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FACT SHEET

L-725

Common Cattle Grubs in Texas

Extension Entomologists, The Texas A&M University System

The common cattle grub is the larval stage of the heel fly, *Hypoderma lineatum* (de Villers). The pest occurs in all states except Alaska but is not commonly found in the extreme southern tip of Texas. A similar species, the northern cattle grub, *Hypoderma bovis* (Linnaeus), is abundant in southern Canada and the United States north of Texas. It has thus far been unable to establish and perpetuate itself in Texas.

LIFE HISTORY

The non-feeding, sexually mature adult heel fly, about the color of a honey bee and nearly twice as large, emerges from a puparium in the soil during warm sunny days of late winter and early spring. In the Hill Country and Edwards Plateau, flies may emerge as early as November or December. Flies may mate within 1 hour after emergence and females may deposit fertile eggs 20 minutes later. During favorable weather, the flies usually exhaust themselves and die within 2 or 3 days; however, some may survive for as long as 3½ weeks if cold weather restricts their activity.

Common cattle grub adults are less aggravating in their egg-laying activities than flies of northern species, and "gadding" (the characteristic reaction of cattle fleeing fly activity) is less severe. Although gadding occurs, common cattle grub adults most often approach a reposing animal and attach their eggs to hairs on the udder, legs, escutcheon, belly or side without noticeaby disturbing the animal. It is not uncommon, however, to see animals fleeing wildly, standing in water up to their bellies or in dense shade to protect themselves from heel fly attack. This is an instinctive reaction since the fly neither bites nor stings nor causes any pain during this egg-laying activity.

Eggs are attached in rows of two or three to as many as 25 or 30 along a single hair. Females usually produce 400 to 800 eggs with an average of 500 eggs per fly. The eggs hatch in 2½ to 6 days, and the larvae crawl down the hair and begin to penetrate the skin, usually at the base of the hair. Within 1½ to 6 hours, the larvae penetrate the skin to begin their migration through the connective tissues. Mortality of these first-stage (instar) larvae is probably greater than 50 percent and likely approaches 100 percent in highly resistant animals.

The first instar larva apparently spends about 8 months migrating through connective tissues. The grub spends most of this time in the submucosa of the esophoagus (gullet), but it has been found in connective tissues of the diaphram, pericardium, spleen, rumen, ribs and peritoneum. Movement of grubs through the connective tissues is assisted by their enzyme secretion.

Upon reaching the back, the grub secretes an enzyme creating a hole in the skin through which the grub obtains oxygen. It remains in the warble for 3 or 4 days before molting into the second instar, which is almost pure white. Growth during the second instar is rapid as the spiny grub feeds on pus, necrotic cells and secretions from the wall of the "warble." After several days of feeding, the larvae darken and molt to the third instar which is tan at first but nearly jet black when mature. Natural mortality of grubs in the back is commonly 50 percent or more and may be as high as 100 percent in some animals.

After developing 1 or 2 months in the warble, the fully-grown grub squeezes through the breathing hole in the skin, drops to the ground and seeks shelter under ground trash, leaves or other debris. Within 2 or 3 days, the larval skin hardens into a puparium, inside which the heel fly develops. The pupal stage usually varies from 20 to 60 days, depending on the temperature. Flies from pupae formed later in winter or spring emerge sooner than from pupae formed during colder periods. Thus, one generation per year is completed.

Grubs normally appear in animals' backs from October to February, varying according to location

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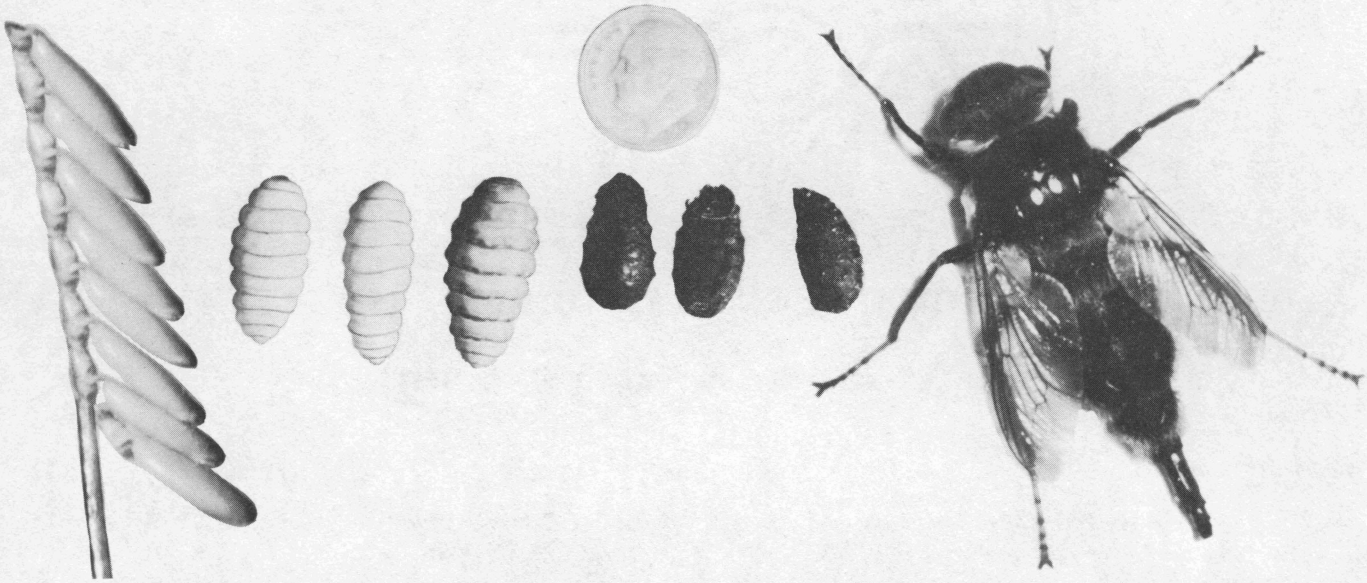

Figure 1. Stages in the life cycle of the common cattle grub. (a) Heel fly eggs deposited on hair (b) Larvae and pupae of common cattle grub (c) Heel fly, the adult of the common cattle grub.

Figure 2. Animal clipped to show warbles on back.

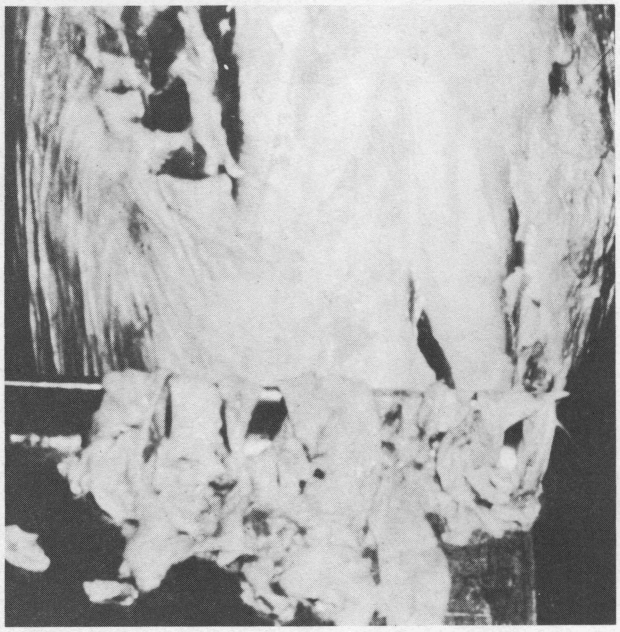

Figure 4. Trim loss from grub damage.

Figure 3. Treating animals with pour-on.

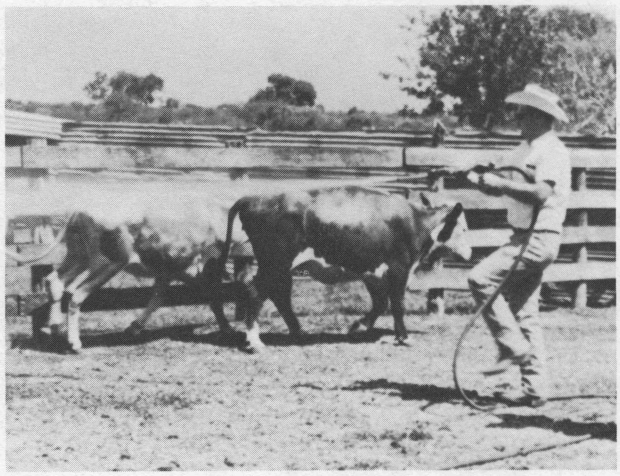

Figure 5. Spraying animals with systemic insecticide.

in Texas. Warbles may appear in July or early August in the Hill Country and Edwards Plateau and areas to the north and south. Variations in the pattern may occur within local areas of the state.

HOSTS

Cattle are the only important hosts of the common cattle grub. Horses are sometimes infested but there is no record of a grub completing its development in a horse. Reports from India indicate that normal development may occur in sheep and goats. Many instances of infestations in humans have been recorded. In man, the first instar larva causes a condition known as a creeping eruption as it travels beneath the skin. In cattle, the preferred hosts appear to be (1) yearlings, (2) calves and (3) older animals, in that order.

NATURE OF DAMAGE

Some authorities feel cattle grubs cost the livestock industry $100-300 million per year in the U.S., all factors considered. Loss of flesh and reduced milk production results as animals flee from flies and are unable to graze normally. The migration and parasitism of the grubs within the animal's body cause irritation and nutritional losses. Warbles in the back lower carcass values, and breathing holes in the skin reduce the hide's leather value. These losses concern the producer, feeder, packer and ultimately the consumer.

Heel fly attacks and grub infestations also cause indirect losses such as reduced weaning weights of calves. Although the latter is difficult to assess, heel flies and grubs may reduce beef cow milk production by as much as 500 pounds over a 205 day weaning period — enough to provide 40 additional pounds of calf weight at weaning time. This represents a direct loss to the cow-calf operator, who depends upon these sales for profit.

Grubby animals may require up to 15 percent more feed for the same amount of gain than grub-free animals. Animals marketed with grubs in their backs generally command a lower price. Some large feedlot operators routinely pay less for feeder animals from grub-infested areas.

Grub-infested animals purchased for slaughter are scrutinized closely by packers. Warbles in the back and loin area must be trimmed, resulting in loss of beef and tallow and a less valuable, unattractive carcass. Five or more grub holes lower the hide grade to at least No. 2, representing a loss of about 1 cent per pound. It is a common practice to pay $1 to $3 per hundredweight less for grubby animals.

Texas packers, responding to a 1962 Texas Agricultural Extension Service questionnaire, strongly indicated their concern over grub infestations; 94 percent stated they definitely considered grub damage when purchasing animals. One-third said they refused to buy grubby cattle during periods when grub-free animals were in good supply. When forced to buy grubby cattle, dockage was common. Only one packing firm stated that grubs were not a problem.

WHAT YOU CAN DO

Cattle grub populations vary tremendously in Texas because of the diverse environmental conditions. Populations within local areas also fluctuate considerably from year to year. Generally, the area west and north of a line extending roughly from Eagle Pass northeastward to Lufkin has consistently higher populations than the area south and east of this line. Local areas on either side of this line frequently experience population fluctuations ranging from low to high. Observation and experience are the best indicators of the problem's severity within a given area.

Individual producers can obtain immediate benefits and perhaps a long-term population reduction on their own ranches by annual treatments with systemic insecticides. Voluntary cooperative treatment programs undertaken on an area- or county-wide basis can provide immediate results and longer-range population reductions when continued for 3 or more years. The success of such programs depends on the degree of cooperation and the percent animals treated.

For effective grub control, treat cattle with systemic insecticides — chemicals absorbed into the animal's body where they control grubs by contact action. Systemics are available as sprays, dips, backline pour-ons, spot-ons and as feed additives or mineral mixtures. The choice of insecticide and treatment method depends on the type of operation. Administer treatments after heel fly activity and before grubs reach the animal's back. In most areas of the state, treat between May 1 and September 1. Cattle in the Edwards Plateau and Hill Country should be treated before August 1 and preferably before July 15. In all areas, better control is obtained by treating soon after May 1.

Treating Dairy Cattle

No insecticide presently is registered for grub control on producing or lactating dairy animals.

Non-lactating animals may be treated with certain systemics discussed below. For restrictions on dairy cattle usage, refer to container labels and MP-691, *Texas Guide for Controlling External Parasites of Livestock and Poultry,* available from the county Extension agent.

Treating Beef Animals

Several systemic insecticides effectively control cattle grubs. These chemicals, depending upon the producer's operation, can be administered as wet sprays, dips, backline pour-ons, spot-ons, in mineral mixtures or as feed additives. Detailed recommendations are included in MP-691, *Texas Guide for Controlling External Parasites of Livestock and Poultry,* available from your county Extension agent.

Sprays. Formulations of systemic insecticides to be applied as water sprays include coumaphos (Co-Ral®), crufomate (Ruelene 25E®), trichlorfon (Neguvon®) and Prolate®. These materials also control horn flies and lice, and coumaphos controls ticks as well.

Since sprays of systemic insecticides must contact the skin for the chemical to be absorbed, wet the animals thoroughly. This may require up to 1 gallon of spray for grown animals and proportionately less for small animals.

Dips. Presently only coumaphos (Co-Ral®) 25 percent wettable powder and crufomate (Ruelene 35D®) 13.7 percent emulsifiable concentrates are recommended as grub control dips. Fill the vat with water and add sufficient chemical according to label directions to obtain 0.25 percent concentration of active ingredient. Coumaphos dip also controls horn flies, lice and ticks. Crufomate is effective in controlling horn flies and lice, as well.

Thorough wetting and maximum absorption is assured by dipping, but the initial expense of charging the vat is high. Dipping usually is more adaptable to large operations or to "community" projects involving large numbers of animals.

Backline Pour-ons. Hand treating individual animals with ready-to-use, pour-on formulations is a rapid, convenient method for gentle herds or when cattle can be held in a crowding pen or driven through a chute. Handling and exciting the animals is minimized. A few ounces of chemical applied to the backline give excellent grub control and also control horn flies by contact for 1 to 3 weeks. Little control of ticks and lice can be expected except by direct contact with the insecticide.

Recommended ready-mixed pour-ons are 4 percent coumaphos (Co-Ral®), 13.5 percent Ruelene (Ruelene 12R®), 13.2 percent famphur (Warbex®), 3 percent fenthion (Tiguvon®), and 8 percent trichlorfon (Neguvon®). Apply recommended amounts according to the animal's weight. In addition, water-diluted pour-ons can be prepared from crufomate (Ruelene 25E®) and Prolate® (11.6% EC). Follow label instructions in mixing with water.

Backline Spot-ons. Spot-on application for cattle grub control is a relatively new pest control concept. This method involves the application of small amounts of systemic insecticide administered to the backlines of cattle by specially designed hand gun type devices. A ready-to-use solution of 20% fenthion (Spotton®) is the only formulation currently labeled for spot-on applications. Consult label instructions for proper pesticide administration.

Mineral Mixes and Feed Additives. Materials containing ronnel can be fed to animals for systemic cattle grub control. Rid-Ezy® and Steer-Kleer®, containing 5.5 percent ronnel in a mineral block or loose granules, are fed free-choice to range animals for a 75-day period. The granules can also be incorporated into feed-lot rations at specified rates and fed for 7 or 14 days, depending upon concentration. Trolene FM® (40 percent ronnel) and Famix® (33.3 percent famphur) are formulated as non-mineral feed additives to be incorporated into regular rations at specified concentrations and fed for a prescribed period. Some reduction in horn fly populations may be noticed in herds consuming ronnel formulations.

CAUTIONS

Exercise caution when handling systemic insecticides to avoid injury to yourself and to cattle. Systemic insecticides can be absorbed through the skin of the applicator. Immediate and thorough cleansing of areas exposed to systemic insecticides is strongly recommended. Follow explicitly all label directions for mixing and applying and heed the recommended precautions. Observe strictly all slaughter intervals and other restrictions to avoid creating illegal residues in meat and milk.

Acknowledgments

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