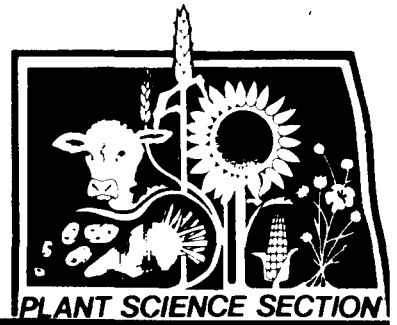


Cooperative Extension Service

NORTH DAKOTA STATE UNIVERSITY
FARGO, NORTH DAKOTA 58105

UNITED STATES DEPARTMENT OF AGRICULTURE
COOPERATING



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Insects of Economic Importance



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There are over 6,000 different species of insects in North Dakota, and less than 2% or 120 species ever cause economic damage to man, his properties, livestock or crops. Because of this, the majority of insects we encounter are only natural curiosity as far as man's interests go. However, it is important to be able to recognize those few species or groups of insects that are pests since the success of any insect control depends upon correct identification of the problem insect.

Many injurious insects are so small that the aid of a microscope or hand lens is required in order to arrive at a correct identification. Still others are large enough or common enough that a lens or microscope is not necessary for identification purposes. This section is intended primarily as an aid in the field identification of some common insect pests occurring throughout North Dakota. Many of these insects possess prominent characteristics and/or body coloration which aids in sight identification.

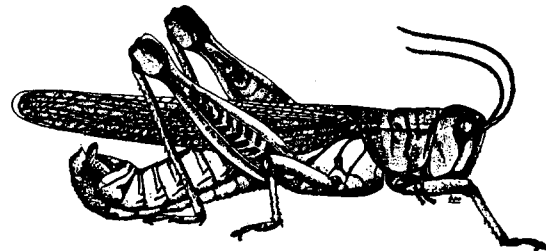
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The sequence of coverage in this section is crop insects (arranged by commodity), beneficial insects, stored product insects and insect pests of cattle.

CROP INSECTS

I. General Feeders - These insects cause economic damage to many different types of crops. They

often have a wide range of different food crops that they can be a problem on.

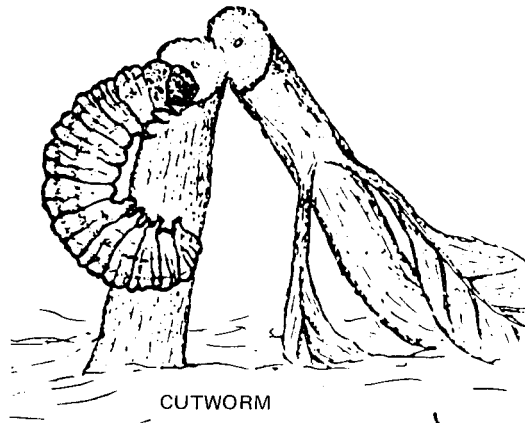
1. Grasshoppers: There are several species of grasshoppers which attack crops in North Dakota. Some of the more common grasshoppers are the two-striped, migratory, red-legged, differential and clear-winged. Grasshopper eggs are usually deposited in a "pod" made of sand glued together by a secretion from the female. These pods can be found in untilled areas such as along field margins, roadsides and prominent sandy areas in fields. These egg pods hatch the following spring and the young hoppers move out into adjacent cultivated crops. Practically any crop grown in North Dakota can suffer grasshopper feeding damage.



DIFFERENTIAL GRASSHOPPER

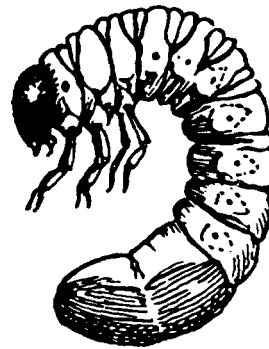
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2. Cutworms: There are several species of cutworms affecting crops in North Dakota. Cutworms are usually grublike in appearance and of a dirty gray or brown color. They are distinctly lacking in body hairs. Some species bear stripes. Cutworms vary in habits with some feeding under ground, others feeding on the soil surface while others climb up on plants to feed. Most North Dakota species of cutworms feed at night and hide in the soil at the base of their host plants during daylight hours. When disturbed, cutworms will usually be found in a curled position.

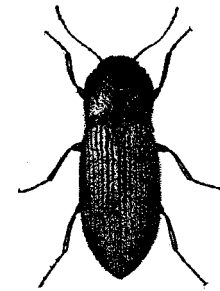


CUTWORM

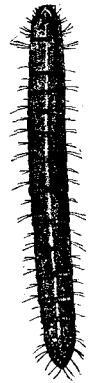
3. Wireworms: The larval stage of this insect actually looks like a piece of copper wire when mature. Young wireworms may be cream colored and will be variable in size depending upon the species. The adult stage of the wireworms is called a click beetle. They are dark brown or black in color and attain a length of about 1/2 inch. Wireworms are serious pests of small grain seeds and seedlings as well as corn, potatoes and sugarbeets.



WHITE GRUB



Adult



Larva

4. White Grubs: White grubs, which live in the soil, are the larval stage of the common June beetle. The grubs feed in the soil for two to three years depending upon which species it is. White grubs are milky white in body color with a tan-colored head capsule. When they are dug from the soil, they draw up into a typical C-shape. These grubs feed on the roots of many different crops, but are most troublesome in small grains, sugarbeets and corn.

II. Small Grain Insects

5. Armyworms: Full grown armyworms are about 1 1/2 inches long. They are usually greenish-brown in color and they have several longitudinal dark stripes running the entire length of the body. On each side there is an orange to reddish-brown stripe. The head capsule is a light mottled brown. Armyworms can severely damage small grains as well as corn, flax and alfalfa.



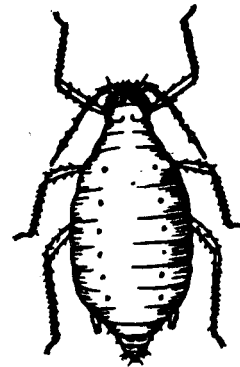
Adult

ARMYWORM



Larva

6. Aphids: Aphids are pear-shaped in appearance and usually bear two projections known as cornicles located on the posterior end of the abdomen. The antennae are slender and are usually held along the sides of the body. Aphids have piercing-sucking mouthparts and will usually be found feeding in groups, on plant stems and leaves. On small grains they begin moving into the heads after crops start to mature. The injurious grain aphids in North Dakota are yellowish-green to green in color and are about 1/8 - 3/16 of an inch long.

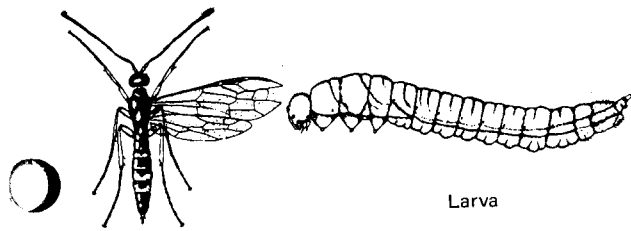


APHID



THRIPS

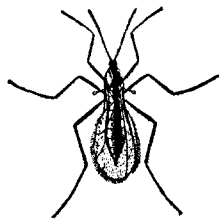
7. Barley Thrips: Adults are about the size of this undotted "i". They are dark brown to black and the females have wings fringed with long hairs. The wingless young are pale greenish-yellow. Barley thrips are usually a pest on barley at heading time but they have also been found on durum.



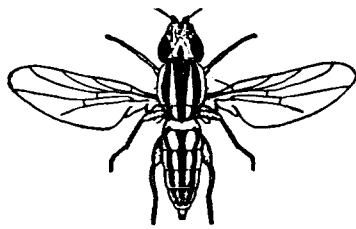
WHEAT STEM SAWFLY

Adult

Larva



Adult



WHEAT STEM MAGGOT

Adult

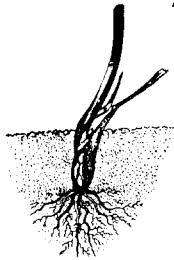


Larva



Larva

Pupa



Damage

HESSIAN FLY

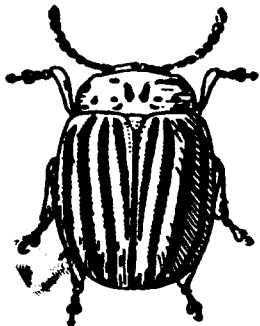


SUNFLOWER MOTH

Adult



Larva

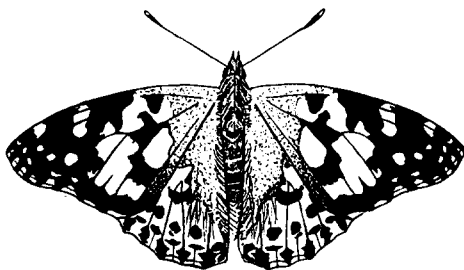


SUNFLOWER BEETLE

Adult



Larva



PAINTED LADY BUTTERFLY - THISTLE CATERPILLAR

(Adult)



(Larva)

8. Wheat Stem Sawfly: The adult wheat stem sawfly is wasp-like in appearance and has black and yellow rings on the abdominal segments. The larva is white and looks somewhat like a fly maggot. When full grown, it measures about 1/2 inch long. The head capsule is tannish-brown and the rear end terminates in a short, blunt point. The larva feeds within the wheat stem, boring down through the joints, and by late summer has reached the lower parts of the plant close to the surface of the ground. Here it cuts a V-shaped groove entirely around and inside the stem, which causes the stem to break off.

9. Wheat Stem Maggot: The larval stage of the wheat stem maggot feeds within the stem of the developing wheat plant. Infested stems eventually die and the unfilled head is referred to as a white head. Besides wheat, this insect also can complete its life cycle on oats, barley, rye and other grasses.

10. Hessian Fly: The Hessian fly can be found throughout North Dakota, but seldom causes economic loss. Adult Hessian flies are small gnats about 1/10 of an inch long. They lay their eggs on wheat leaf blades. Eggs hatch and the larvae move down beneath the leaf sheath and begin feeding. After completion of larval development, they change into the pupal stage that looks very similar to a flaxseed, and is referred to as the flaxseed stage. Several generations are passed in a single season. Early infestations of wheat cause a stunting of the young plant and later season infestations cause stem weakening and lodging before harvest. The Hessian fly will also attack barley, rye and some wild grasses.

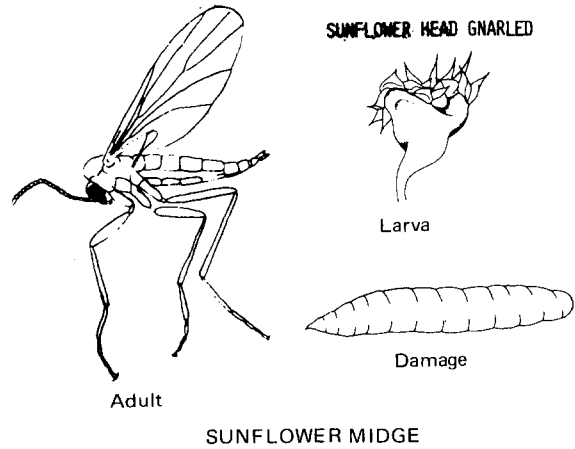
III. Sunflower Insects

11. Sunflower Moth: The injurious stage in the life cycle of this insect is the larva. It is reddish-brown in color with four longitudinal, light blue-green stripes on its back. When full grown it is about three quarters of an inch long. The young larvae feed chiefly on the florets of the sunflower, but as the larvae develop, they tunnel through the seeds. While feeding, the larvae spin silk threads, which become matted with florets and give the head a thrashy appearance. An infestation may become sufficiently heavy to destroy all seeds in the head.

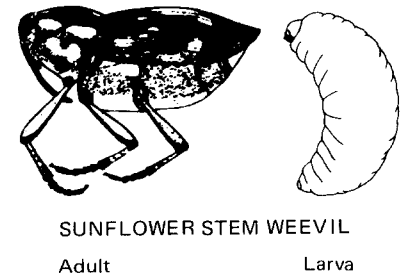
12. Sunflower Beetle: The sunflower beetle is found throughout the state but seldom is an economic problem in North Dakota. The adult is similar in appearance to the Colorado potato beetle, but smaller in size. Four black and five yellow stripes run lengthwise on each wing cover. The larva is dull yellow-green and is sluggish and hump-backed. When full grown it may be almost half an inch long. Both adults and larvae of this insect feed on sunflower foliage.

13. Thistle Caterpillar: The adult of the thistle caterpillar is the painted lady butterfly which lays its eggs on the leaves of sunflower plants. These eggs hatch and the larvae or thistle caterpillar feed on sunflower foliage. There are two generations per season and the adults migrate south for the winter.

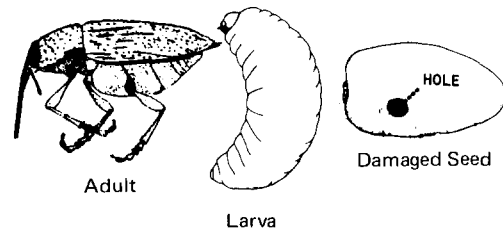
14. Sunflower Midge: The adult sunflower midge is a gnat about 1/10 of an inch in length. It lays its eggs in the sunflower buds and the larvae feed first next to the bracts and then throughout the head. Larval feeding in the head causes a gnarled growth and the heads often cup inward.



15. Sunflower Stem Weevil: Adults of the stem weevil are a small, brown beetle about 3/16 inch long with lighter spots on its back. Adults are present in the field and can be found on sunflower plants when they are in the 10-14 leaf stage. Adult female weevils lay their eggs by boring a small hole in the stem of the plant near the leaf base. The eggs hatch and larvae bore downward through the pith of the stem. The larvae pass the winter at the base of the sunflower stalk.



16. Sunflower Seed Weevil: Adult seed weevils are seen feeding on open sunflower heads as fields come into bloom. The adults feed on pollen in the head and do no damage. Female seed weevils lay their eggs in the developing sunflower seeds of the head. The larva consumes about 1/3 to 1/2 of the seed, and, upon completion of development, bore a typical round hole through the sunflower seed coat. Larvae drop to the ground in the fall, overwinter and pupate the following spring.



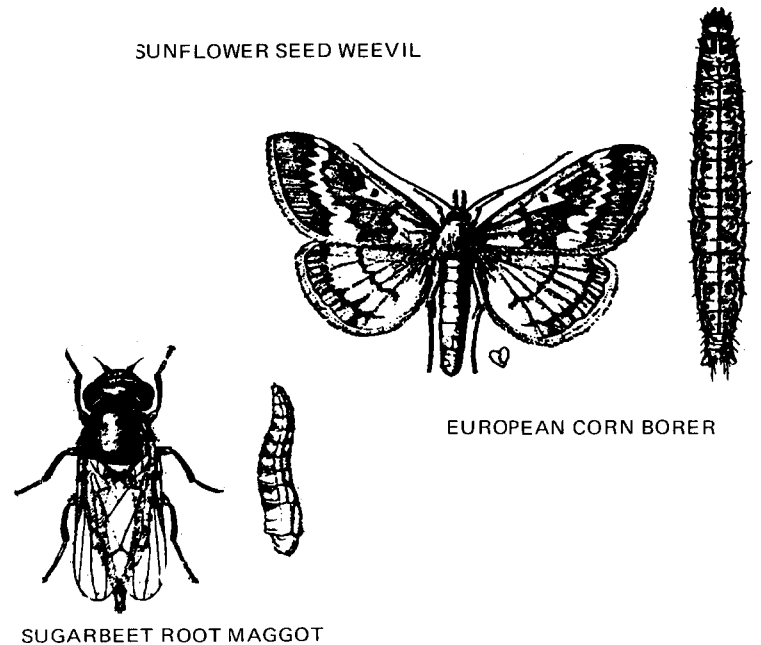
IV. Corn Insects

17. European Corn Borer: The larva is flesh colored and marked with small, round brown spots. When full grown, the borers are 3/4 to 1 inch long. The adult female moths are pale yellowish-brown with irregular dark bands running in wavy lines across the wings. The male moth is distinctly darker, having the wings heavily marked with olive brown. The female lays her white eggs in 1/8 inch patches, resembling fish scales, on the underside of corn leaves, and they hatch in four to nine days.

SUNFLOWER SEED WEEVIL

V. Sugarbeet Insects

18. Sugarbeet Root Maggot: The sugarbeet root maggot adult is about the size of a normal housefly; however, it is darker in color and the wings bear two dark spots on the inner front margin. The maggots are white and taper from front to rear. When full grown, they are nearly 1/2 inch long.

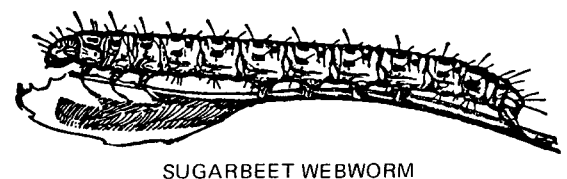


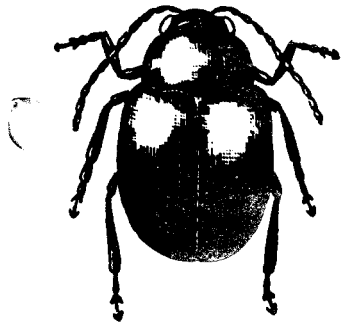
19. Sugarbeet Webworm: The larva of the sugarbeet webworm is green with two narrow white stripes running down the back and two broken white stripes on each side. They are about 1 inch in length when full grown and they feed on sugarbeet leaves under a protective webbing which they make as they feed. The adult is dark tan in color with light tan wavy lines on the wings.

SUGARBEET ROOT MAGGOT

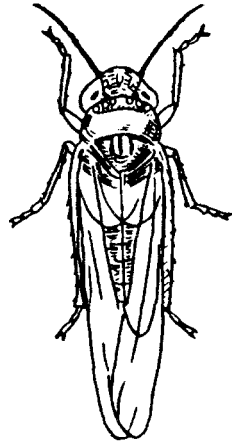
VI. Potato Insects

20. Flea Beetles: These are small, shiny black beetles that jump readily when disturbed. They are about 1/8 inch long, oval shaped and have the hind legs greatly enlarged. The injury caused by these beetles is a shot-hole





FLEA BEETLE



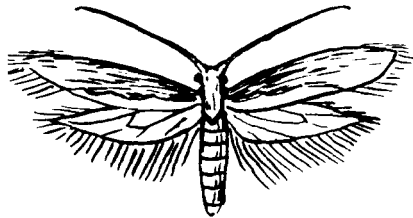
POTATO LEAFHOPPER

effect on leaves of potatoes, sugarbeets, tomatoes, mustard, rape and many other garden plants.

21. Leafhoppers: Leafhoppers are usually yellowish-green to green in color and the head is wedge-shaped. The wings are held roof-like over the back. The six-spotted leafhopper is known to transmit aster yellow virus to potatoes and several small grain crops in North Dakota.

VII. Mustard and Rape Insects

22. Flea Beetles: The most important pest of mustard and rape in North Dakota is the flea beetles. The species affecting the cultivated crops are the same ones that feed on wild mustard. Early season damage due to these small beetles can totally destroy a mustard or rape crop. (See #20 for a description of flea beetles and damage.)



Adult

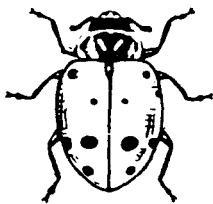
DIAMONDBACK MOTH



Larva

23. Diamondback Moth: This insect is a pest on commercially grown mustard in North Dakota. The larva is yellowish-green in color and rarely exceeds a length of over 1/3 of an inch. The body is tapered at the ends and is covered with fine black hairs. They feed on the underside of leaves, and when full grown they construct a thin, gauzy, silken cocoon in which pupation takes place. The name diamondback moth is derived from the adult male which is gray and has a row of three diamond-shaped yellow spots down the middle of the back when the wings are folded.

VIII. Beneficial Insects: In field crops many insects are economically important from a beneficial standpoint. These are the parasites and predators of the pest species which help keep populations of the pest species below economically damaging levels. Listed are a few of the common beneficial insects found in most agricultural situations.



Adult



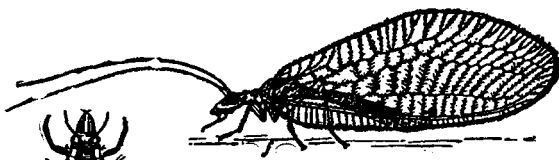
Pupa



Larva

LADYBIRD BEETLE

24. Ladybird Beetles: Both the larvae and adults of ladybird beetles feed on aphids and other small, soft-bodied insects. When abundant, they can reduce insect infestations considerably. Adult beetles are humpbacked, hard-shelled and are orange with black dots. The larvae are elongate and are black and orange in color.



(Adult)

APHID LION and LACEWING



(Larva)

25. Lacewings and Aphid Lions: The lacewing adult is green in color and holds its large net-veined wings roof-like over its body. These insects are predators of aphids and other small insects found in agricultural crops. The larvae are called aphid lions because of the ferocious attacks they make upon aphid populations. Aphid lions are tan in color, elongate and have two curved, sickle-like mandibles protruding from the front of the head. They feed on aphids and other small insects by inserting their mandibles into the victim and sucking out the body juices.

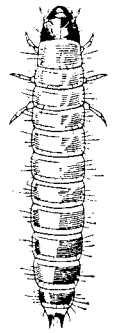
26. Syrphid Fly Larvae: This maggot-like insect is light green in color and is tapered from front to rear. It is about 1/2 inch long when full grown and feeds primarily on aphids.



SYRPHID FLY LARVA



Adult



Larva

CONFUSED FLOUR BEETLE



Adult



Larva

SAWTOOTHED GRAIN BEETLE

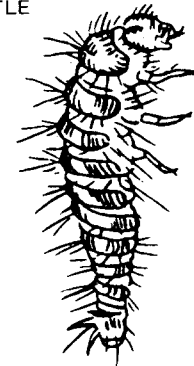
IX. Stored Product Insects

27. Confused Flour Beetle and Red Flour Beetle: These two pests of stored products are very similar in appearance and damage caused. These are small, dark brown beetles about 1/8 of an inch in length. They are usually found in and around cupboards where flour and cereal products are stored, as well as in farm stored grains.

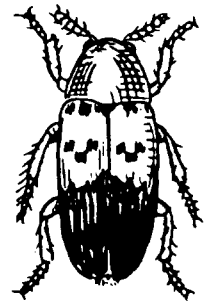
28. Sawtoothed Grain Beetle: This insect is about the same size and color as the confused flour beetle, but it has a sawtoothed margin along the sides of the thorax. It is found in stored grain, flour and cereal products.

29. Dermestid Beetles: These insects are rather elongate worms, brown in color and bearing long hairs. There are several species in the state, two of which are quite common in homes and stored grain bins. One is the larder beetle larva which bears two spines on the end of the abdomen. The other is the black carpet beetle larva which is smaller than the larder beetle larva and bears no spines. It does have a tuft of long hairs on the end of the abdomen. These insects are frequent pests in homes, feeding on fabrics, cereal products and leather goods. The adult larder beetle is about 1/3 inch long, black in color, and bears a yellowish band across the front part of the wing covers. This band bears six black dots. The black carpet beetle is about 3/16 inch long and entirely black. Both insects will feed on fabrics, cereal products and the like.

30. Indian Meal Moth: The Indian meal moth larva feeds on stored grain in bins as well as dried fruits and cereals in the home. The adult moth is tan in color with the back 2/3 of their wings a darker brown color. The larva feeds on stored products and spins webbing over the surface of their food. In storage bins the damage is most often confined to the upper 10 inches of grain and adults are seen flying over the grain surface in the top of the bin.



Larva



Adult

DERMESTID BEETLE



Adult



Larva

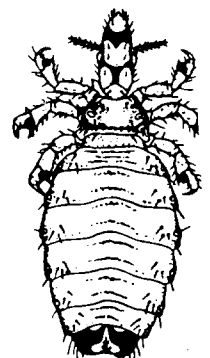
INDIAN MEAL MOTH

X. Insect Pests in Cattle

31. Cattle Lice: Cattle lice are present on livestock all season; however, winter months are conducive to population buildups of these pests. There are two main types of cattle lice in North Dakota. One is the red cattle louse which has a rounded head and bears chewing mouthparts. The other is the bloodsucking louse which is blue-gray in color and has sucking mouthparts. It is crablike in appearance.



BITING LOUSE

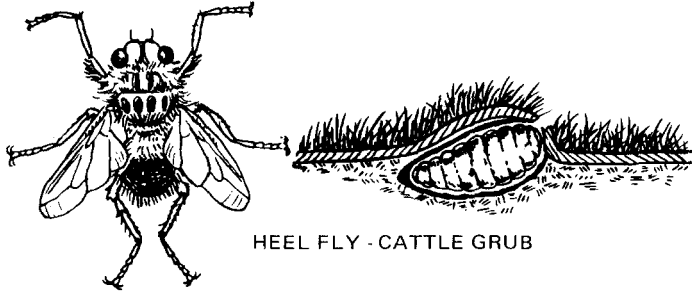


CHEWING LOUSE



STABLE FLY

32. Nuisance Flies: There are three major species of flies that attack livestock in North Dakota. They are the stable fly, horn fly and face fly. The stable fly can be distinguished by its long piercing mouthpart and the blunt, rounded abdomen bearing a "checkerboard" pattern on the top. Horn flies look like half-sized stable flies but do not have the checkerboard pattern on the top of the abdomen. Face flies look similar to houseflies but are slightly larger. In the males the eyes almost meet in front instead of being separated.



HEEL FLY - CATTLE GRUB

33. Cattle Grubs: There are two species of cattle grubs, both of which occur in North Dakota. They are the northern cattle grub and the common cattle grub. Both are similar in appearance, being white in color when young, changing to dark brown or black when mature. The skin is wrinkled in appearance and the thick-bodied grubs will be about one inch long when full grown. Adult grubs are heel flies which look very much like small bumblebees.
