Measurements of fruit size—volume, diameter, fresh weight, and dry weight—moisture content, and oil content were taken. Two years' results have been obtained using the Mission and Manzanillo varieties and a complete report of this work will be published soon.

## Pruning

Two pruning plots have been established—one in Tehama County and one in Butte County—to give information on how severely bearing olives should be pruned.

Two years' results, while insufficient for drawing conclusions, have been in agreement that the trees receiving the least pruning have been the most profitable.

## Fertilization

To determine whether the time at which nitrogen fertilizers are applied to olives has any effect on fruit set, experimental

plots have been established in Tehama and Tulare counties in which different trees are fertilized at about two-month intervals throughout the year. Results must be obtained for several years before valid conclusions can be drawn.

## Nontillage

Another phase of current olive research concerns the practice of nontillage in olive orchards—the control of weeds by oil sprays. A number of experimental plots have been set up by the Agricultural Extension Service in the several olive producing counties to examine the feasibility of such practices.

An experimental plot also has been established by the University in Glenn County where trees are grown under clean cultivation, sod culture, and weed control by oil sprays.

Individual tree-yield records were obtained for the 1947-48 season. The maintenance of such plots for a number of years will compare the value of these different types of soil management.

## Specialized Studies

A number of other projects are underway, such as nutrition studies, including minor elements, physiological effects of spray materials, collections of desirable variety strains, blossom-thinning sprays, fruit-bud differentiation, irrigation studies and temperature in relation to fruitfulness.

Many of these projects must be carried on for a number of years before definite results can be expected.

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## GRUBS

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rotenone-sulfur formula seems superior.

Recent work conducted at the University of California has demonstrated that the northern grub is more resistant to treatment than is the common grub; however, control of either species is often incomplete.

The main value of the present program of area-wide treatment lies in the fact that a single season of community-wide spray treatment in a grubby area will reduce the number of grubs so much that relatively little trouble will be experienced the following year.

There is the immediate advantage of ridding the animals of those grubs currently sapping the vitality and reducing the market value of the stock.

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## SEEDS

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Scarification may frequently be harmful, especially with beans because growing points of some seeds are injured by the rough treatment. If not carefully done, too much coat is scratched off causing a rapid decline in viability, and allowing a ready entrance for fungi.

Another practice is to keep the beans and possibly other legumes in a storage of the proper humidity and temperature so that the moisture in the seeds is maintained high enough so there are few or no hard seeds, yet the moisture is not so high as to cause loss of viability.

From the experimental results obtained at Davis, and from the work reported by research workers in Connecticut and in Puerto Rico it seems that at storage temperatures around 70° F, a relative humidity of 50% or a little higher is dry enough to prevent all but a few hard seeds in even the most susceptible varieties.

For long storages of over a year, a lower humidity or a lower temperature is advisable. The seed could then be stored at the higher humidity or temperature for a month or six weeks before expected shipment.

The long time approach is to make selections or breed out of each variety the tendency for hard seed development at normal storage humidities.

Thus, if bean seeds are stored in the proper humidities, hard seeds can be reduced greatly or avoided. If the seed companies and experimental stations test for hard seeds in their breeding and selection programs the strains with genetic tendencies toward hard seeds may be eliminated.

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## FIRE

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is important also to consider cost and difficulty of replacement as well as use and occupancy in the case of destruction by fire of homes, farm buildings, fences and other improvements.

Increased costs for materials and wages and marked scarcity of many critical items may make quick replacement of burned facilities virtually impossible without undue delay.

A farm home, barn, milk house or other equipment may be quite as vital in the carrying on of farm operations to the owner as is a factory, mill or office building to a business corporation. The hidden losses must include the cost of replacement and the inconvenience of doing without such destroyed facilities.

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