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A Key to the Nebraska Cutworms and Armyworms that Attack Corn

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COLLEGE OF AGRICULTURE

UNIVERSITY OF NEBRASKA

AGRICULTURAL EXPERIMENT STATION

RESEARCH BULLETIN 81

A Key to the Nebraska Cutworms and Armyworms that Attack Corn

DON B. WHELAN

Department of Entomology

LINCOLN, NEBRASKA

JUNE, 1935

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A Key to the Nebraska Cutworms and Armyworms that Attack Corn

DON B. WHELAN¹

The following key to the Nebraska cutworms and armyworms injurious to corn is based upon structural characters supplemented in some instances by color. Color characters alone cannot be depended upon in all cases, as there is at times a wide variation even among individuals of a single species. Such color-markings as the stripes on the Bronze Cutworm (*Nephelodes emmedonia*) are quite constant and can be used in a key for the separation of the species. Such marks, however, often disappear in the last larval instar. Structural characters are more stable, but even with these there may be some variations. The location of certain setae and the relation of other setae and the punctures accompanying them are examples of this instability. Cutworms may have abnormal characters at times. In one specimen of the Dingy Cutworm (*Feltia subgothica*) there was a normal spiracle on the right side of the fifth abdominal segment while on the opposite side of the same segment the spiracle was entirely missing. A similar omission of a spiracle on one side of the seventh abdominal segment of a specimen of the Pale Western Cutworm (*Porosagrotis orthogonia*) was also noted. Both of these cases were plainly abnormal. By the use of a combination of both structural characters and color the different species usually can be readily separated. One using this key should bear in mind that inflated specimens may have their pattern of skin granulation modified by stretching so that it is quite unlike that found on living or alcoholic specimens.

Not all of the species in this key have been found in Nebraska; some are included because they are to be found in near-by states to such an extent that they probably are present in this state. For example the larval stage of the Pale Western Cutworm (*Porosagrotis orthogonia*) has never been found in Nebraska, although the type locality for the species, based on the moth, is within the borders of this state. The Red-backed Cutworm (*Euxoa ochrogaster*) has not been reported or identified from this state, although it has been found in both Colorado and Missouri, which join this state on the west and east. With the description of each species is included its seasonal abundance, which will also, in some cases, help to separate the species.

To better describe the injurious habits of cutworms and armyworms, they are divided into four kinds. The climbing cutworms are those that climb trees, vines, and shrubs, usually in the spring, to feed upon the buds and leaves; the army cutworms are usually found in large numbers feeding on the tops of the plants; the garden, or solitary, cutworm is one

¹ Acknowledgment is made to Mr. S. E. Crumb, author of Technical Bulletin 88 of the U. S. Department of Agriculture on "Tobacco Cutworms", for the helpfulness of the terminology used by him in that publication and also for suggestions in simplifying the key and for specimens for study; also to Messrs. W. C. Cook, T. H. Frison, R. W. Harned, J. H. Hawkins, Kenneth M. King, and Roger C. Smith for furnishing specimens; and to Mr. M. H. Swenk for cooperation in the work and suggestions during the preparation of this bulletin.

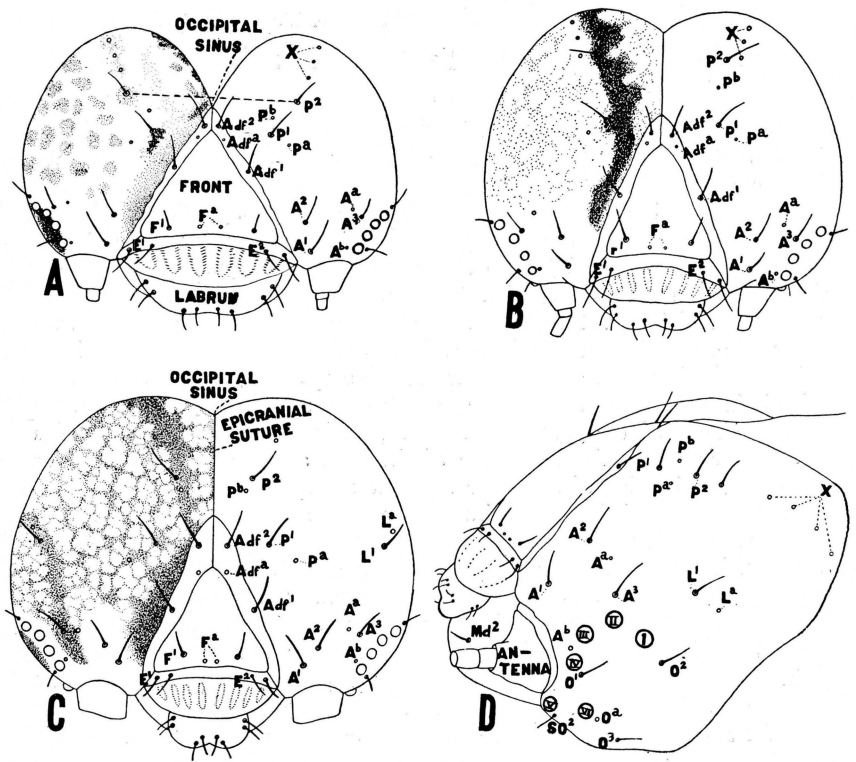


FIG. 1.—Front views of heads of cutworms: A, *Euxoa auxiliaris*; B, *Nephelodes emme-donia*; C, *Cirphis unipuncta*. Side view of a typical cutworm, D.

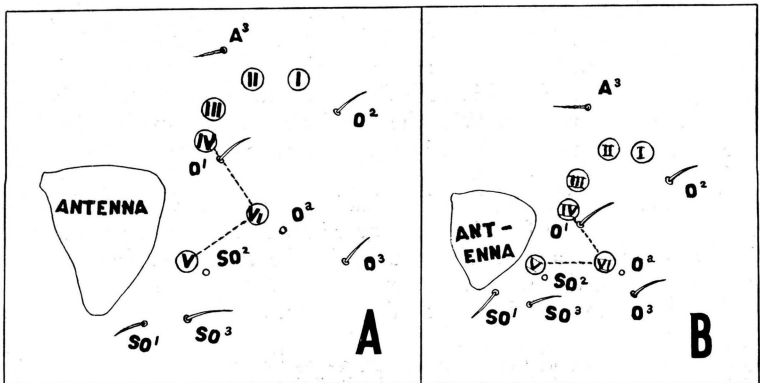


FIG. 2.—Ocular areas of cutworms: A, *Cirphis unipuncta*; B, *Polia renigera*.

that cuts off the plant near the surface of the ground; and the subterranean cutworm feeds on the plant below the top of the soil. Any cutworm may and often does belong to more than one of these groups.

DESCRIPTION OF THE HEAD SETAE AND PUNCTURES

A cephalic view of a cutworm (Fig. 1, A, B, and C) shows a median triangular-shaped sclerite, the front, and parallel with its two upper sides are two long, narrow sclerites, the adfrontals. Just below the front is the

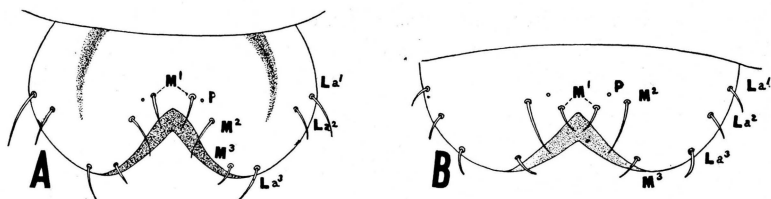


FIG. 3.—Labra of cutworms: A, *Laphrygma frugiperda*; B, *Chloridea obsoleta*.

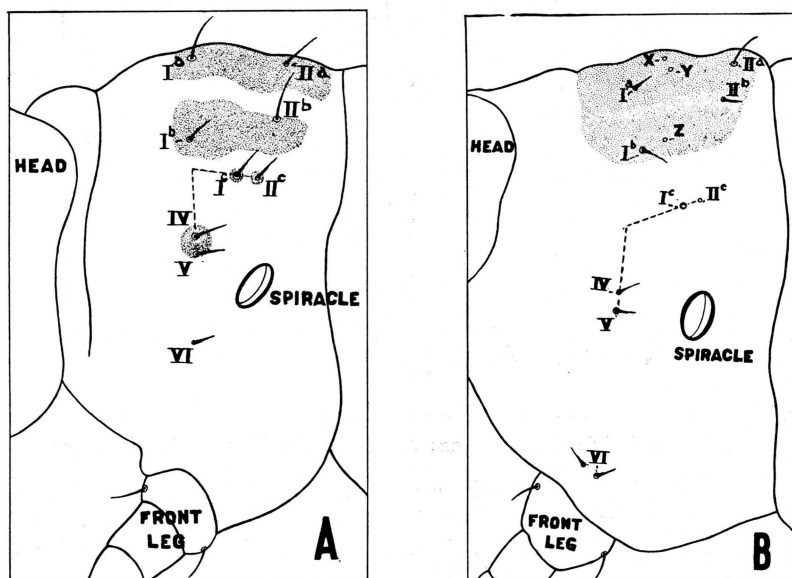


FIG. 4.—Prothoracic segments: A, *Laphrygma frugiperda*; B, *Prodenia ornithogalli*.

epistoma and below this is the upper lip, or labrum. The mandibles and the other mouthparts lie behind the labrum. The remainder of the head is called the epicranium. Near the base of the mandibles are the antennae and above these antennae are the simple eyes arranged in the form of an arc (Figs. 1D and 2). The simple eye farthest from the antenna, on the

side of the head, is ocellus I, while the one closer to the antenna, and just above it, is ocellus IV, with ocelli II and III between them. Ocellus V is close to and just below the antenna and ocellus VI is located behind both ocelli IV and V.

Near the lower edge of the front is located a pair of frontal setae F^1 and between them a pair of frontal punctures F^a . On each adfrontal sclerite are two setae and a puncture. Adfrontal seta Adf^1 is located at a point slightly above the middle of the front, adfrontal seta Adf^2 is located near the apex of the front, and the adfrontal puncture Adf^a is situated between them. There are two pairs of setae on the epistoma: the outer and lower pair are epistomal setae E^1 and the inner and upper pair are

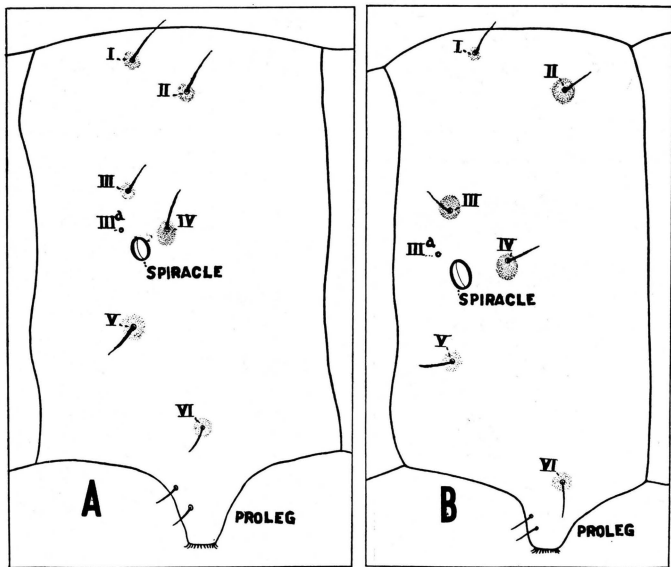


FIG. 5.—Third abdominal segments: A, *Feltia subgothica*; B, *Agrotis ypsilon*.

epistomal setae E^2 . The posterior groups of setae and punctures are located near the upper part of the adfrontal sclerites. Each group is composed of two setae and two punctures. Posterior seta P^1 is closer to Adf^1 and nearly as close to Adf^2 , while P^2 is located above and posterior to P^1 . The posterior puncture P^a is to one side and posterior to P^1 while the posterior puncture P^b is situated between and nearly equidistant from P^1 and P^2 . Above and back of this group is a series of ultraposterior setae and punctures all shown at X. Between the lower part of the front and the ocular area is the anterior group of setae and punctures. A^1 is located just above the antenna, A^2 is above A^1 , and A^3 is close to and in front of ocellus II. The anterior puncture A^a is located just above a line be-

tween A^2 and A^3 and nearly equidistant between them, and the anterior puncture A^b is just in front of ocelli III and IV and almost touching them. Between ocellus I and the ultraposterior setae and punctures is the lateral seta L^1 and its closely associated puncture L^a . The ocular group is closely associated with the ocelli: O^1 is just back of and very close to ocellus IV, O^2 is back of and fairly close to ocellus I, O^3 is to the rear

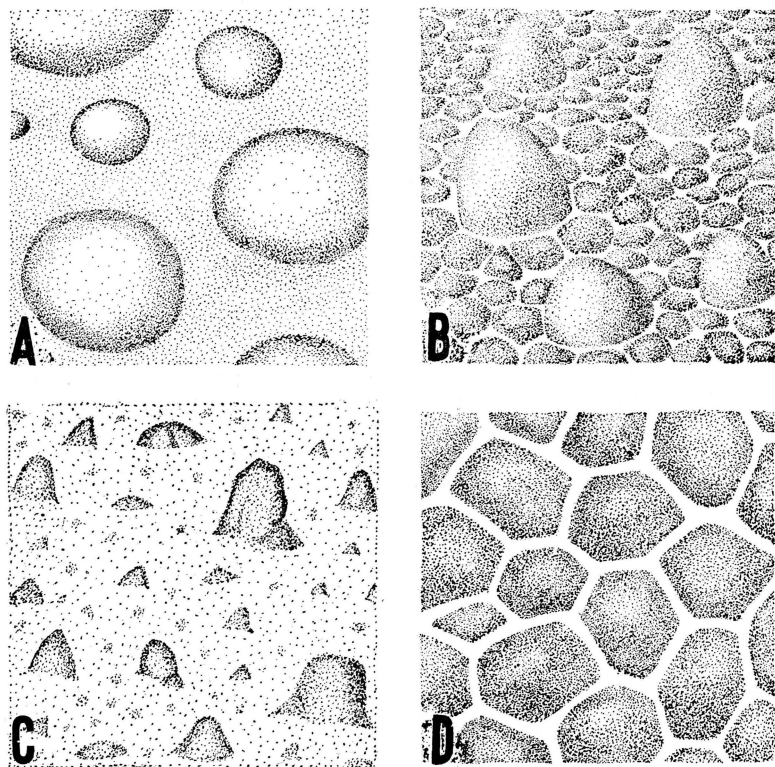


FIG. 6.—Highly magnified portions of the skin: A, *Agrotis ypsilon*; B, *Polia renigera*; C, *Feltia annexa*; D, *Feltia gladiaria*.

of and below ocellus VI, and the ocular puncture O^a lies between it and this ocellus. The subocular group (Fig. 2) lies below ocelli V and VI with SO^1 close to the lower articulation of the mandible, SO^2 very close to ocellus V, and SO^3 back of a line between SO^1 and SO^2 . The labrum (Fig. 3) bears six pairs of setae and one pair of punctures. At the middle there is a pair of setae, which are the median labial setae M^1 with their closely associated punctures P. These are located above M^1 in some species and even with them in others. Slightly below and to the side of M^1 are M^2 and below these are M^3 . On each lateral margin of the labrum are two

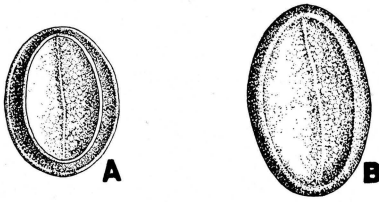


FIG. 7.—Prothoracic spiracles: A, *Feltia subgothica*; B, *Prodenia ornithogalli*.

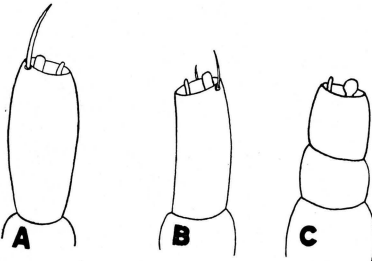


FIG. 8.—Second antennal segments: A, *Nephelodes emmedonia*; B, *Prodenia ornithogalli*; C, *Euxoa messoria*.

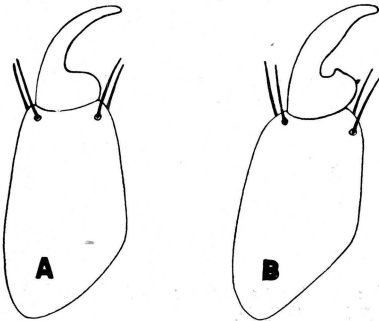


FIG. 9.—Prothoracic claws: A, *Feltia gladiaria*; B, *Euxoa niveilinea*.

setae; the upper or outside one is La^1 and the lower inside one La^2 , while La^3 is usually located in the lower margin. On the mandible are two setae, Md^1 (not shown) situated nearer to its base and Md^2 (Fig. 1D) closer to the teeth.

THE BODY SETAE AND PUNCTURES

The prothorax bears the cervical or prothoracic shield dorsally and the oval-shaped spiracle laterally. Near the anterior edge of the shield (Fig. 4) are the two setae with I^a the more median and I^b lateral to it, with the puncture Z between them. Close to the posterior margin of the shield are the two setae II^a , nearest to the median line, and II^b below it. The two punctures X and Y are situated between the setae I^a and II^a . Above the spiracle are the two closely associated setae I^c and II^c , while in front of the spiracle are the two setae IV and V. Below it and above the leg is seta VI.

A dorsal view of the third abdominal segment (Fig. 5) shows setigerous tubercle I the more anterior and closest to the median line with setigerous tubercle II below and posterior to it. On the side, above the spiracle, is setigerous tubercle III and anterior to its upper edge is the puncture III^a . Setigerous tubercle IV is posterior to the spiracle while setigerous tubercle V is below the spiracle.

KEY TO THE CUTWORMS AND ARMYWORMS

1. Occipital sinus extending nearly or quite to a line which would connect setae P^2-P^2 ; epicranial suture less than half as long as height of front and usually about one-fourth as long (Fig. 1A)..... 2
- Anterior apex of occipital sinus not extending to a line between P^2-P^2 (except sometimes in the Variegated Cutworm); epicranial suture at least half as long as the height of front (Fig. 1B or 1C)..... 14

2. Skin granules conical or upright (Fig. 6B or 6C).....
GRANULATED CUTWORM (*Feltia annexa*)
 Skin granules convex, flat or wanting (Fig. 6A or 6D)..... 3
3. Skin granules convex (Fig. 6A)..... 4
 Skin granules flat or wanting (Fig. 6D)..... 7
4. Prothoracic spiracle oval, about one and one-half times as long as wide (Fig. 7A)..... DINGY CUTWORMS (*Feltia subgothica* and *F. ducens*)
 Prothoracic spiracle elongate, about twice as long as wide (Fig. 7B)..... 5
5. Setigerous tubercle II on abdomen larger than tubercle I; anal proleg with more than 20 crochets..... 6
 Setigerous tubercles I and II on abdomen the same size; anal proleg with 12 to 16 crochets..... SANDHILL CUTWORM (*Euxoa detersa*)
6. Skin granules strongly convex with small secondary granules (Fig. 6A); ocelli IV, VI, and V forming an acute angle ... GREASY CUTWORM (*Agrotis ypsilon*)
 Skin granules small, slightly convex, without secondary granules; ocelli IV, VI, and V forming a right or obtuse angle.....
DARK-SIDED CUTWORM (*Euxoa messoria*)
7. Spiracle on prothoracic segment round, or but slightly oval (Fig. 7A); second segment of antenna about twice as long as wide (Fig. 8A or 8B).....
PALE WESTERN CUTWORM (*Porosagrotis orthogonia*)
 Spiracle on prothoracic segment an elongated oval (Fig. 7B); second segment of antenna less than twice as long as wide (Fig. 8C)..... 8
8. Coloration like that of a white grub; prothoracic claw without distinct notch (Fig. 9A); skin granules obscure; ocular seta O² distinctly more than width of ocellus from ocellus I (Fig. 2A).... GLASSY CUTWORM (*Sidemia devastator*)
 Coloration normal, usually brownish; prothoracic claw with a distinct notch (Fig. 9B); skin granules distinct; ocular seta O² about the width of ocellus from ocellus I (Fig. 2B)..... 9
9. Ocular puncture O^a situated distinctly posterior to a line between the center of ocellus VI and ocular seta O³ (Fig. 2B)..... 10
 Ocular puncture O^a situated nearly on or slightly in front of a line between the center of ocellus VI and ocular seta O³ (Fig. 2A) 11
10. Head markings back of ocular area heavy, more stripe-like, not arranged in isolated spots..... STRIPED CUTWORM (*Euxoa tessellata*)
 Head markings, if any, as faint isolated spots
ARMY CUTWORM (*Chorizagrotis auxiliaris*)
11. Epicranium with brownish, freckle-like spots (Fig. 1A)..... 13
 Epicranium with brownish markings but not arranged in spots (Fig. 1C)..... 12
12. Crochets on anal proleg about 12 in number; mandibular teeth serrate; anterior puncture A^a about equidistant between the anterior setae A² and A³ (Fig. 1D)..... CLAY-BACKED CUTWORM (*Feltia gladiaria*)
 Crochets on anal proleg 18-20 in number; mandibular teeth not serrate; anterior puncture A^a closer to A³ than to A² (Fig. 1B)
DUSKY CUTWORM (*Feltia venerabilis*)

- 13. Freckles on epicranium distinct; ocellus II closer to III than to I; body length about 25 to 30 mm.; head about 2.5 to 2.8 mm. wide.....
SMALL STRIPED CUTWORM (*Euxoa niveilinea*)
 Freckles on epicranium not distinct; ocelli I, II, and III about equidistant; body length 36 to 40 mm.; head about 3.2 mm. wide.....
RED-BACKED CUTWORM (*Euxoa ochrogaster*)
- 14. Skin granules upright or conical (Fig. 6B or 6C)..... 15
 Skin granules slightly convex, flat, or wanting; not as above (Fig. 6A or 6D) 16
- 15. Ocular puncture O^a anterior to a line from the center of ocellus VI to seta O³; median seta of labrum M² situated even with or higher than M¹ (Fig. 3B); a line between the centers of ocelli IV, VI, and V forming a right or obtuse angle (Fig. 2A).....CORN-EAR WORM (*Heliothis obsoleta*)
 Ocular puncture O^a posterior to a line from the center of ocellus VI to seta O³ (Fig. 2B); median seta of labrum M² situated below M¹ (Fig. 3A); a line between the ocelli, as above, forming an acute angle (Fig. 2B).....
BRISTLY CUTWORM (*Polia renigera*)
- 16. Spiracles yellowish or whitish within..... 17
 Spiracles brown or black within..... 19
- 17. Dorsum with paired triangular, black spots, largest posteriorly..... 18
 Dorsum without triangular spots; body striped or not.....
WHEAT-HEAD ARMYWORM (*Neleucania albilinea*)
- 18. Second segment of antenna less than twice as long as wide (Fig. 8C); without black spots above spiracles; black subdorsal spots not including setigerous tubercle I except on some posterior segments.....
SPOTTED CUTWORM (*Agrotis c-nigrum*)
 Second segment of antenna more than twice as long as wide (Fig. 8A or 8B); usually with black spots above spiracles; black subdorsal spots with an angular extension, including setigerous tubercle I.....
W-MARKED CUTWORM (*Agrotis unicolor*)
- 19. Mandibles with not more than one or two obscure teeth; a line between the centers of ocelli IV, VI, and V forming a right angle (Fig. 2A)..... 20
 Mandibles with four or five distinct teeth; a line between the centers of ocelli IV, VI, and V forming an acute angle (Fig. 2B)..... 21
- 20. Head brown with few markings above the eyes; prothoracic claw with little or no notch (Fig. 9A); body robust, bronze or brownish with one median stripe and two lateral light stripes on each side.....
BRONZE CUTWORM (*Nephelodes emmedonia*)
 Head with net-like retculations above the eyes; prothoracic claw with a distinct notch (Fig. 9B); body more slender, striped, but not as above..
TRUE ARMYWORM (*Cirphis unipuncta*)
- 21. Body marked with four to six yellowish or whitish dots on dorso-median line, more distinct on third thoracic and first and second abdominal segments.....VARIEGATED CUTWORM (*Lycophotia saucia*)
 Body not marked as above..... 22

22. Skin granules flat or pavement-like (Fig. 6D); setae tuberculate; on first thoracic segment a line through setae II^c and I^c would meet a line drawn through setae V and IV in an acute angle (Fig. 4A); cervical shield usually black or dark brown; nub of prothoracic claw acutely angled (Fig. 9B) FALL ARMYWORM (*Laphrygma frugiperda*)
- Skin smooth, apparently not granulate; setae not tuberculate; on first thoracic segment a line drawn as above would form an obtuse angle (Fig. 4B); cervical shield light brown or concolorous; nub of prothoracic claw rounded, not angled (Fig. 9A) COTTON CUTWORM (*Prodenia ornithogalli*)

CORN-EAR WORM, *Heliothis obsoleta* (Fabricius)

Description.—Body length about 32 to 38 mm. Head 2.8 to 3.2 mm. wide. Color variable, head usually tan, smooth, and unmarked, the darker individuals with freckles; body sometimes light green or pink to brown or almost black, usually with a double mid-dorsal line the length of the body. Some individuals are concolorous, while others are more or less striped. Cervical shield varies with color of larva. Ocular area light. Adfrontal sutures do not extend to the occipital sinus. Anterior puncture A^a about equidistant between anterior setae A² and A³, a line through A³ to A² to A¹ forming a right or slightly acute angle. Ocular seta O¹ posterior to a line drawn between the centers of ocelli IV and VI. Ocular puncture O^a anterior to a line from the center of ocellus VI to seta O³. A line between the centers of ocelli IV to VI to V forms a right or obtuse angle. Mandibular teeth pointed and acutely angled at their base. Median seta of labrum M² situated even with or higher than the first seta of labrum M¹. Second segment of antenna not more than twice as wide. Setae of abdomen tuberculate, setigerous tubercle II larger than I, setigerous tubercle III larger than spiracle. Spiracles white within. Skin granules thorny. Anal proleg with 18 to 20 crochets.

Distribution.—Occurs throughout southern Canada, most of the United States and Mexico. In Nebraska it has been reported abundantly from all parts of the state and is probably present wherever corn is grown.

Seasonal Abundance.—The corn-ear worm usually begins to injure the corn about the latter part of June, and from then on until frost.

Habits.—The later broods of this pest usually attack the corn ears, but the first brood usually eats through the curled leaves of the plant, in a manner similar to that of some species of cutworms.

Food Plants.—Besides corn, it is known to attack tomatoes, cotton, tobacco, a large number of other cultivated crops, and weeds.

PALE WESTERN CUTWORM, *Porosagrotis orthogonia* (Morrison)

Description.—Body length about 32 to 38 mm. Head 2.8 to 3.0 mm. wide, shining light brown, with a dark band extending from the edge of the clypeus up and back along the adfrontal sutures and through the ultra-posterior setae. Body a sordid whitish or grayish color with no mark-

ings. Cervical shield a light shining brown cut by a light median line. Ocular area dark. The adfrontal sutures extend to the occipital sinus. A line through anterior setae A^3 to A^2 to A^1 forms an acute angle. Ocular seta O^1 posterior to a line drawn between the centers of ocelli IV and VI. Ocular puncture O^a posterior to a line from the center of ocellus VI to ocular seta O^3 . Ocellus II closer to ocellus III than to I, ocellus III closer to IV than to II, a line between the centers of ocelli IV, VI, and V not forming a right angle. Mandibular teeth prominent, triangular, their bases acutely angled. A line from mandibular seta Md^1 to Md^2 prolonged would not bisect the teeth. Second segment of antenna not more than twice as long as wide. Setigerous tubercle II larger than I, IV larger than III. Spiracles light brown within. Skin finely granulated with flat pavement-like granules. Anal prolegs with 12 to 16 crochets.

Distribution.—The distribution of this species is mostly western, extending from Canada south through Montana and Wyoming to Colorado and northern Arizona and New Mexico, and touching western North Dakota, South Dakota, Nebraska, and Kansas. The species was originally described by Morrison in 1876 from Glencoe, Nebraska, which is therefore the type locality.

Seasonal Abundance.—In Canada most of the damage is done during May and June.

Habits.—The larvae work mostly underground, cutting off the roots.

Food Plants.—It is known to attack wheat, oats, corn, barley, flax, alfalfa, and beets.

SMALL STRIPED CUTWORM, *Euxoa niveilinea* (Grote)

Description.—Body length about 25 to 30 mm. Head 2.5 to 2.8 mm. wide, cream to light brown with dark freckles, no reticulations or dark bands. Body a dull brownish color. Cervical shield conspicuous, shining, light brown, cut by a light median line, a row of black dots along its posterior edge and a cluster of black dots posterior to seta I^b . Ocular area light to dark. Adfrontal sutures reach the occipital sinus. Anterior setae A^3 , A^2 , and A^1 form an acute angle. Ocular seta O^1 posterior to a line drawn between the centers of ocelli IV and VI. Ocular puncture O^a about on a line between ocellus VI and ocular seta O^3 . Ocellus II closer to III than to I, ocellus III closer to IV than to II, a line between centers of ocelli IV, VI, and V forming an acute angle. Mandibular teeth prominent, their bases not acutely angled. A line through the mandibular setae Md^1 and Md^2 prolonged would not bisect the teeth. Second segment of antenna not twice as long as wide. Setigerous tubercle II larger than I, IV larger than III. Spiracles brown within. Skin granules small, flat to slightly convex and closely set. Anal prolegs with 14 to 16 crochets.

Distribution.—This species is mostly western in its distribution, having been reported from Nebraska, Kansas, and Colorado to Texas and New Mexico. In Nebraska it has been reported from such widely distributed

localities as Cheyenne, Franklin, Hamilton, Antelope, and Lancaster counties.

Seasonal Abundance.—This species has been collected mostly from May 27 to June 30, nearly all individuals pupating between the middle and the last of August.

Habits.—Similar to the Dark-sided Cutworm.

Food Plants.—It attacks sweet clover, corn, and wheat.

SANDHILL CUTWORM, *Euxoa detersa* (Walker)

Description.—Body length about 23 mm. Head 2.5 mm. wide, smooth and usually unmarked, sometimes with faint freckles, small fuscous flecks just below the posterior seta P^1 . Cervical shield with fuscous flecks similar to those of *Euxoa messoria*. Ocular area light. Adfrontal sutures reach the occipital sinus. Anterior puncture A^a closer to A^3 than to A^2 , a line from A^3 to A^2 to A^1 forming a right angle. Ocular seta O^1 posterior to a line between the centers of ocelli IV and VI. Ocelli IV, VI, and V forming an obtuse angle, ocelli III and IV approximate. Mandibular teeth pointed, acutely angled at their base. Second segment of antenna not more than twice as long as wide. A line from seta I^a of prothorax to punctures Y and X form an obtuse angle. Setigerous tubercles I and II about same size, IV larger than III. Spiracles black within. Skin with closely set convex granules. Anal proleg with 12 to 16 crochets.

Distribution.—This species is found in eastern Canada, Nova Scotia, and in the United States in the northern, eastern, and central parts at least as far west as Nebraska and Colorado. In Nebraska it has been reported or found in Loup, Holt, Wheeler, Antelope, Pierce, Madison, Stanton, and Cuming counties.

Seasonal Abundance.—Most of the damage is reported during the last of May and through June to early July.

Habits.—The larvae cut the corn plant off at the surface of the ground when the weather is cool but after a warm spell they will go below the ground to do their injury. The injury is confined to the light, sandy soils.

Food Plants.—Grasses and corn are readily eaten.

DARK-SIDED CUTWORM, *Euxoa messoria* (Harris)

Description.—Body length about 28 to 37 mm. Head about 3.0 to 3.2 mm. wide, creamy to tan with groups of freckles. Cervical shield light brown with several dark brown dots along its posterior edge and bunched behind seta I^b . Ocular area light to dusky. Adfrontal sutures reaching the occipital sinus. A line from anterior setae A^3 to A^2 to A^1 would form an acute angle. Ocular seta O^1 posterior to a line between the centers of ocelli IV and VI. Ocellus II closer to III than to I, ocelli IV, VI, and V form a right or obtuse angle. Mandibles with at least five distinct teeth, their bases acutely angled. A line through mandibular setae Md^1 to Md^2

prolonged would not bisect the teeth. Second segment of antenna little longer than wide. A few scattered dots between setae I^a and II^a. A light median line extends faintly to rear of body. Dorsum of body brown. The sides darker, a dark band extending from seta II to and including the spiracles. Setigerous tubercle II larger than I, and IV larger than II. Spiracles black within. Skin granules minute, convex, and contiguous. Anal proleg with 20 to 24 crochets.

Distribution.—This species occurs in Canada and in the United States north of a line between New Jersey, Tennessee, Nebraska, Colorado and California. In Nebraska it has been reported from Lancaster, Hamilton, Merrick, Hall, Greeley, Antelope, Madison, Buffalo, Cherry, and Dundy counties.

Seasonal Abundance.—These cutworms are most active in May and June.

Habits.—It is a garden type of cutworm but is often very destructive as a climbing cutworm feeding on the buds of fruit trees.

Food Plants.—It attacks corn, tobacco, onions, tomatoes, sweet potatoes, cabbage, radishes, spinach, beans, peas, lettuce, sugar beets, turnips, strawberry plants, flowering plants, clover, and grasses as well as the buds of apple, currant, soft maple, and grape.

STRIPED CUTWORM, *Euxoa tessellata* (Harris)

Description.—Body length 32 to 38 mm. Head 3 mm. wide, creamy to tan with groups of freckles similar to *Euxoa messoria*, only heavier, markings back from eyes stripe-like. Body color pale, dorsum dull ferruginous, a mid-dorsal and a pair of suprspiracular pale lines present as a white subspiracular stripe. Cervical shield same color as head but with brown clouded areas and a few fuscous flecks. Ocular area black. A line between anterior setae A³, A² and A¹ forming an acute angle. Ocular seta O¹ anterior to a line between the centers of ocelli IV and VI. Ocular puncture O^a posterior to a line between ocellus VI and ocular seta O³. Ocellus II about equidistant between I and III, ocelli IV, VI, and V not forming a right angle. Second segment of antennae about 1½ times as long as wide, wider at distal than proximal end. Setigerous tubercle II larger than I, II and III about the same size, and IV distinctly the largest. Spiracles black within. Prothoracic claw deeply notched, nub acutely angled. Skin very finely pavement granulose. Anterior proleg with about 16 crochets and anal proleg with about 22 crochets.

Distribution.—This is a more northern species, occurring north of the Ohio river and Virginia and mostly east of the Rocky Mountains. It was reported from Sioux City, Iowa, by Crumb, and the Nebraska records list it from Sidney in western Nebraska. It is probably scarce but fairly widely distributed in the state.

Habits.—It has been reported as climbing trees and also as a regular garden variety cutting off plants just above the ground and feeding on them during the day.

Seasonal Abundance.—This insect is probably one-brooded, passing the winter in the larval stage. They do the greatest amount of damage during late May and early June. The moths are found from early June until early August.

Food Plants.—This species has been reported eating the leaves of apple, cherry, and pear as well as bean, beet, cabbage, celery, clover, corn, cucumber, flax, grass, flowering plants, lettuce, melon, onion, parsnip, plum, Polygonium, potato, radish, Rumex, rhubarb, squash, tobacco, and tomato.

RED-BACKED CUTWORM, *Euxoa ochrogaster* (Guenée)

Description.—Body length 36 to 40 mm. Head about 3.2 mm. wide, smooth, shining, a dirty brown color with a cloudy appearance, a broad dark stripe along the adfrontals and through the ultraposterior setae. Body light brown to gray, the dorsum with a light median stripe bordered by two broad, reddish bands on either side, brown below the spiracles and the venter lighter. Cervical shield a shining light brown with fuscous spots along the posterior margin, some posterior to I^b and a few scattering. Ocular area darker. Adfrontal sutures reach the occipital sinus. Anterior puncture A^a closer to A³ than to A². A line between anterior setae A³, A², and A¹ would form an acute angle. Ocular seta O¹ anterior to a line between the corners of ocelli IV and VI. Ocular puncture O^a nearly on a line between ocellus VI and ocular seta O³. Ocelli I, II, and III about equidistant, III closer to IV than to II, ocelli IV, VI, and V forming an acute angle. Mandibular teeth bluntly rounded, not acutely angled at their bases. A line through the mandibular setae Md¹ and Md² prolonged would not bisect the teeth. Second segment of antenna not much longer than wide. Setigerous tubercle II larger than I, IV larger than III. Spiracles brown to black within. Skin granules flat and pavement-like. Anal proleg with 12 to 14 crochets.

Distribution.—This species is found throughout Canada, where it is numerous and very destructive, and in the United States south to Missouri, Colorado, and California.

Seasonal Abundance.—Most of its damage is done in May and June in Montana and eastern Canada, the moths flying in July and August.

Habits.—It works mostly underground, cutting off plants beneath the surface.

Food Plants.—This species attacks corn, wheat, oats, barley, and such garden vegetables as peas, beans, cabbage, cauliflower, beets, radishes, and potatoes as well as flowering plants.

ARMY CUTWORM, *Chorizagrotis auxiliaris* (Grote)

Description.—Body length about 40 mm. Head 3.2 to 4.0 mm. wide, light brown with brownish freckles, dusky along adfrontal sutures and on front. Cervical shield with dusky areas and dark brown dots, cut by a median line which is lost on the abdomen. Ocular areas dark brown. Adfrontal sutures variable, either reaching the occipital sinus or not.

Posterior epicranial puncture P^b distinctly closer to posterior seta P^2 than P^1 . Ocular seta O^1 posterior to a line connecting the centers of ocelli IV and VI. Ocular puncture O^a does not lie directly between the third ocular seta O^3 and ocellus VI. Ocellus IV closer to VI than to V, the three not forming a right angle. Ocellus II about equidistant between I and III, ocellus III closer to IV than to II. Mandibular teeth prominent and at least five in number, a line through the mandibular setae Md^1 and Md^2 prolonged, not bisecting the teeth. Second segment of antennae but little longer than broad. Ground color of abdomen yellowish with indefinite markings, a dark broken line running through seta II. Setigerous tubercle II at least twice as large as I and setigerous tubercle IV over twice as large as III. Spiracles brown to black within. Prothoracic claw little notched. Skin finely pavement granulose. Anal proleg with about 20 to 22 crochets.

Distribution.—This species occurs in the United States, mostly in the plains states from North Dakota to Texas and New Mexico. In Nebraska the moths have a general distribution, while the cutworm reports have come chiefly from western Nebraska. The Nebraska reports are from the following counties: Boyd, Knox, Cedar, Pierce, Antelope, Wheeler, Madison, Platte, Merrick, Howard, Hall, Buffalo, Custer, Butler, Polk, Hamilton, York, Lancaster, Otoe, Jefferson, Thayer, Nuckolls, Webster, Kearney, Furnas, Hitchcock, Hayes, Chase, Perkins, Keith, Lincoln, Logan, Arthur, Deuel, Cheyenne, Kimball, Banner, Morrill, Garden, Dawes, and Sheridan.

Seasonal Abundance.—The cutworms of this species are injurious from early March until the latter part of April. The moths are generally most numerous during May.

Habits.—This species when abundant goes in armies, devouring the plants above ground, not cutting them off. They are distinctly a surface feeder, burrowing very little. At times they climb trees and eat the buds.

Food Plants.—Because of the early season when this species is abundant, they usually injure only wheat, grasses, rye, oats, barley, and alfalfa, although in gardens they feed on cabbage, horse-radish, turnip, beet, corn, pea, celery, tomato, potato, onion, rhubarb, and strawberry.

CLAY-BACKED CUTWORM, *Feltia gladiaria* (Morrison)

Description.—Body length 37 to 38 mm. Head 3.1 to 3.2 mm. wide, light brown with dark brown arcs along and back from the adfrontal sutures, reticulations present between the ocelli and the ultraposterior setae. Body light with brownish or reddish markings on the dorsum, extending to setigerous tubercle II, the sides brownish. Cervical shield dark brown, slightly rugged, with three light stripes. Ocular area dark, front with a dark central spot. Adfrontal sutures reach the occipital sinus. A line from anterior seta A^3 to A^2 to A^1 would form an acute angle. Ocular seta O^1 on or slightly posterior to a line between the centers of ocelli IV and VI. Ocular puncture O^a nearly on a line between ocellus VI and ocular seta O^3 . Ocellus II about equidistant between I and III, ocelli

IV, VI, and V not forming a right angle. Mandibular teeth distinct, pointed and slightly serrate, acutely angled at their base. A line through the mandibular setae Md^1 and Md^2 prolonged would not bisect the teeth. Second segment of antenna not much longer than wide. Setigerous tubercle II larger than I, IV larger than III. Spiracles black to dark brown within. Skin granules round, flat or slightly convex, of about equal size, but slightly separated from each other. Anal proleg with about 12 crochets.

Distribution.—This species is found generally distributed in the United States and in Canada east of the Rocky Mountains. In Nebraska it has been reported only from Dodge and Lancaster counties.

Seasonal Abundance.—They are generally found during the latter half of May, being dormant during the summer and pupating about the first of September. The moths are found late in September.

Habits.—They cut off the plants and when abundant may assume an army-like habit.

Food Plants.—Among the crops it is known to attack are: corn, clover, tobacco, potato, tomato, sweet potato, bean, onion, raspberry, strawberry, oats, and grass as well as aster, goldenrod, and pansy.

DUSKY CUTWORM, *Feltia venerabilis* (Walker)

Description.—Body length 40 to 43 mm. Head about 3.0 to 3.5 mm. wide, shining cream color, with a dark band extending from the sides of the clypeus along the adfrontal sutures and through the ultra-posterior setae, reticulations extending from this band to the lateral seta L^1 and puncture L^a , front with median dark spot. Body mottled brown color. Cervical shield conspicuous, shining brown cut by a median light line. Ocular area dark. Adfrontal sutures reach the occipital sinus. A line between the anterior setae A^3 to A^2 to A^1 would form a right angle. Ocular seta O^1 posterior to a line between the centers of ocelli IV and VI. Ocular puncture O^a on a line between ocellus VI and ocular seta O^3 . Ocelli IV, VI, and V do not form a right angle, ocellus II closer to III than to I. Mandibular teeth triangular, their bases acutely angled. A line through the mandibular setae Md^1 and Md^2 prolonged would hardly bisect the teeth. Second segment of antenna less than twice as long as wide. Setigerous tubercle II larger than I, IV larger than III. Spiracles black within. Skin finely pavement granulose. Anal proleg with 18 to 20 crochets.

Distribution.—Found in Canada and the United States from Nova Scotia and Virginia to Tennessee, Nebraska, Colorado, Texas, and California. In Nebraska it has been reported from Red Willow, Dawson, Buffalo, Hall, Hamilton, and Lancaster counties. Crumb lists it from Sioux City, Iowa, a short distance from the northeast corner of this state.

Seasonal Abundance.—Our records show damage by this species from May 2 until June 6.

Habits.—It has the cutting habit well developed.

Food Plants.—Reported food plants in this state are corn, alfalfa, sweet clover, garden vegetables, and grass pastures.

DINGY CUTWORM, *Feltia subgothica* (Haworth) and *F. duceus* (Walker)

Description.—Body length varying from 22 to 32 mm. Head 2.5 to 2.7 mm. wide, shining brown with darker submedian arcs. Body color a dull, dingy brown, each abdominal segment cut by two transverse light lines, venter light. Cervical shield brown, cut by a faint median light line, a few solitary black dots being present. Adfrontal sutures variable, sometimes reaching the occipital sinus and sometimes not. Ocular seta O^1 posterior to a line between ocelli IV and VI. Ocelli IV, VI, and V form an acute angle. Mandibular teeth bluntly rounded and not acutely angled at their base. A line through mandibular setae Md^1 and Md^2 prolonged would bisect the teeth. Second segment of antenna about one and one-half times as long as wide. Setigerous tubercles I and II about the same size, IV much larger than III. Spiracles black within. Skin granules rounded, isolated and slightly convex, not all the same size. Anterior prolegs with 4 to 12 crochets, anal prolegs with 20 to 21 crochets.

Distribution.—Occurs widely distributed in the United States and Canada but more abundant in the northern part of its range. In Nebraska these cutworms have been reported from Richardson, Lancaster, Clay, Red Willow, Dawson, Buffalo, Hall, Howard, Madison, Antelope, Holt, Cheyenne, and Scotts Bluff counties.

Seasonal Abundance.—Most reports of these cutworms come during the month of May and early June. They mature about the last week of June but do not pupate until the last of August.

Habits.—This cutworm usually works in small numbers in cultivated areas but at times may climb fruit trees to feed on the buds.

Food Plants.—It is a general feeder, eating corn, wheat, grasses, clover, strawberry, beans, peas, squash, cucumber, tomato, cabbage, horse-radish, etc.

GRANULATED CUTWORM, *Feltia annexa* (Treitschke)

Description.—Body length 30 to 37 mm. Head 3.0 to 3.2 mm. wide, light brown, slightly roughened, shining, submedian arcs present with fine reticulations below. Body color a dark gray with a pair of yellowish oblique lines on each segment, venter a pale greenish gray. Cervical shield a dull brown cut by a faint median line. Ocular areas dark. Adfrontal sutures terminate in the occipital sinus. Posterior epicranial puncture P^b does not lie directly between epicranial setae P^2 and P^1 . A line drawn from anterior setae A^3 to A^2 to A^1 would form an obtuse angle. Ocular puncture O^a on a line between the centers of ocelli IV and VI. Ocelli IV, VI, and V do not form a right angle, ocelli III and IV closer together than I and II. Mandibular teeth triangular, their bases not acutely angled. A line through setae Md^1 and Md^2 prolonged would not bisect the teeth. Second segment of antenna at least twice as long as wide, its sides slightly

rounded. Setigerous tubercle II larger than I, IV larger than III. Spiracles black within. Prothoracic claw with a deep acute notch, nub pointed. Skin granules upright, conical, somewhat retrorse, many secondary granules present. Anterior proleg with 8 to 12 chochets, and anal proleg with 18 to 20 crochets.

Distribution.—Occurs from Massachusetts and New York westward to South Dakota, Arizona, California, and southward through Mexico and Central and South America. It probably does not breed regularly in the northern part of its range. It has been reported from Lincoln, Lancaster county, in Nebraska.

Seasonal Abundance.—This species probably winters as a pupa, the moths emerging early in the spring, the cutworms reaching maturity by early June. A second brood appears in July.

Habits.—It is a general feeder, usually cutting off the plants and feeding on them by day but it will climb plants and feed on the leaves. Often it will gnaw the epidermis from the stems at or below the surface of the ground, or even at some distance above the ground.

Food Plants.—Among its food plants are pepper, tomato, potato, sweet potato, cabbage, pea, bean, turnip, corn, wheat, grasses, clover, cotton, tobacco, and pepper grass.

GREASY CUTWORM, *Agrotis ypsilon* (Rottemburg)

Description.—Body length 30 to 45 mm. Head 3.5 to 4.0 mm. wide, dull brown, rough with darker brown markings, darkest adjacent to the adfrontal sutures. Body nearly uniformly dark greasy-gray to a dull leaden-brown color with an indistinct mid-dorsal yellowish line and two faint lateral stripes, venter a dark greenish yellow. Cervical shield brown with dark mottlings. Ocular area dark. Adfrontal sutures terminate in the occipital sinus. Epicranial puncture P^b anterior to a line between the epicranial setae P² and P¹. Ocular seta O¹ posterior to a line between ocelli IV and VI. Ocular puncture O^a posterior to a line between the centers of ocellus VI and ocular seta O³. Ocelli IV, VI, and V form an acute angle. A line through the mandibular setae Md¹ and Md² prolonged would hardly pass through the teeth. The second segment of antenna at least twice as long as wide. Setigerous tubercle II much larger than I, IV larger than III. Spiracles black within. Skin granules strongly convex, rounded, coarse and interspersed with smaller granules. Anterior proleg with 16 to 21 crochets, anal proleg with about 28 crochets.

Distribution.—Found practically throughout the United States, Canada, and south to Mexico. In Nebraska it has been reported from Dawes, Dawson, Buffalo, Valley, Harlan, Hamilton, York, Clay, Fillmore, Thayer, Lancaster, Johnson, Otoe, Dodge, and Douglas counties.

Seasonal Abundance.—These cutworms have been injurious in this state from the middle of May until the middle of August. Pupation takes place in the last of June and in July.

Habits.—This species is a general feeder, cutting off its food plants and dragging them into its burrow. It feeds mostly at night, remaining in the burrows during the day. The climbing habit is little developed.

Food Plants.—Their food comprises corn, grasses, garden vegetables, strawberry, tobacco, cotton, and weeds.

SPOTTED CUTWORM, *Agrotis c-nigrum* Linnaeus

Description.—Body length about 30 to 36 mm. Head 2.8 to 3.0 mm. wide, cream to light brown, shining, with dark brown submedian arcs, two brown marks posterior to the ocelli, remainder of head reticulated. General color of body a dull brown with brownish and blackish flecks, paired triangular spots just anterior to seta II on each abdominal segment, missing on thorax. Cervical shield a dull reddish-brown cut by a median line. Adfrontal sutures do not terminate in the occipital sinus. Ocular seta O¹ posterior to a line drawn between the centers of ocelli IV and VI. Ocelli IV, VI, and V do not form a right angle, ocelli III and IV nearly touching. Mandibular teeth prominent, their bases acutely angled. Second segment of antenna not twice as long as wide. Setigerous tubercles minute and about equal in size. Spiracles usually white or yellowish within, sometimes a light brown. Skin smooth. Anterior proleg with about 25 crochets, anal proleg with 30 to 36 crochets.

Distribution.—Occurs in Canada and United States south to Virginia, Tennessee, Kansas, and Arizona, more abundant northward. In Nebraska it has been reported only from Lincoln, Lancaster county.

Seasonal Abundance.—The specimens in our collection were all captured during May. There probably is another brood sometime in July and perhaps another in late September and October.

Habits.—These cutworms are general feeders on garden and field crops and will either climb trees to feed on the buds and foliage or, when abundant, will assume an army-like habit. In Massachusetts they have been reported as having a climbing habit.

Food Plants.—It is a general feeder and is known to feed upon corn, clover, tobacco, tomato, carrot, cauliflower, celery, pea, rhubarb, turnip, wheat, oat, pear, apple, cabbage, onion, grasses, beet, and cranberry.

W-MARKED CUTWORM, *Agrotis c-nigrum* Linnaeus

Description.—Body length 30 to 32 mm. Head 2.7 to 3.0 mm. wide, smooth, light brown with dark bands extending from the edge of the clypeus up and back along the adfrontal sutures, through the ultra-posterior setae, reticulations extending to the ocelli. Body a dull gray to brown color with a series of subdorsal brown to black spots on each segment of the abdomen, faint to missing on thorax, another set of spots including the spiracles on abdomen. Cervical shield light brown with brownish flecks, cut by three light lines. Ocular area dusky. Adfrontal sutures do not reach the occipital sinus. A line from anterior setae A³ to A² to

A¹ would form an obtuse angle. Ocular seta O¹ just posterior to a line between the centers of ocelli IV and VI. Ocular puncture O^a just posterior to a line between the center of ocellus VI and ocular seta O³. Ocellus II closer to I than to III, ocellus III closer to IV than to II, a line between the centers of ocelli IV, VI, and V would nearly form a right angle. Mandibular teeth prominent. Second segment of antenna two and one-half times as long as wide. Setigerous tubercles minute. A light band below the spiracles. Skin smooth. Anal proleg with 34 crochets.

Distribution.—This species is found in Canada and in northern United States as far south as Kentucky, Missouri, Kansas, Colorado, Utah, Nevada, and California. In Nebraska it has been reported only from Lincoln, Lancaster county.

Seasonal Abundance.—The Nebraska specimens have been collected between April 22 and May 23.

Habits.—According to the literature this is a climbing cutworm attacking apple, currant, and gooseberries and at times is also a garden type.

Food Plants.—The larvae are general feeders, attacking a wide variety of plants such as apple, asparagus, bean, boxelder, buckwheat, corn, clover, cabbage, currant, celery, cauliflower, chicory, gooseberry, grasses, lettuce, soft maple, peach, pumpkin, plantain, tobacco, wheat, and wild endive.

VARIEGATED CUTWORM, *Lycophotia margaritosa* form *saucia* (Hübner)

Description.—Body length 35 to 46 mm. Head 3.0 to 3.2 mm. wide, smooth, shining, light to dark brown in color with variable markings, usually with dark brown submedian arcs adjacent to the adfrontal sutures and often extending posterior on either side of the epicranial suture, reticulations usually present. Body color varies from pale gray to a dark mottled brown intermixed with red and yellow, yellowish mid-dorsal spots visible on the third thoracic segment and at least the first four abdominal segments, a velvety black spot on the dorsum of eighth abdominal segment, a yellowish area following it. A black dash anterior to seta II on each segment, less distinct on thorax, below this an orange dash, then a dark band extending to and including the spiracles, a yellowish or orange band below the spiracles to and including seta V, venter pale flecked with white. Cervical shield brown, heavily mottled with dark brown intermixed with yellow. Adfrontal sutures do not terminate in the occipital sinus. Epicranial puncture P^b anterior to a line between the epicranial setae P² and P¹. Ocular seta O¹ posterior to a line between the centers of ocelli IV and VI. The ocular puncture O^a variable, either on or posterior to a line between ocellus VI and ocular seta O³. Ocelli III and IV closer than I and II, ocelli IV, VI, and V forming an acute angle. Mandibular teeth bluntly rounded, their bases not acutely angled. A line through the mandibular setae Md¹ and Md² prolonged would not pass through the teeth. Second segment of antenna from two to three times as long as wide. Setae not tuberculate. Spiracles black within. Skin smooth. Anterior prolegs with 18 to 23 crochets, anal prolegs with 28 to 30 crochets.

Distribution.—It occurs throughout the United States, Canada, and into Mexico. In Nebraska it has been found practically all over the state, most abundant in the southern and eastern portions.

Seasonal Abundance.—Damage in this state has been reported chiefly during the month of June and again in July.

Habits.—Most of its feeding is above ground. It may assume an army-like habit when numerous or it may climb trees. It prefers moist locations.

Food Plants.—In Nebraska it has been reported from corn, alfalfa, sweet clover, potatoes, peas, and other garden vegetables. Other states report a long list of food plants.

BRISTLY CUTWORM, *Polia renigera* (Stephens)

Description.—Body length 25 mm. Head 2.0 to 2.1 mm. wide, brown in color, rough in texture with dark brown submedian arcs. Dorsum a dull brown bordered by a narrow light band just below seta II, then a darker band with a lighter band below the spiracles, venter a dull gray. Cervical shield brown and cut by a faint median and two lateral lines. Ocular areas dark with reticulations extending up and posterior. Adfrontal sclerites darker than front, adfrontal sutures not terminating in the occipital sinus. Ocular seta O^1 posterior to a line drawn between ocelli IV and VI. Ocular puncture O^a posterior to a line between the centers of ocellus VI and seta O^3 . Ocelli IV, VI, and V form an acute angle. Mandibular teeth distinct and not acutely angled at their base. A line drawn through the mandibular setae Md^1 and Md^2 prolonged would not bisect the teeth. Second segment of antenna about twice as long as wide. Spiracles black within. Skin granules composed of low horny or bristly plates. Anterior proleg with 7 to 13 crochets, anal proleg with about 26 crochets.

Distribution.—Its general distribution is in the United States east of the Rocky Mountains. In Nebraska it has been found only in Lancaster and Madison counties, although the moths have been captured in Douglas and Cuming counties. Its range is probably quite general, as others have reported it from Kansas, Colorado, and North Dakota.

Seasonal Abundance.—Our reports of damage by this species have all come during May and early June.

Habits.—It is chiefly a grass and garden pest, usually feeding on the roots.

Food Plants.—It feeds on corn, clover, alfalfa, grasses, turnips, cabbage, tobacco, weeds, and garden flowers.

BRONZE CUTWORM, *Nephelodes emmedonia* (Cramer)

Description.—Body length 35 to 45 mm. Head 4.2 to 4.5 mm. wide, smooth, shining light brown with few markings. Labrum, antennae and adfrontal sclerites light colored. Body color dark bronze-brown, cut by five pale stripes, the mid-dorsal one distinct throughout its length, on

either side a bronze-brown stripe containing seta II in its lower edge, then a light stripe followed by another dark stripe with the spiracles in its lower edge and another light stripe below this. Cervical shield bronze-brown cut by five pale lines. Adfrontal sutures do not terminate in the occipital sinus. Anterior seta A^2 about equidistant between A^1 and A^3 . Ocular seta O^1 posterior to a line drawn between ocelli IV and VI. Ocular puncture O^a anterior to or on a line between ocellus VI and ocular seta O^3 . Ocelli IV, VI, and V form a right or obtuse angle. Ocelli III and IV widely separated. Mandibles with two median, rounded teeth and two or three poorly defined ones. A line through the mandibular setae Md^1 and Md^2 prolonged would bisect the teeth. Second segment of antenna about twice as long as wide. Setigerous tubercles minute. Seta II^c on prothorax missing. Spiracles black within. Skin smooth, apparently not granulate. Sides of prolegs with a brown patch. Anal proleg with 18 to 20 crochets.

Distribution.—Occurs throughout the northern United States and Canada east of the Rocky Mountains. In Nebraska it has been reported from Dixon, Otoe, Lancaster, Valley, Hitchcock, Cheyenne, and Morrill counties.

Seasonal Abundance.—They have been reported from the middle of May to the middle of July—one generation a year with the moths flying in September and October.

Habits.—Usually found feeding on the ground but at times will climb trees.

Food Plants.—They prefer grasses and cereal crops but sometimes ascend fruit trees and feed on the buds and leaves.

TRUE ARMYWORM, *Cirphis unipuncta* (Haworth)

Description.—Body length 30 to 35 mm. Head 3.0 to 3.5 mm. wide, smooth, cream to light brown color with dark reticulations giving a honey-comb-like appearance. A band of dark brown bordering the adfrontal sutures and extending back along the ultra-posterior setae. Body brown with fuscous markings, cut by one median and two lateral white lines, the median line distinct on the thorax but interrupted on the abdomen. On either side a broad band of mottled brown, darker at the edges and extending to seta II, a narrow white line below this, followed by a band of orange or brown edged with white, then a dark brown stripe to the spiracles edged with white. Below the spiracles an orange stripe edged with white, venter gray to cream with fine brownish mottlings. Cervical shield brown with fuscous markings. Adfrontal sutures do not reach the occipital sinus. Posterior cranial puncture P^b almost on a direct line between the posterior setae P^1 and P^2 and about equidistant between them. A line drawn between the anterior setae A^3 , A^2 , and A^1 would form an obtuse angle. Ocular seta O^1 nearly on a line between ocelli IV and VI. Ocular puncture O^a between ocellus VI and ocular seta O^3 . A line between ocelli IV, VI and V would form a right angle. Mandibles with one or two obscure teeth. Second segment of antenna at least three

times as long as wide. Spiracles dark brown to black within. Skin not noticeably granulated. Prolegs with a brown lateral patch, anal prolegs with about 24 crochets.

Distribution.—This species occurs throughout the United States east of the Rocky Mountains. In Nebraska it has been reported from most of the counties in the eastern third of the state, and fewer towards the west.

Seasonal Abundance.—Armyworms are usually most abundant from the middle of June to the middle of August, although they are frequently found both earlier and later than these dates. The second brood probably does the most damage.

Habits.—When abundant they go in large armies, eating nearly everything as they go.

Food Plants.—They prefer grasses and cereals but will eat almost anything in their paths when on the march. They have been reported attacking a long list of vegetables, some fruits, and many weeds.

WHEAT-HEAD ARMYWORM, *Neleucania albilinea* (Hübner)

Description.—Body length 25 to 30 mm. Head 3.0 mm. wide, smooth, dull cream color with two broad, light-brown stripes extending from the clypeus up and back along the adfrontal and epicranial sutures. Three dark lines extend up and back from the oculars with fine cross reticulations. Body color a grayish or greenish-gray, with a broad stripe on dorsum to and including seta I, cut by a narrow light line throughout its length, a broad, pale stripe with tubercle II at its upper margin and tubercle III in its lower margin, the lower half of the stripe mottled with red or brown, a broad, brownish stripe including the spiracles, and a pale subspiracular stripe. Cervical shield concolorous with remainder of body. Ocular area light. Adfrontal sutures do not extend to the occipital sinus. Ocular seta O¹ posterior to a line between the centers of ocelli IV and VI. Ocular puncture O² anterior to a line drawn between ocellus VI and ocular seta O³. Ocelli I, II, III, and IV about equidistant, ocelli IV, VI, and V forming a right or obtuse angle. Mandibular teeth bluntly rounded, their bases not acutely angled. A line through the mandibular setae Md¹ and Md² prolonged would not pass through the teeth. Second segment of antenna not more than twice as long as wide. Spiracles white within. Skin very finely granulate with minute, flat, pavement-like granules. Anal proleg with 28 to 32 crochets.

Distribution.—Occurs throughout eastern United States north of the Tennessee river and west to Colorado, New Mexico, and Arizona. In Nebraska it has been reported from Kimball, Box Butte, Morrill, Cheyenne, Garden, Hooker, Chase, Hitchcock, Valley, Kearney, Saunders, and Lancaster counties.

Seasonal Abundance.—Damage in this state has been reported usually from the last week in June to the middle of July and again from the middle of August until the last of September.

Habits.—It climbs plants and eats on the heads of its food plants.

Food Plants.—It feeds on various grasses and cereal crops, showing a preference for the heads. It is known to attack timothy, wheat, barley, rye, and clover.

GLASSY CUTWORM, *Sidemia devastator* (Brace)

Description.—Body length 35 to 40 mm. Head 4.0 to 4.5 mm. wide, smooth, shining reddish-brown with no conspicuous markings. Body a dirty whitish color with a greenish tinge, no markings. Cervical shield conspicuous, shining brown cut by a light median line. Ocular area not darker than adjacent areas. The adfrontal sutures reach the occipital sinus. A line through the anterior setae A^3 to A^2 to A^1 would form a right angle. Ocular seta O^1 posterior to a line between the centers of ocelli IV and VI. Ocular puncture O^a on a line between ocellus VI and ocular seta O^3 . Ocelli IV, VI, and V form a right angle. Mandibular teeth bluntly rounded, their bases not acutely angled. A line through the mandibular setae Md^1 and Md^2 prolonged would pass through the teeth. Second segment of antenna less than twice as long as wide. Spiracles narrow and long, white within. Skin not distinctly granulate, a glassy shining appearance. Anal prolegs with 12 to 14 crochets.

Distribution.—Widely distributed in Canada and in the United States from the Atlantic to the Pacific, more abundant in the northern part of its range, less abundant southwards. In Nebraska it has been reported from Grant, in Perkins county.

Seasonal Abundance.—They winter as larvae, doing most of their injury in April and May, and then pupate in June and July.

Habits.—This species seldom comes to the surface even at night. It works below the surface of the ground in burrows, eating off roots and cutting underground stems.

Food Plants.—It feeds on various kinds of grasses, wheat, oats, barley, corn, cabbage, beans, radishes, strawberries, hollihocks, and lettuce.

FALL ARMYWORM, *Laphrygma frugiperda* (Abbott and Smith)

Description.—Body length about 25 mm. Head 2.6 to 2.9 mm. wide, with heavy dark-brown reticulations leaving areas from brown to cream colored, lightest areas above and posterior to oculars and along the epicranial suture. Body dark brown cut by one median and one lateral light line, the median being faint on the abdomen. On either side of the median line is a broad, light-brown band with brownish and reddish-brown mottlings, laterad a narrow yellowish line just below seta II, then a broader brown line and a reddish line of the same width, the two merging on the thorax. A yellow band with reddish mottlings just below the spiracles, the venter a cream color with reddish patches. Cervical shield dark brown cut by one median and two lateral light lines. Adfrontal areas cream to white. The adfrontal sutures do not reach the occipital sinus. Ocelli IV, VI, and V form an acute angle. Mandibles with at least five distinct teeth. Labial puncture L^a situated even with the second median

seta M², labium with lateral grooves. Second segment of antenna more than twice as long as wide. Setigerous tubercle III much larger than IV, tubercles I and II about the same size. Spiracles light to dusky within. Skin granules flat or pavement-like. Anal proleg with 20 to 24 crochets.

Distribution.—This species occurs from New York to Florida and west to Nebraska, Kansas, Texas, and New Mexico. In Nebraska it has been reported from Cass, Pawnee, Gage, Lancaster, Dodge, Seward, Saline, York, Jefferson, Thayer, Clay, Merrick, Dawson, and Boyd counties.

Seasonal Abundance.—It is usually reported from the middle of September to the latter part of October. It seldom winters in this state. Crosby and Leonard state that "Recent observations have shown that in southern Nebraska there are three generations a year."

Habits.—This species assumes an army-like habit and devours the entire plant. It climbs trees when abundant.

Food Plants.—It is a general feeder, eating garden and field crops very readily. It is fond of bent-grass.

COTTON CUTWORM, *Prodenia ornithogalli* (Guenée)

Description.—Body length 20 to 36 mm. Head 2.6 to 3.0 mm. wide. Color variable, the light form with a brown head and white adfrontal sclerites, the dark form with nearly all black or dark brown. Cervical shield brown, faintly cut by a median line which terminates on the second thoracic segment, and two lateral lines, a row of lateral dots, distinct on the second thoracic segment, faint on the third, larger posteriorly. Seta I located in the apex of the triangular dots and seta II in the lower posterior corner. Between these the dorsum is either a light reddish brown band or dark colored, below these triangles is a cream to bright yellow band sometimes with four narrow brown lines in it, and below this a dark band with the spiracles in the lower edge. Ocular area light. Adfrontal area white. Adfrontal sutures do not reach the occipital sinus. Ocular seta O¹ anterior to or on a line between the centers of ocelli IV and VI. Ocelli IV, VI, and V form an acute angle. Mandibular teeth prominent, bluntly rounded at their base. Second segment of antenna about three times as long as wide. Spiracles light brown with a black rim. Anterior prolegs with 17 to 25 crochets, anal prolegs with 32 to 36 crochets.

Distribution.—Occurs from Massachusetts to Florida and westward to Minnesota, Nebraska, New Mexico, Arizona, and California, but usually common only in the south. In Nebraska it has been reported from Cass, Gage, Lancaster, Polk, and Clay counties, while moths have been captured in Cuming and Johnson counties. Probably fairly common in the eastern part of the state.

Seasonal Abundance.—Our species has been caught in July and the remainder in September and early October.

Habits.—They generally feed on many wild and cultivated plants. As a climber it attacks fruit buds.

Food Plants.—It attacks corn, wheat, cotton, tobacco, beet, cabbage, potato, tomato, salsify, asparagus, watermelon, alfalfa, clover, and buds of peach, raspberry, and grape.

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