

AN ILLUSTRATED FIELD KEY TO COMMON **Cutworm, Armyworm, and Looper Moths**

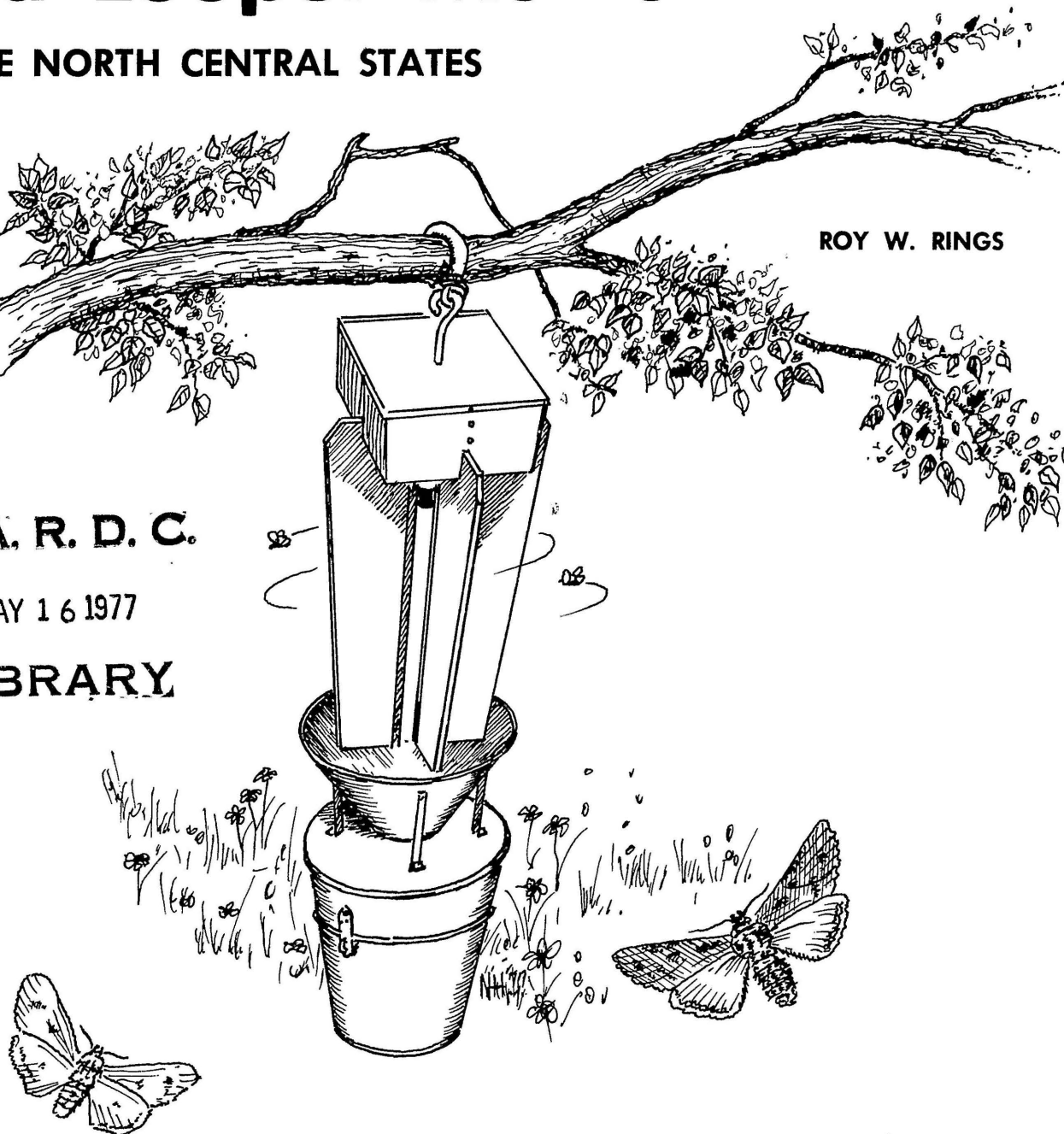
IN THE NORTH CENTRAL STATES

ROY W. RINGS

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AN ILLUSTRATED FIELD KEY TO COMMON CUTWORM, ARMYWORM, AND LOOPER MOTHS IN THE NORTH CENTRAL STATES¹

Roy W. Rings²

Introduction

The following key is designed to provide rapid identification of moths which are frequently caught in black light traps in the North Central United States. It is intended as a tool to implement pest management programs for agricultural crops.

How to use the key: The key is based upon the recognition of the more obvious wing patterns and shapes. It is, as most keys, two-branched; *i.e.*, it considers only two possibilities at one time. To use the key, take the moth to be identified and turn to page 4. Compare the insect with 1A and 1B of the key. If the unknown moth has prominent silvery-white, comma or oval-shaped markings in the center of the wing, proceed to the choices 2A and 2B. The preceding character immediately narrows the choice down to the looper moths.

If the unknown moth lacks this character, proceed to 4A vs. 4B and so on. When you reach a picture which is most nearly like the unknown moth, you should have identified it. If the unknown moth generally resembles the picture but some details do not match, then turn to page 28. This section presents more detailed descriptions of moths which will confirm or deny the tentative identification. This section also tells when you are most likely to catch a given species in light traps, the appearance of the larvae of the moth, its host plants, and its economic importance.

This key is neither infallible nor final. To make the key easier to use, many of the less common moth species have been omitted. If you should try to determine a moth of an omitted species, you will either be unable to identify it or end up in the wrong place.

The average size of the moth is shown as a silhouette at the lower right or left corner of the figures.

Before using the key, read the section on page 2 which explains the terms used.

Outbreak prediction: When large numbers of a single species appear in light traps, this *may* indicate that an unusually large larval population will follow in 2 to 4 weeks. The ability to identify moths will enable pest management scouts, fieldmen, and agricultural agents to review the life history, host range, and other important features of the pest's biology. This will give some facts upon which to base predictions of potential outbreaks. Whether outbreaks occur or not depends upon the number and degree of environmental resistance factors. Some of these are weather,

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parasites, predators, pathogens, and chemical control programs for other pests. For optimum predictions, the light trap or traps should be located as near as possible to the area to be protected. If the traps are 1 or more miles away from a given area, they will be useful only in predicting very general and widespread outbreaks.

Explanation of Terms Used in the Key

The most useful characters for separating species of moths illustrated in this publication are found in the wing patterns, particularly the front wing pattern. A brief explanation of terms used in the key is given below. Definitions of additional terms such as those used in describing larvae may be found in the glossary.

Front Wing Patterns

In the more highly developed moths such as the noctuids, the wings show a basic pattern which is common to armyworms and cutworms. The fore wing is usually divided into different areas by transverse lines of varying distinctness.

Lines: There are usually two, more or less prominent, lines which trisect the fore wing: the *antimedial line* (am) (Fig. 1) and the *postmedial line* (pm). In most of the moths considered in this publication, these lines are not obvious; one exception is the spotted-sided cutworm (Fig. 18). In most cases these lines are complicated; for example, in Fig. 18, the postmedial line is composed of a light line shaded on one side by a dark line. In some cases the lines are reduced to a series of spots on the wings (Fig. 21). The *basal line* is situated about halfway between

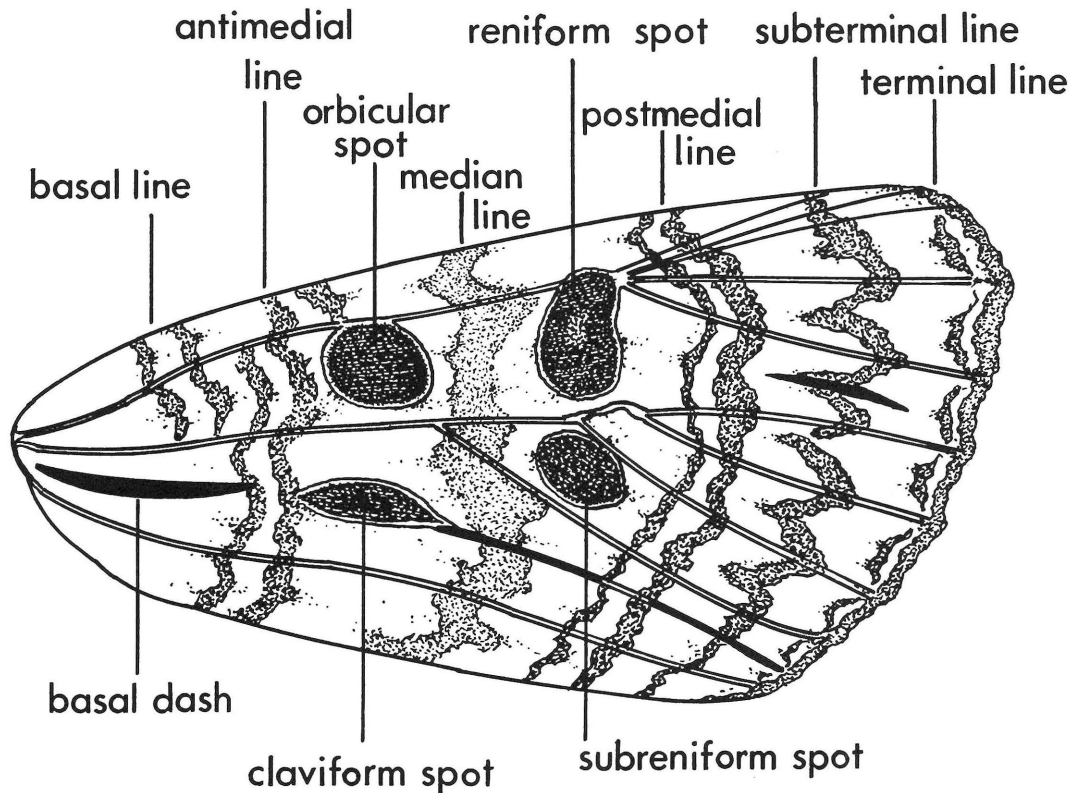


Figure 1.--Stylized moth wing pattern showing principal lines, spots, and dashes.

the antimedial line and the attachment of the wing to the thorax. This basal line is usually similar to the antimedial and postmedial lines but is always simpler.

Just beyond the postmedial line is the *subterminal line* which does not match the two principal lines (am and pm). This line (sbt) is usually more strongly asymmetrical and less complex and is commonly in the form of a dark shade followed by a pale shade with a sharp but irregular boundary (Figs. 1 and 30).

In the middle of the wing is the *median line* which is usually simple and less sharply defined than the two principal lines (am and pm) (Fig. 1). Finally there is the *terminal line* which follows the outer margin of the wing at the base of the fringe.

Spots: The second element of noctuid wing patterns consists of several spots or markings which are consistent in well-marked species. The first of these is the *orbicular* spot which is usually round or oval in shape (Fig. 1). The second most prominent spot is the kidney-shaped *reniform* (Figs. 1 and 21). The noctuids also have two other markings which other families of moths do not. One of these is the *claviform* (Figs. 1 and 25) which is spindle or wedge-shaped; the other is the *subreniform* (Fig. 1) which is prominent and silvery white in looper moths, and in this instance is called a *stigma*.

Dashes and vein lines: The *basal dash*, when present, consists of a heavy black line extending from the base of the wing to the antimedial line (Figs. 1 and 17). The *medial dash* is a bar connecting the antimedial and postmedial lines (Fig. 17).

The *vein lines*, when present, are usually fine lines which follow the veins of the fore wing. These are often broken into bars and spots.

Hind Wing Patterns

The hind wings in armyworms, loopers, and cutworms usually do not provide distinguishing characteristics but some (Figs 2 and 6) aid in identification in combination with fore wing patterns.

An Illustrated Field Key to Common Cutworm,
Armyworm, and Looper Moths in the North Central States

- 1A. Fore wings with prominent silvery-white markings which are comma or oval-shaped and are centered (Figs. 2 to 4)..... 2
- 1B. Fore wings without prominent silvery-white markings..... 4
- 2A. Silvery-white markings tear-shaped, superimposed on a dark reddish-brown background; ground color of hind wings tan, dark brown on outer margin (Fig. 2)..... Celery Looper

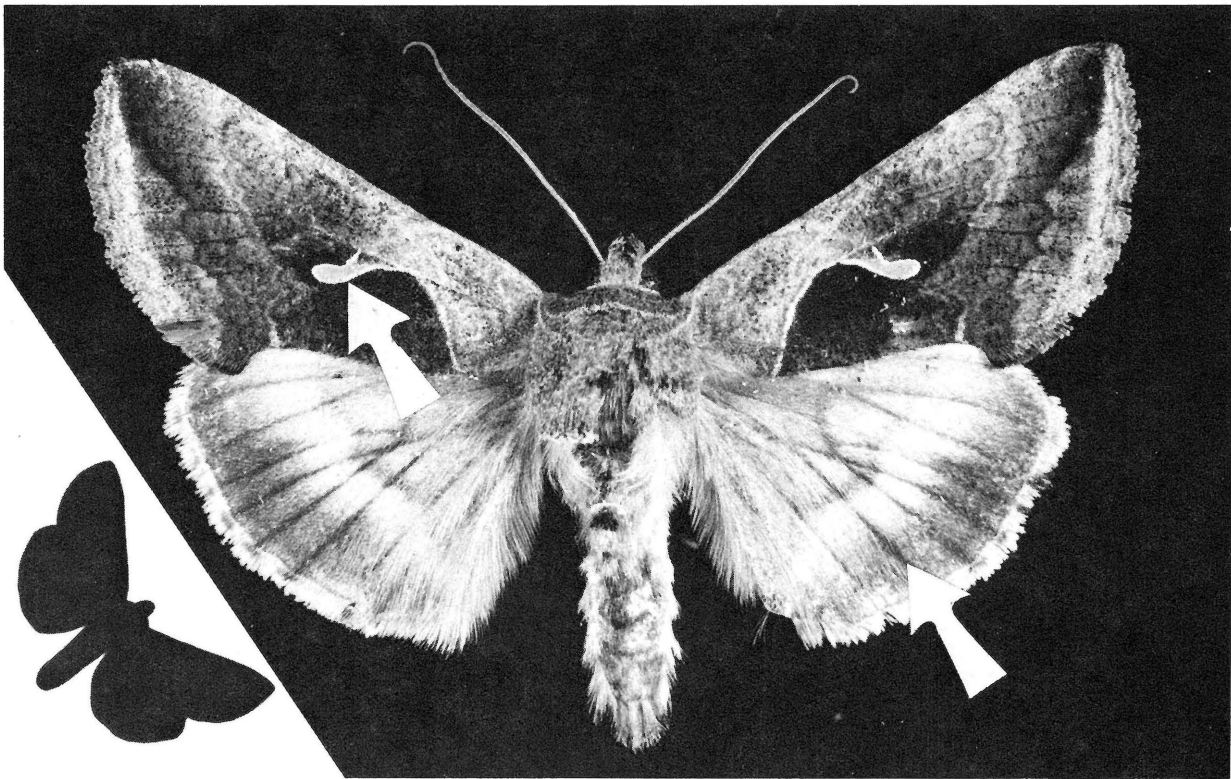


Figure 2.--Celery Looper, *Anagrapha falcifera*

- 2B. Silvery-white markings partially separated into two distinct spots; hind wings dark brownish-gray..... 3
- 3A. Silvery-white markings tear-shaped but indented on upper side (Fig. 3)..... Plantain Looper



Figure 3.--Plantain Looper, *Plusia precatationis*

- 3B. Silvery-white markings not tear-shaped, appearing as two separate spots joined by a small white line (Fig. 4)..... Cabbage Looper

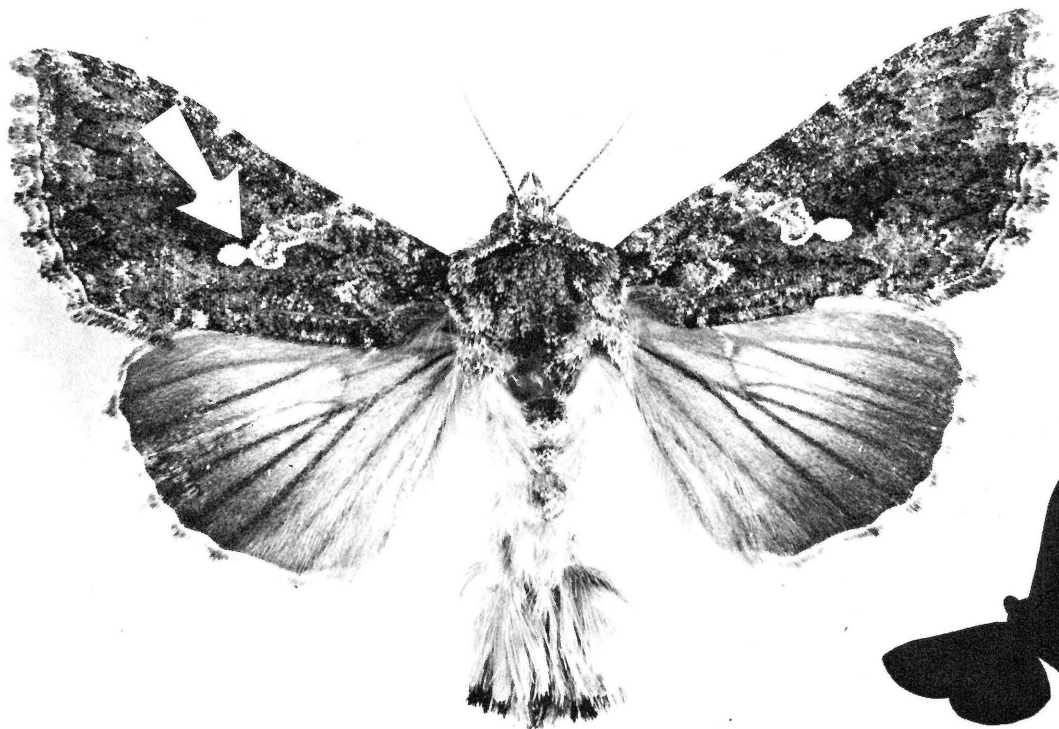


Figure 4.--Cabbage Looper, *Trichoplusia ni*

- 4A. Fore wings with a prominent, pinkish, triangular orbicular marking (Fig. 5)..... Spotted Cutworm

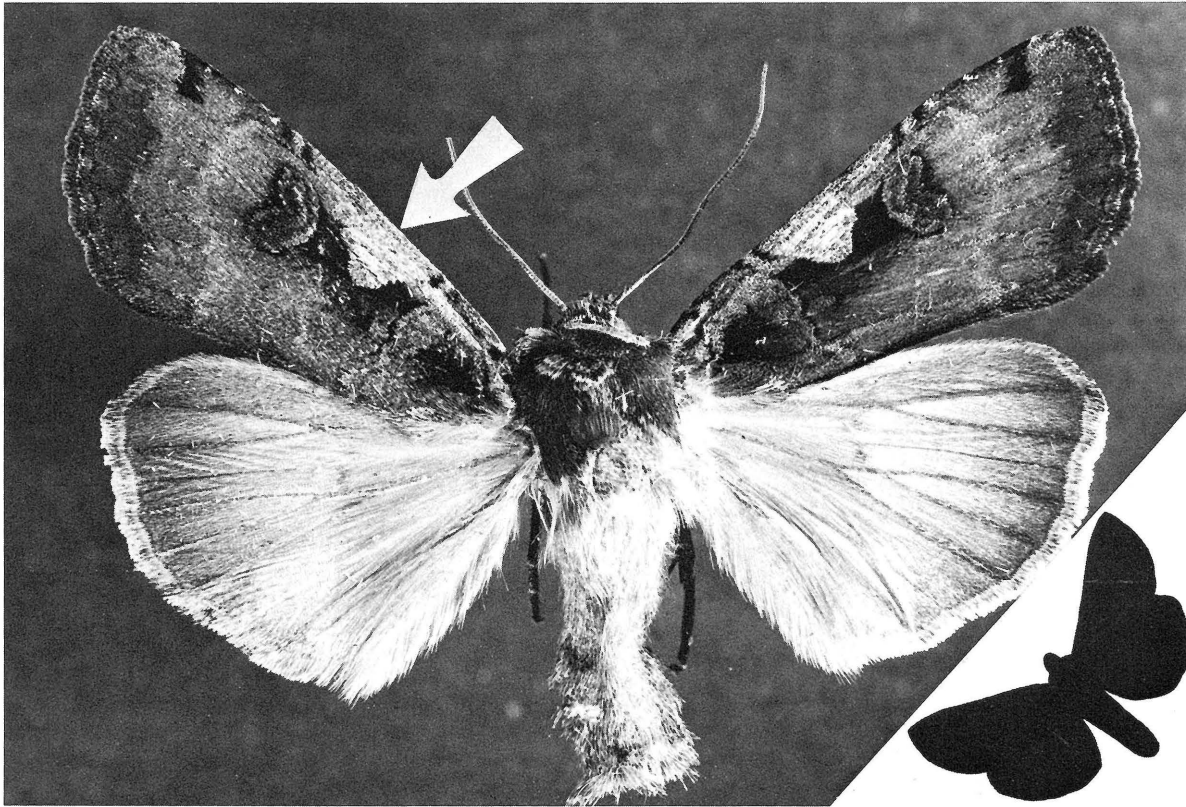


Figure 5.--Spotted Cutworm, *Amathes c-nigrum*

- 4B. Fore wings without a prominent, pinkish, triangular orbicular marking.... 5
- 5A. Hind wings with one or more prominent, dark transverse bands (Figs. 6 to 9)..... 6
- 5B. Hind wings without dark transverse bands..... 9
- 6A. Hind wings with a single, prominent, broad, transverse band; fore wings pale brown (Fig. 6)..... Corn Earworm



Figure 6.--Corn Earworm, *Heliothis zea*

- 6B. Hind wings with two prominent, dark, transverse bands; fore wings dark brown or gray..... 7
- 7A. Fore wings without two strongly contrasting dark bars (Fig. 7)..... Forage Looper ♀

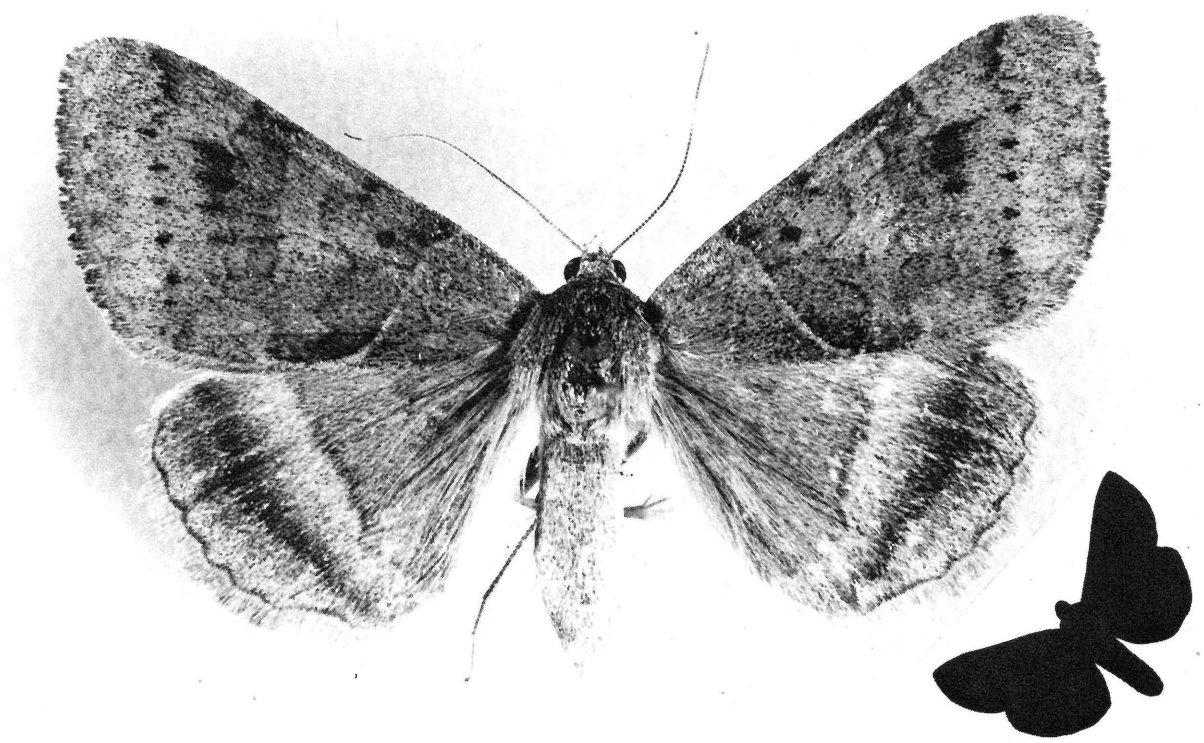


Figure 7.--Forage Looper, *Caenurgina erecta* ♀

- 7B. Fore wings with two contrasting dark bars (antimedial and postmedial lines) (Figs. 8 and 9)..... 8
- 8A. The inner dark brown bar, when complete, forms a wide loop and joins or nearly joins the outer bar at the bottom (Fig. 8).... Clover Looper

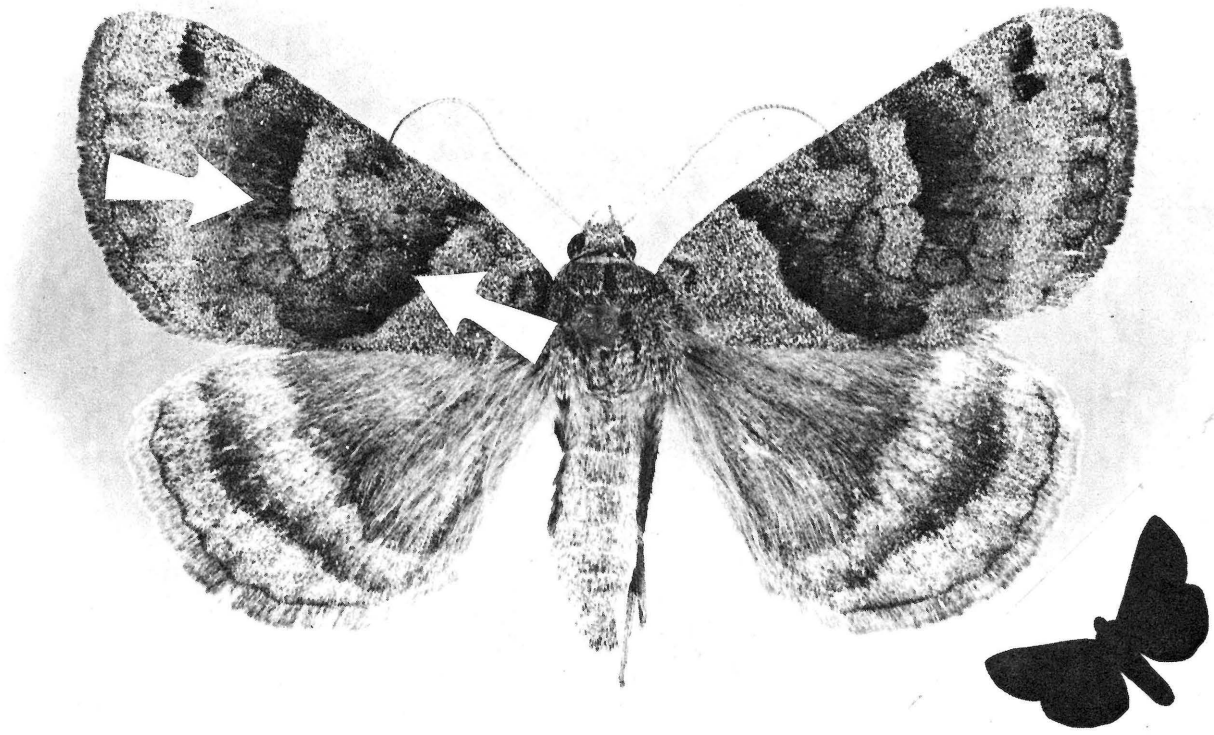


Figure 8.--Clover Looper, *Caenurgina crassiuscula*

8B. The two contrasting dark brown bars not touching the hind margin of the wing or each other (Fig. 9)..... Forage Looper ♂



Figure 9.--Forage Looper, *Caenurgina erectea* ♂

- 9A. Fore wings with a dagger-shaped marking at outer edge of reniform which is outlined in black; claviform distinct (Fig. 10)..... Black Cutworm

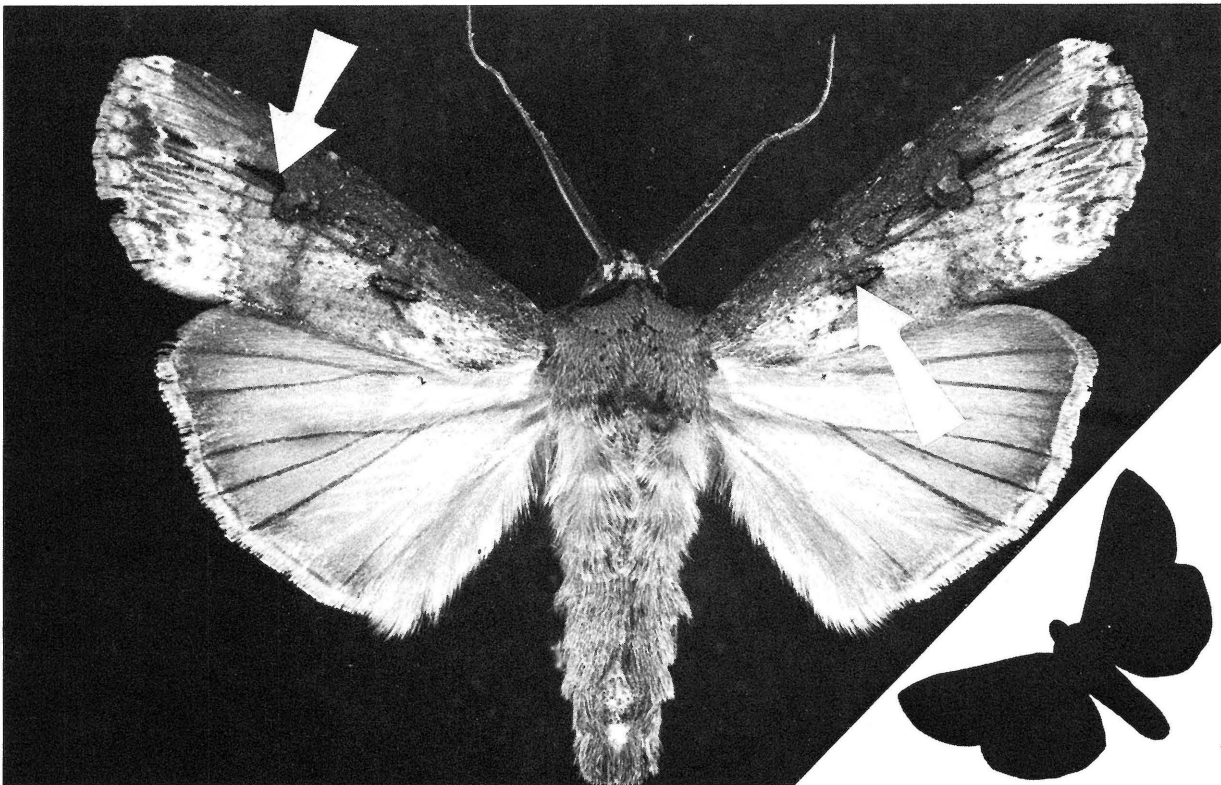


Figure 10.--Black Cutworm, *Agrotis ipsilon*

- 9B. Fore wings without a dagger-shaped marking at outer edge of reniform..... 10
- 10A. Hind wings white, pale, or with very narrow transverse bands (Figs. 11 to 16)..... 11
- 10B. Hind wings gray or dark gray-brown, sometimes with heavy shading on outer border (Figs. 17 to 24)..... 16
- 11A. Fore wings with several longitudinal dark stripes or dashes on a pale buff background (Fig. 11)..... Wheat Head Armyworm

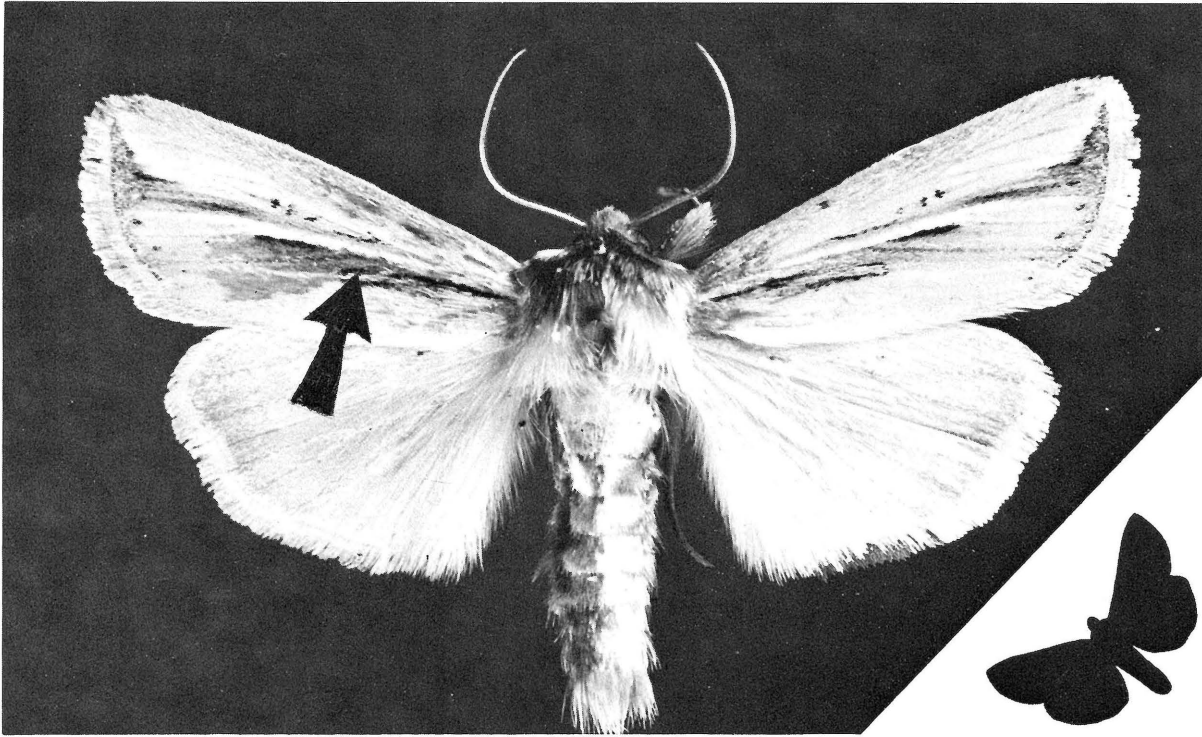


Figure 11.--Wheat Head Armyworm, *Faronta diffusa*

- 11B. Fore wings without longitudinal dark stripes on a pale buff background..... 12
- 12A. Fore wings chocolate-brown; reniform large and irregular (Fig. 12)..... Zebra Caterpillar

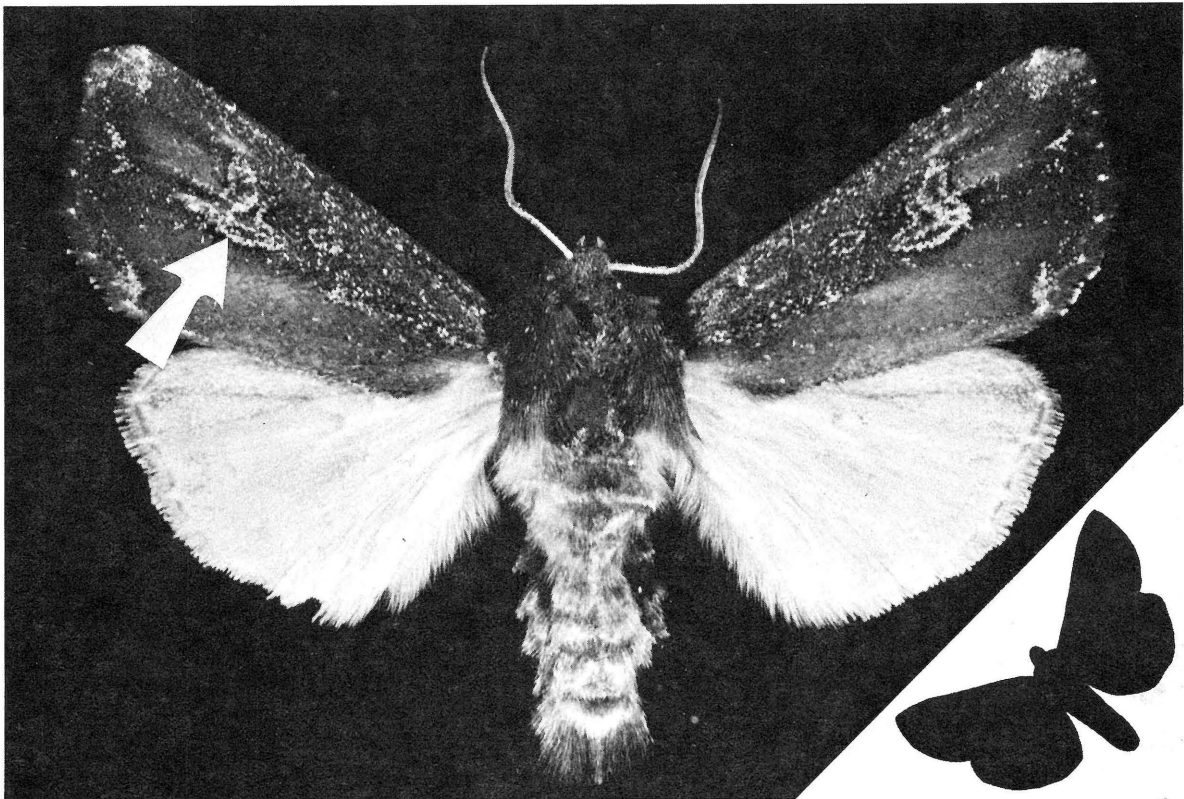


Figure 12.--Zebra Caterpillar, *Ceramica picta*

- 12B. Fore wings not chocolate-brown..... 13
- 13A. Fore wings with a prominent, white, diagonal bar on fore edge
(Figs. 13 and 14)..... 14
- 13B. Fore wings without a prominent, white, diagonal bar on fore edge..... 15
- 14A. Prominent, white diagonal bar sharply defined, blending
posteriorly to a large, pale, broad area extending to
hind margin of wing; tip of wing more pointed than
following species (Fig. 13)..... Yellow-striped Armyworm

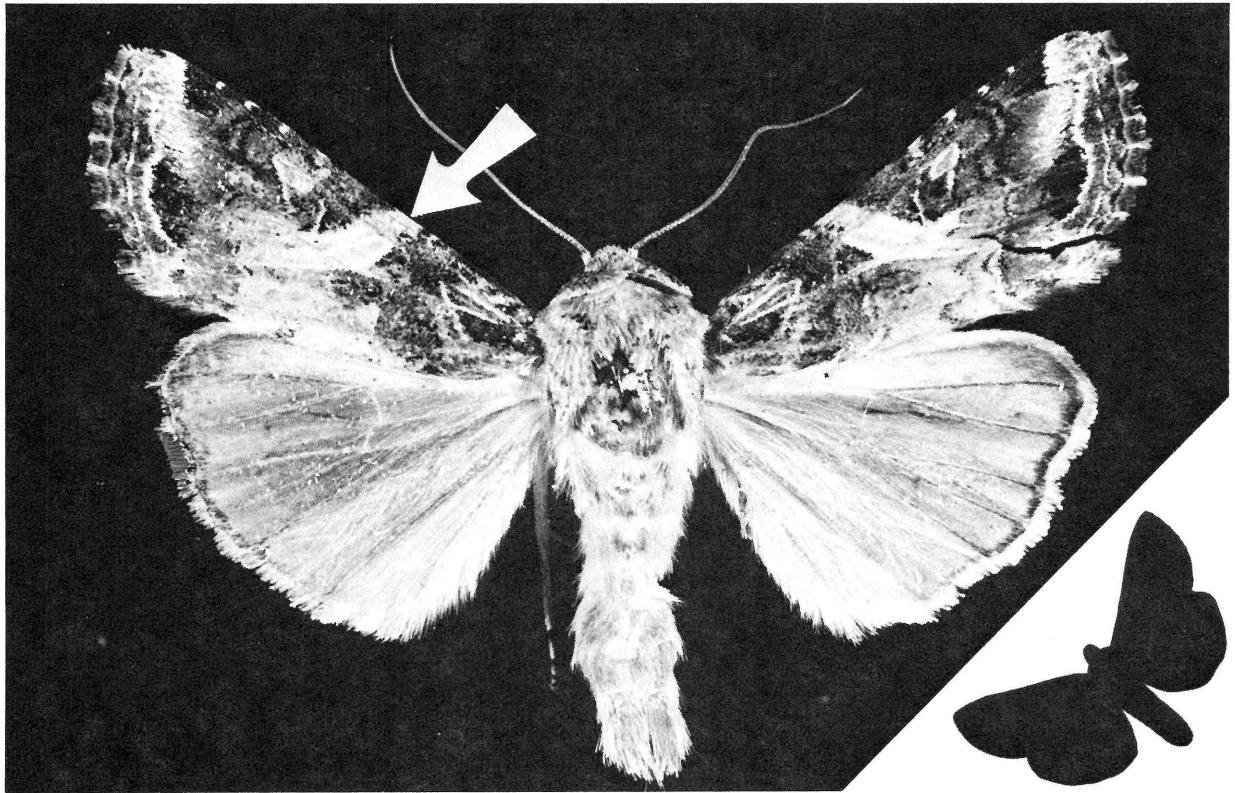


Figure 13.--Yellow-striped Armyworm, *Spodoptera ornithogalli*

- 14B. Prominent, white diagonal bar not sharply defined, extending only halfway to hind edge of wing or connected by an oblique, narrow, white line; tip of fore wing more rounded than preceding species (Fig. 14)..... Fall Armyworm ♂

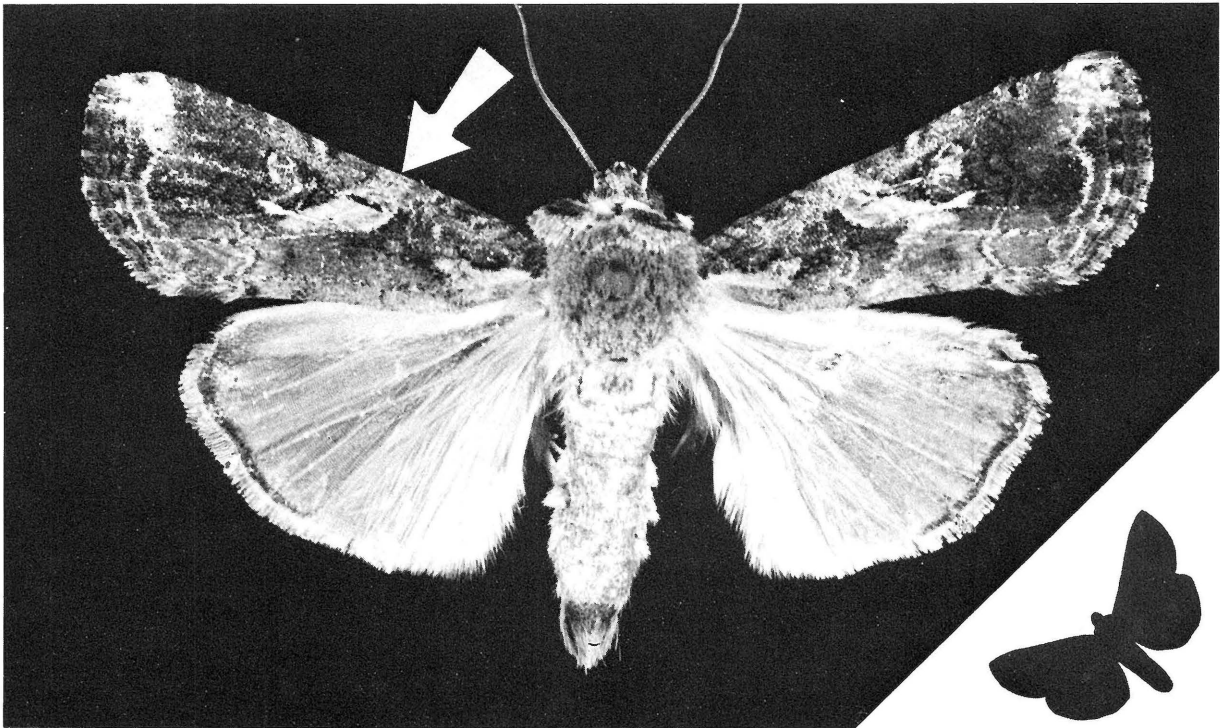


Figure 14.--Fall Armyworm, *Spodoptera frugiperda* ♂

15A. Orbicular and reniform markings obscure but traceable and faintly outlined in white; hind wings with a violet tinge (Fig. 15)..... Fall Armyworm ♀

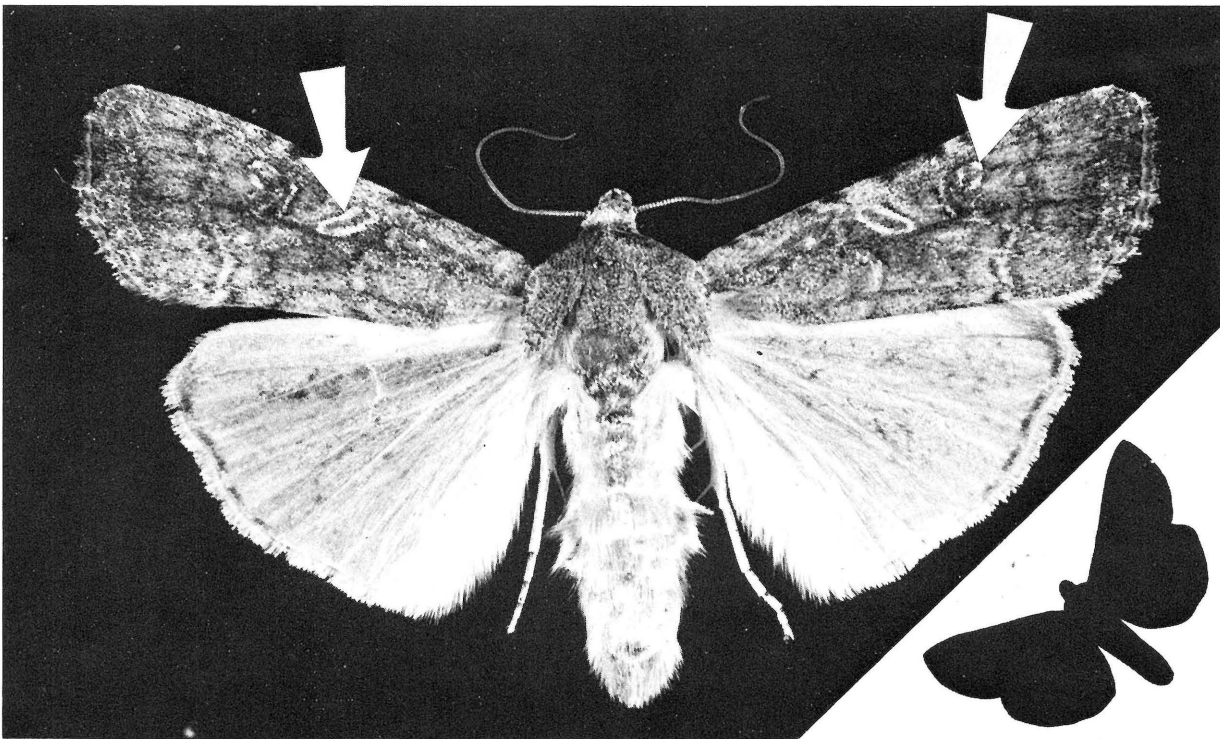


Figure 15.--Fall Armyworm, *Spodoptera frugiperda* ♀

- 15B. Orbicular and reniform markings outlined in pale scales; reniform with a gray dot in lower part; hind wings without a violet tinge (Fig. 16)..... White Cutworm

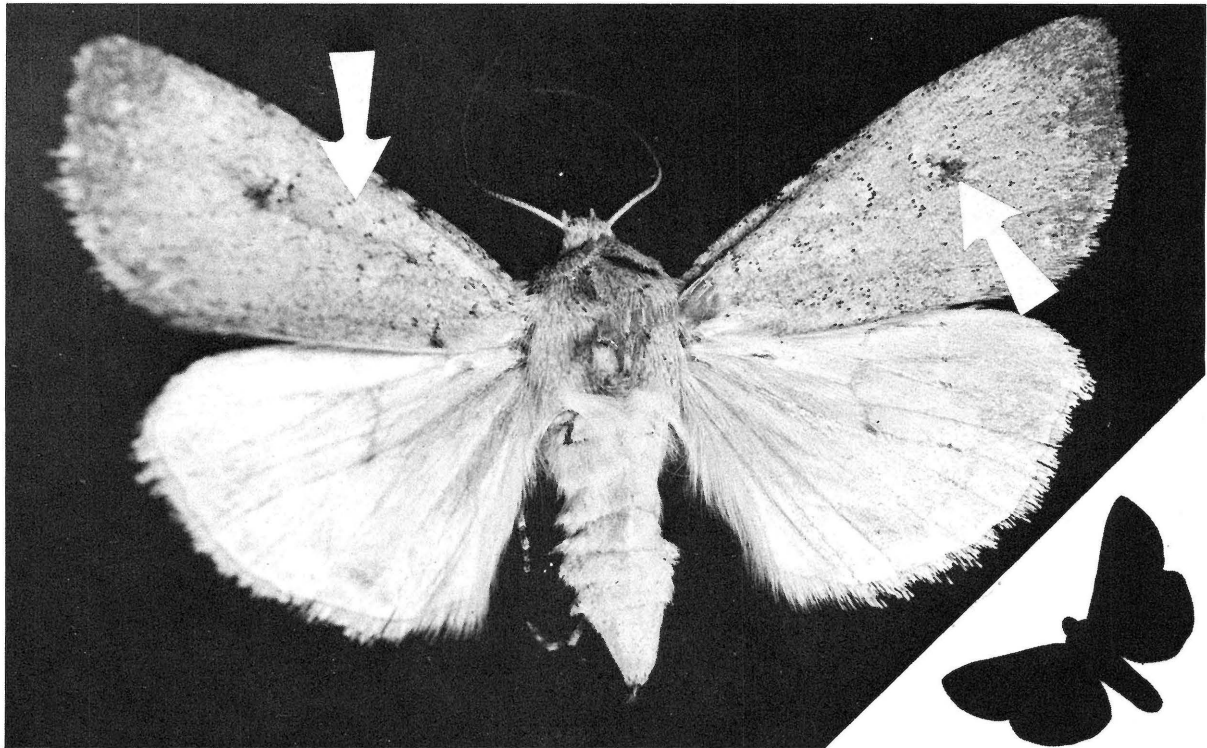


Figure 16.--White Cutworm, *Euxoa scandens*

- 16A. A heavy, black, wedge-shaped basal dash and a black medial dash (Fig. 17)..... Speckled Cutworm

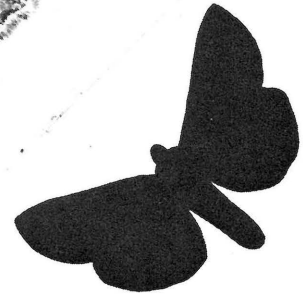
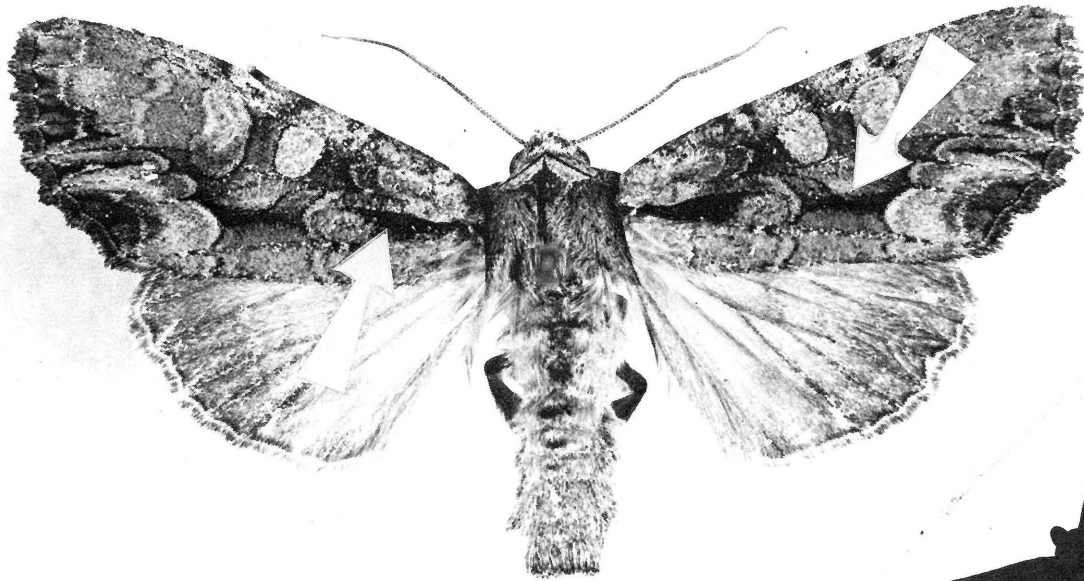


Figure 17.--Speckled Cutworm, *Polia subjuncta*

- 16B. No heavy, black, wedge-shaped basal and medial dashes..... 17
- 17A. Antimedial and postmedial lines prominent; each line composed of a dark line and a pale line (Fig. 18).... Spotted-sided Cutworm



Figure 18.--Spotted-sided Cutworm, *Agrotis badinodis*

- 17B. Antimedial and postmedial lines not prominent..... 18
- 18A. Size small, wingspread 20 to 25 mm.; reniform elongate with pale greenish scales in center in fresh specimens; sometimes white in preserved specimens (Fig. 19); in one form the reniform is absent (Fig. 19)..... Bristly Cutworm

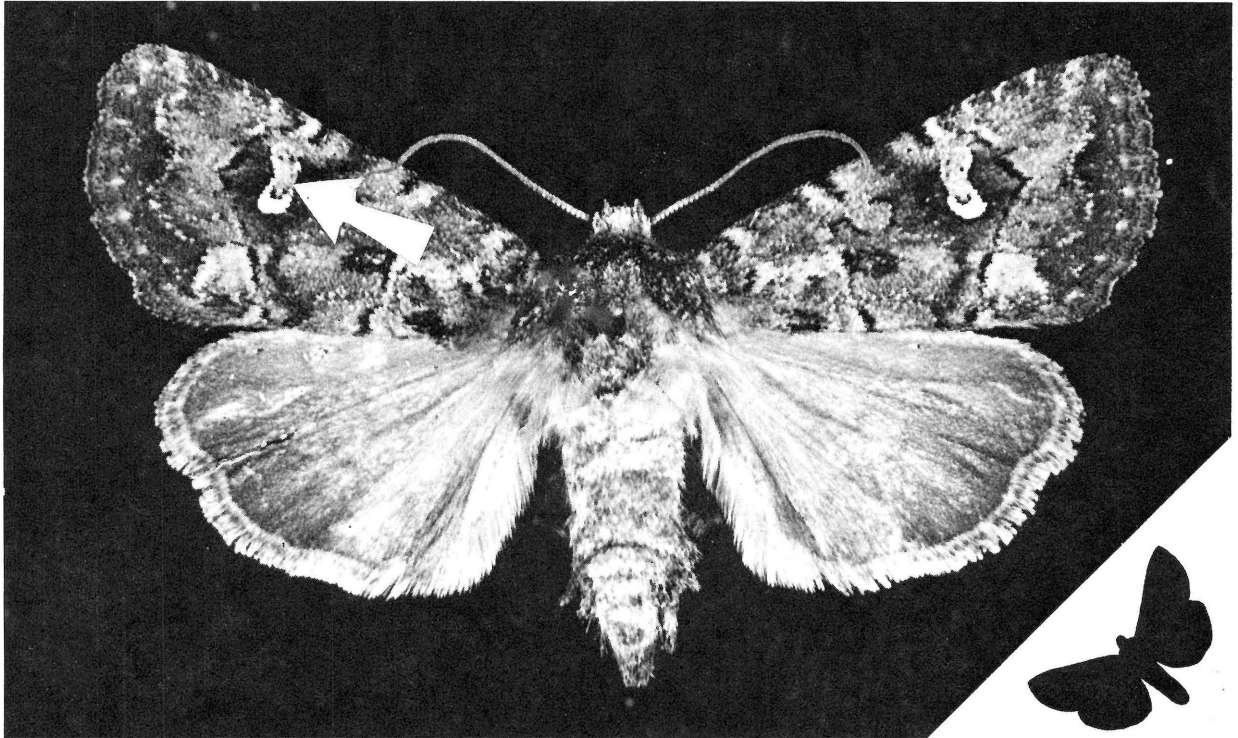


Figure 19.--Bristly Cutworm, *Lacinipolia renigera*

- 18B. Size medium or large, wingspread 25 to 50 mm.; no pale green scales in reniform..... 19
- 19A. Orbicular triangular; reniform pale on dark background (Fig. 20)..... Dingy Cutworm

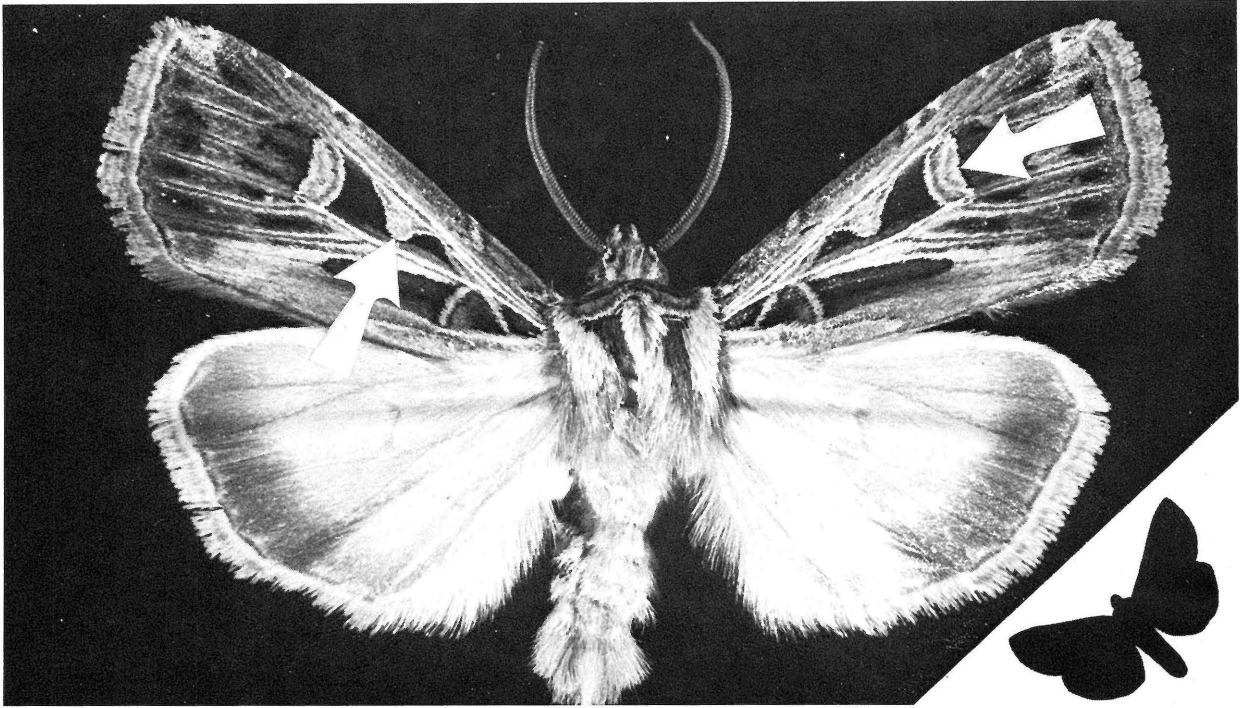


Figure 20.--Dingy Cutworm, *Feltia ducens*

- 19B. Orbicular not triangular; usually oval..... 20
- 20A. Hind wings darker than fore wings (Figs. 21 to 24)..... 21
- 20B. Hind wings not as dark as fore wings..... 23
- 21A. Orbicular and reniform contrasting and
distinct; consisting of dark scales
outlined with pale scales (Fig. 21)..... Mottled Gray Cutworm (light phase)

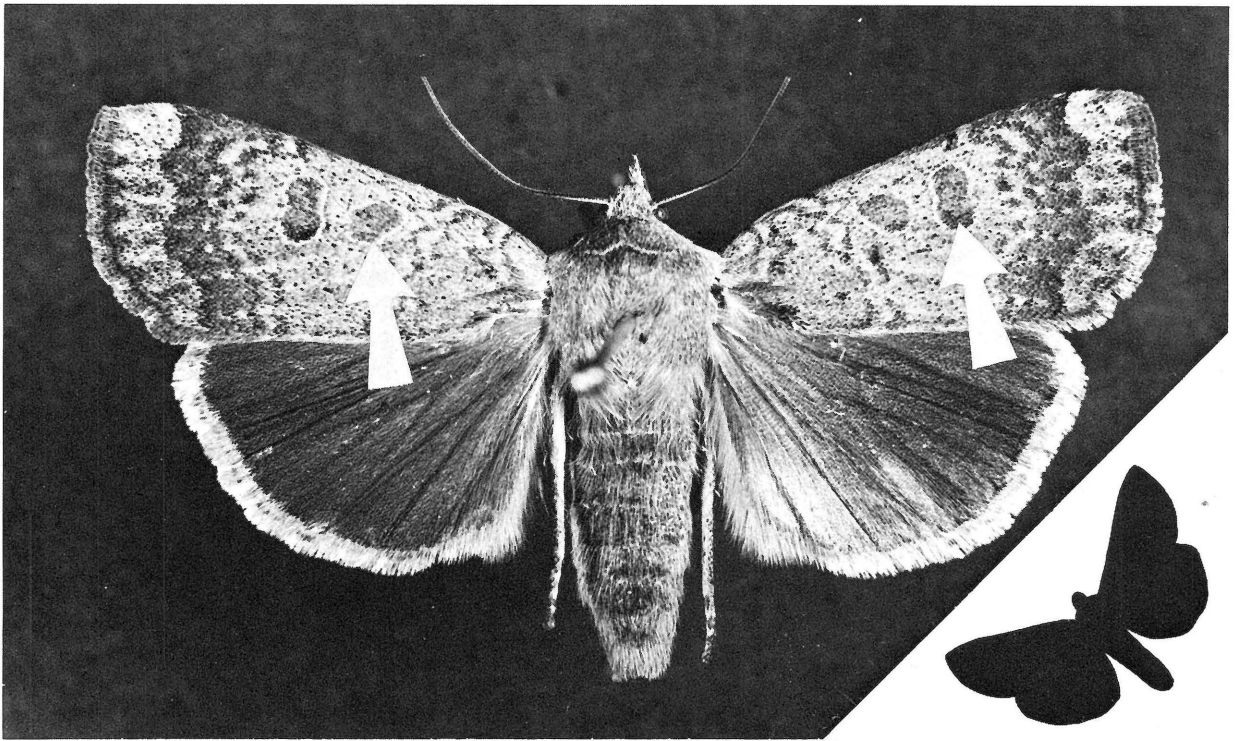


Figure 21.--Mottled Gray Cutworm, *Abagrotis alternata* (light phase)

- 21B. Orbicular and reniform indistinct and not contrasting..... 22
- 22A. A blackish triangle on outer edge of wing representing remnants of the subterminal line (Fig. 22)..... Brown Cutworm



Figure 22.--Brown Cutworm, *Rynchagrotis cupida*

- 22B. A small white spot, with dark markings on each side, representing the reniform; fore wings pale buff (Fig. 23)..... Armyworm

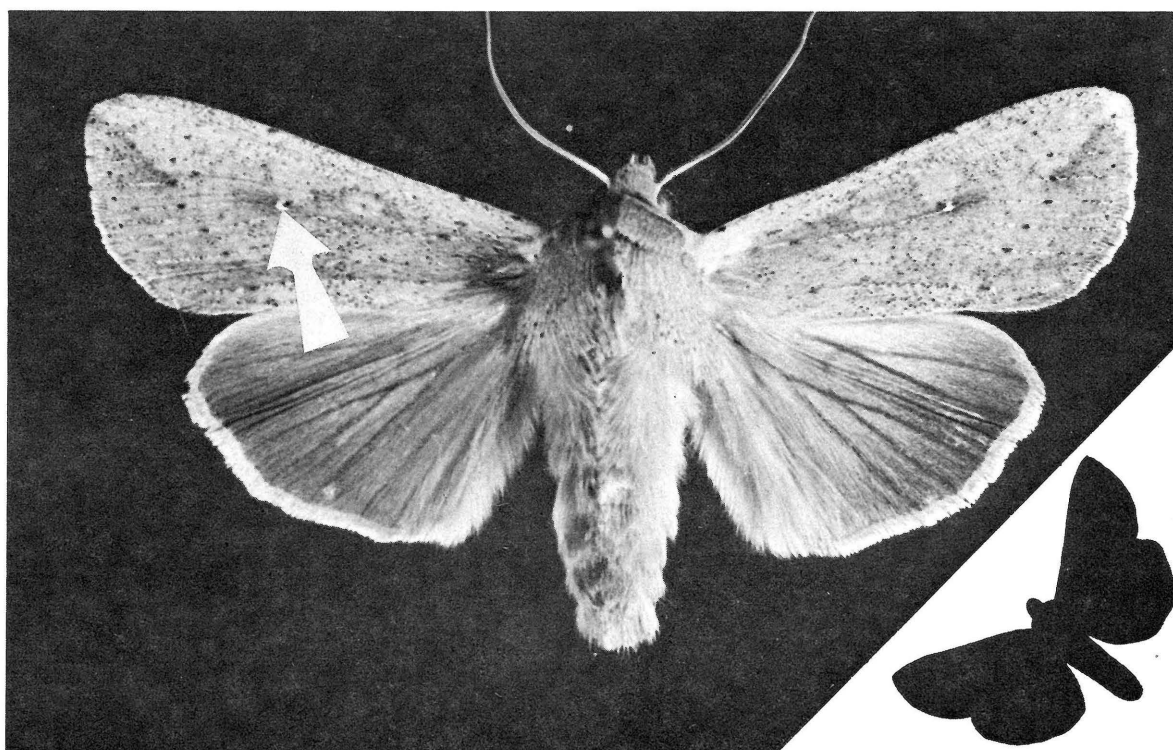


Figure 23.--Armyworm, *Pseudaletia unipuncta*

- 23A. Orbicular and reniform distinct, pale or dark brown outlined with pale scales (Figs. 24 and 25)..... 24
- 23B. Orbicular and reniform much less distinct (Figs. 26 and 27)..... 25
- 24A. A broad, pale band on outer edge of fore wing; claviform indistinct (Fig. 24)..... Mottled Gray Cutworm (dark phase)

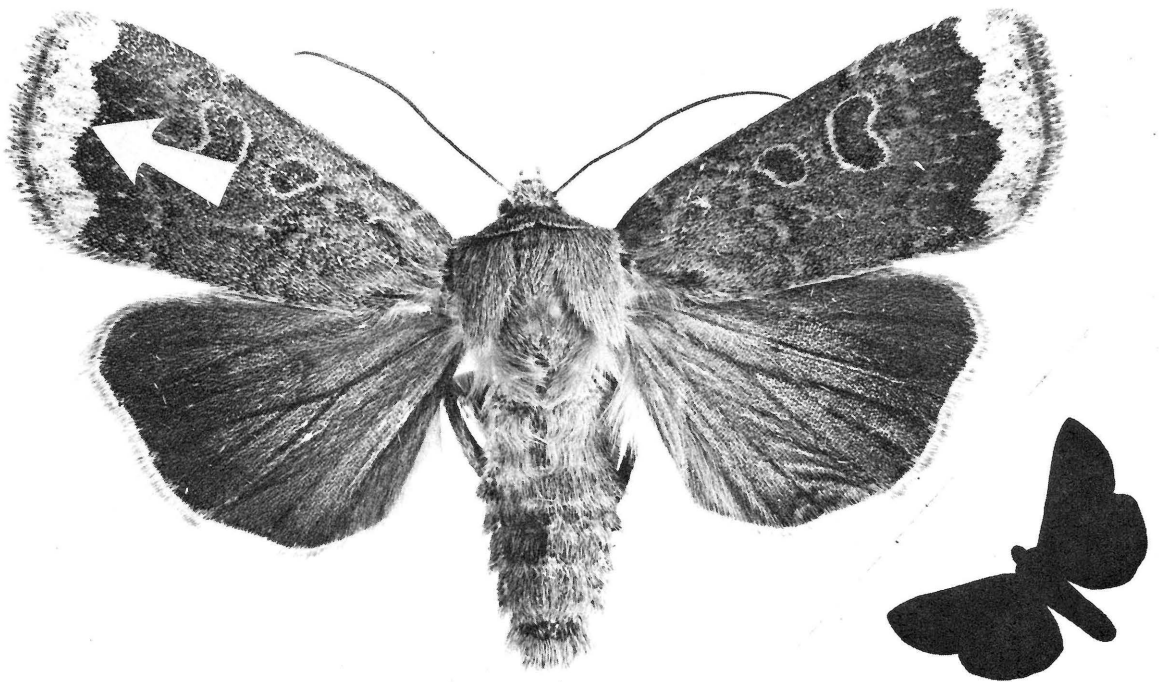


Figure 24.--Mottled Gray Cutworm, *Abagrotis alternata* (dark phase)

24B. Without a broad, pale band on outer edge of wing;
 claviform distinct (Fig. 25)..... Army Cutworm

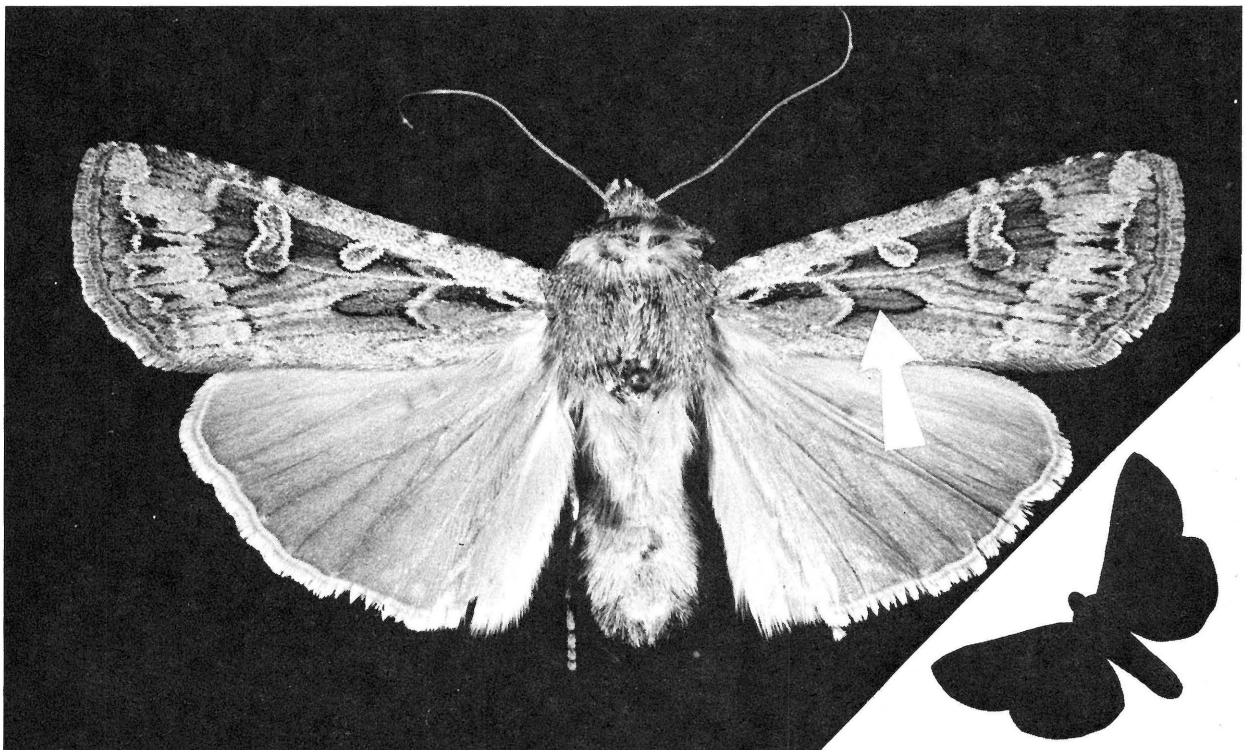


Figure 25.--Army Cutworm, *Euxoa auxiliaris*

- 25A. Claviform distinct (Figs. 26 and 27)..... 26
- 25B. Claviform indistinct (Figs. 28 to 32)..... 27
- 26A. Subterminal line consisting of pale dots, preceded by a
row of black wedges (Fig. 26)..... Clay-backed Cutworm

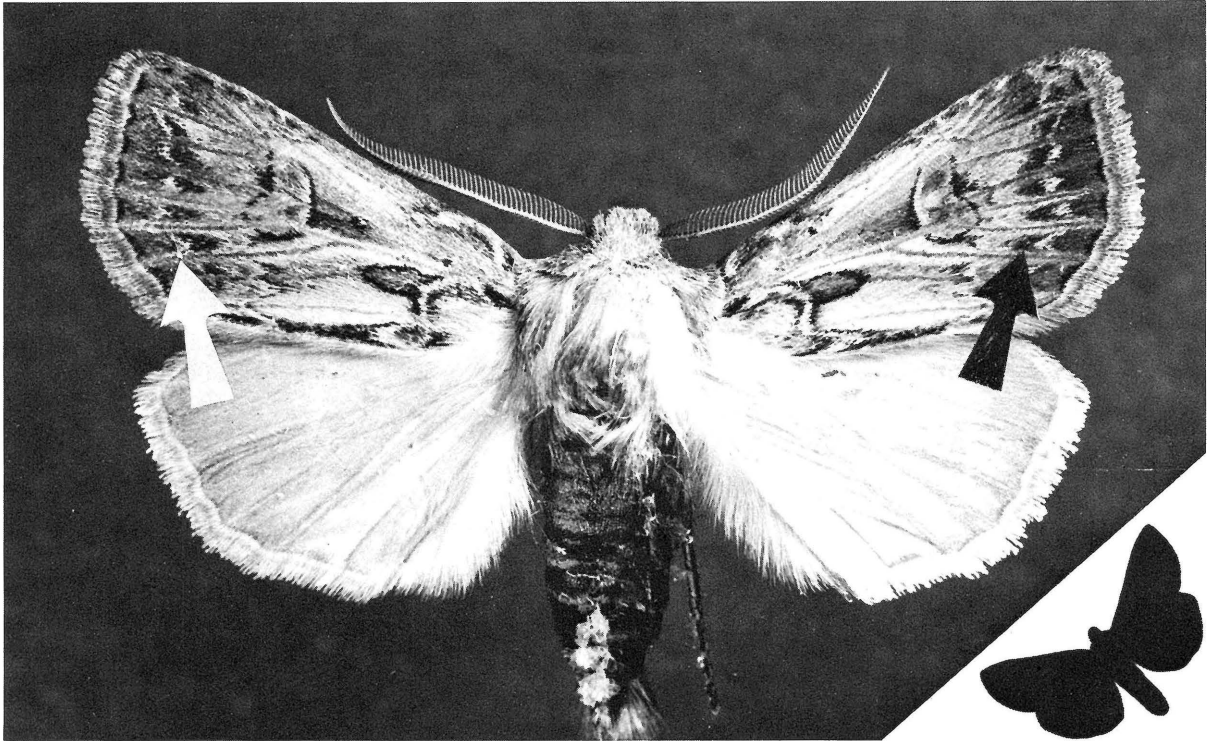


Figure 26.--Clay-backed Cutworm, *Agrotis gladiaria*

- 26B. Subterminal line consisting of only pale dots, not preceded by
a row of black wedges (Fig. 27)..... Dusky Cutworm

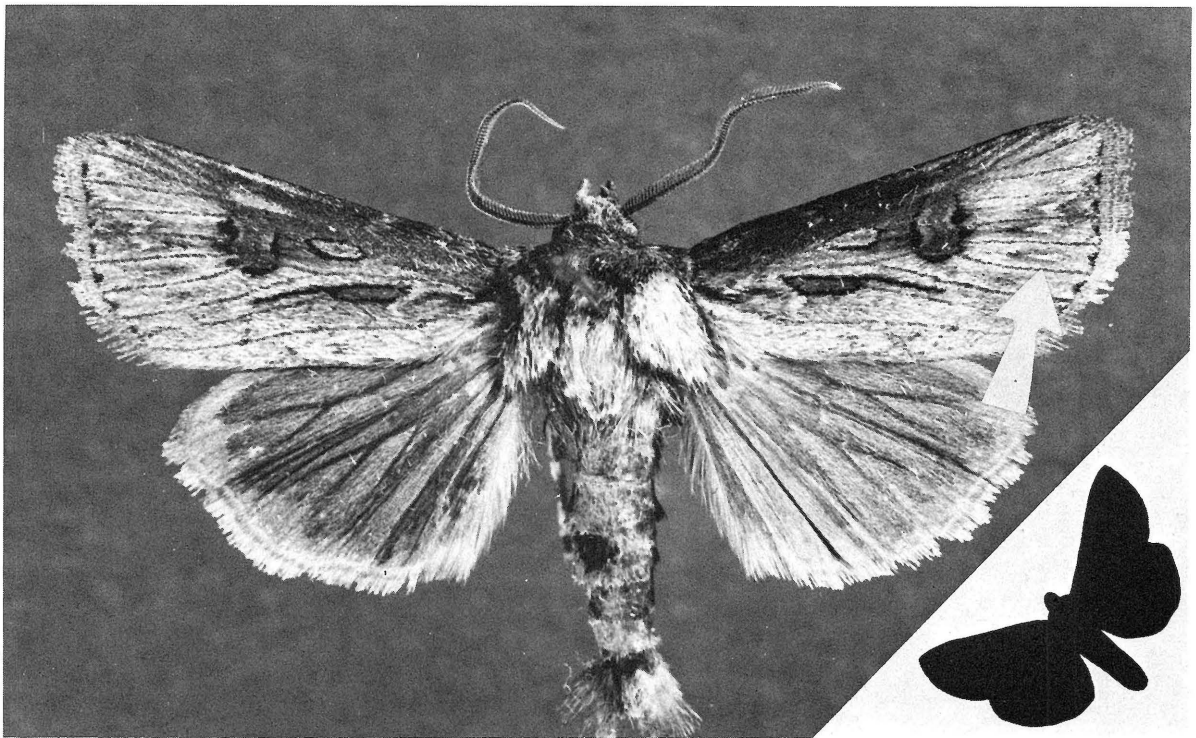


Figure 27.--Dusky Cutworm, *Agrotis venerabilis*

- 27A. Ground color dull ochre, olive, rosy, or purplish with a bronzy sheen; normal markings obscure; wingspread 34 to 50 mm.; moths found only from early September to early October (Fig. 28)... Bronzed Cutworm

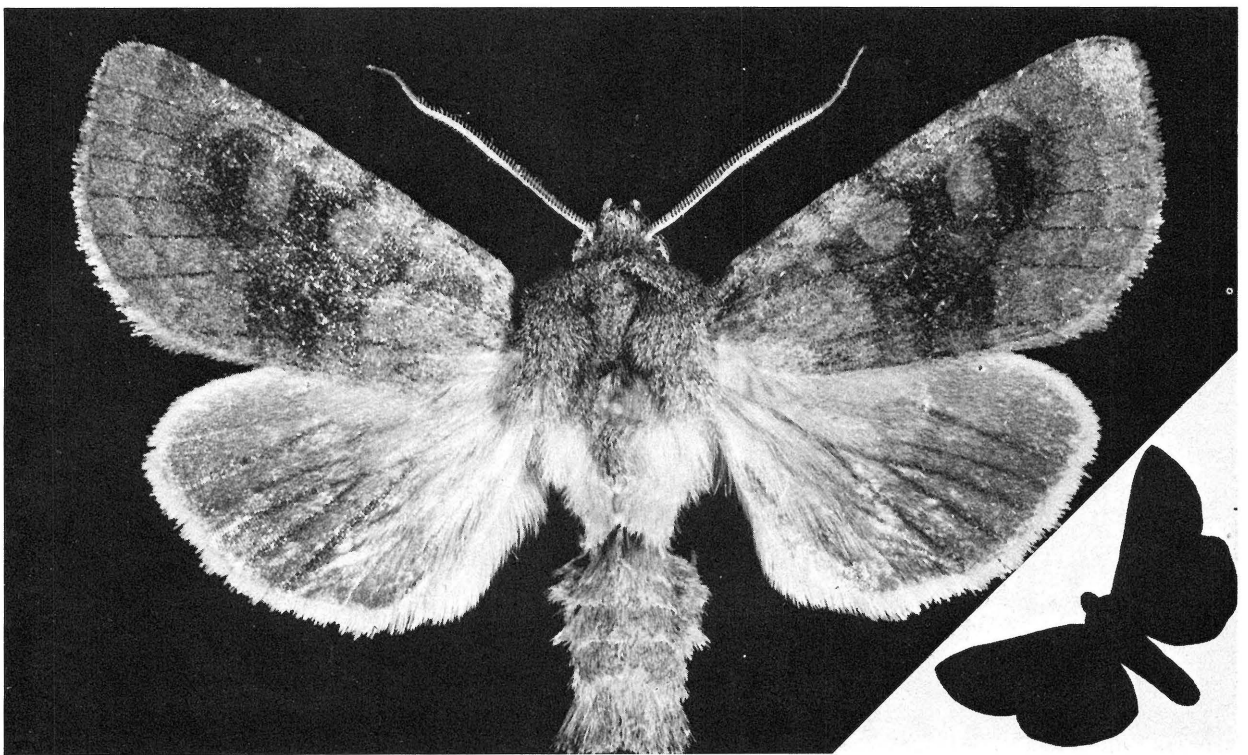


Figure 28.--Bronzed Cutworm, *Nephelodes minians*

- 27B. Ground color not as above, without a bronzy sheen..... 28
- 28A. Labial palpi elongated; color blackish or black and gray;
wingspread 25 to 28 mm. (Fig. 29)..... Green Cloverworm

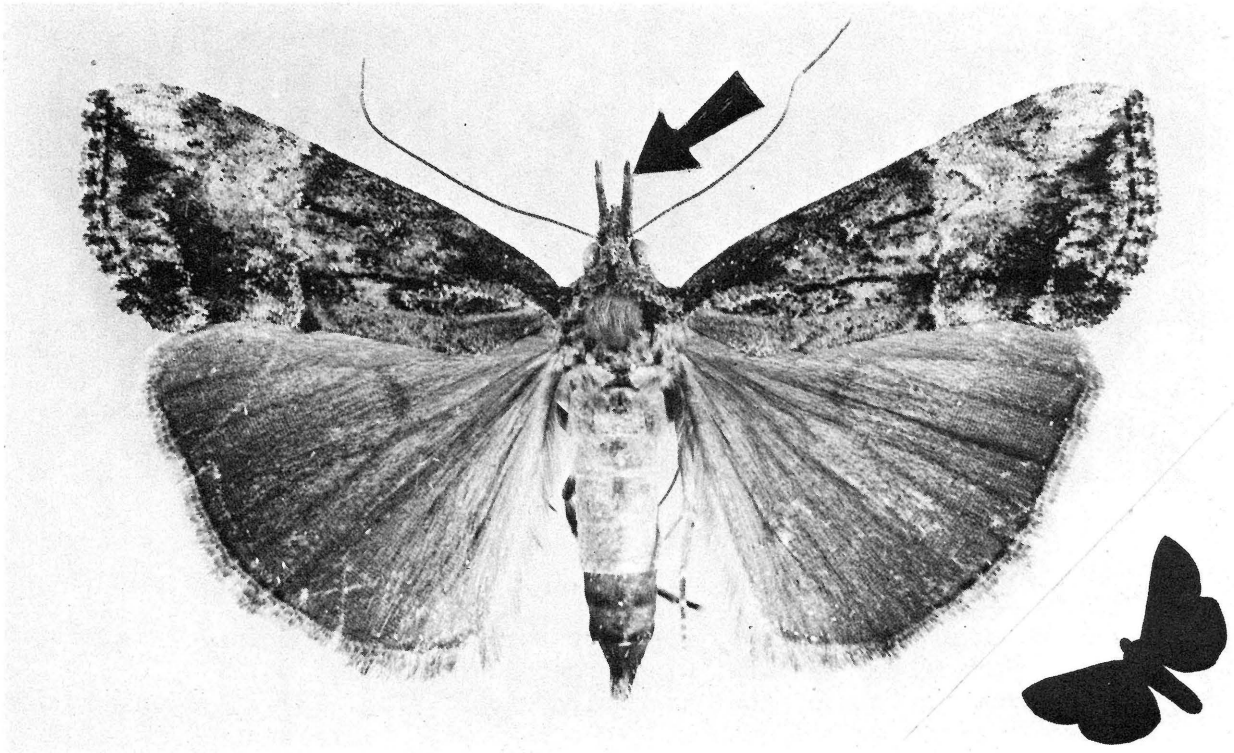


Figure 29.--Green Cloverworm, *Plathypena scabra*

- 28B. Labial palpi not elongated; color grayish, brownish, or
reddish-brown..... 29
- 29A. Subterminal line broad and light gray; ground color of
fore wings reddish-brown; orbicular and reniform irregular
and dominantly gray-green; wingspread 35 to 47 mm.
(Fig. 30)..... Yellow-headed Cutworm

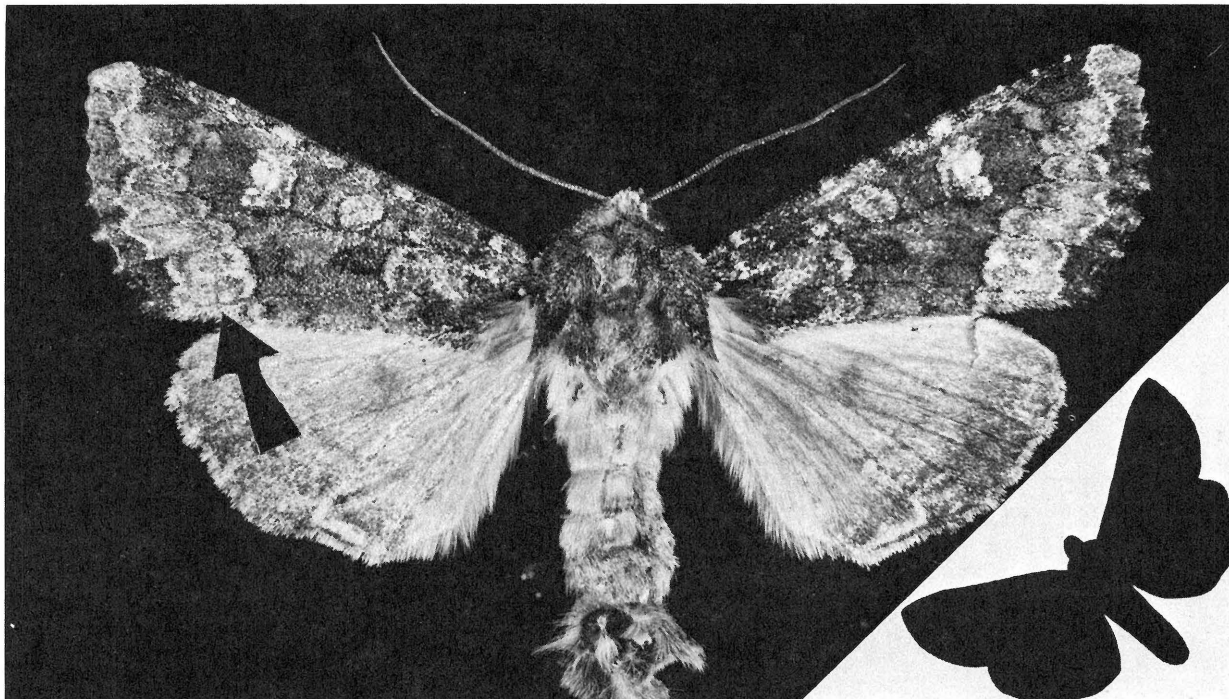


Figure 30.--Yellow-headed Cutworm, *Apamea amputatrix*

- 29B. Subterminal line not broad and light gray; ground color of fore wings not reddish-brown..... 30
- 30A. Ground color dark, brownish-gray; orbicular pale, oblique; reniform large, pale, and rectangular in shape (Fig. 31)..... Glassy Cutworm

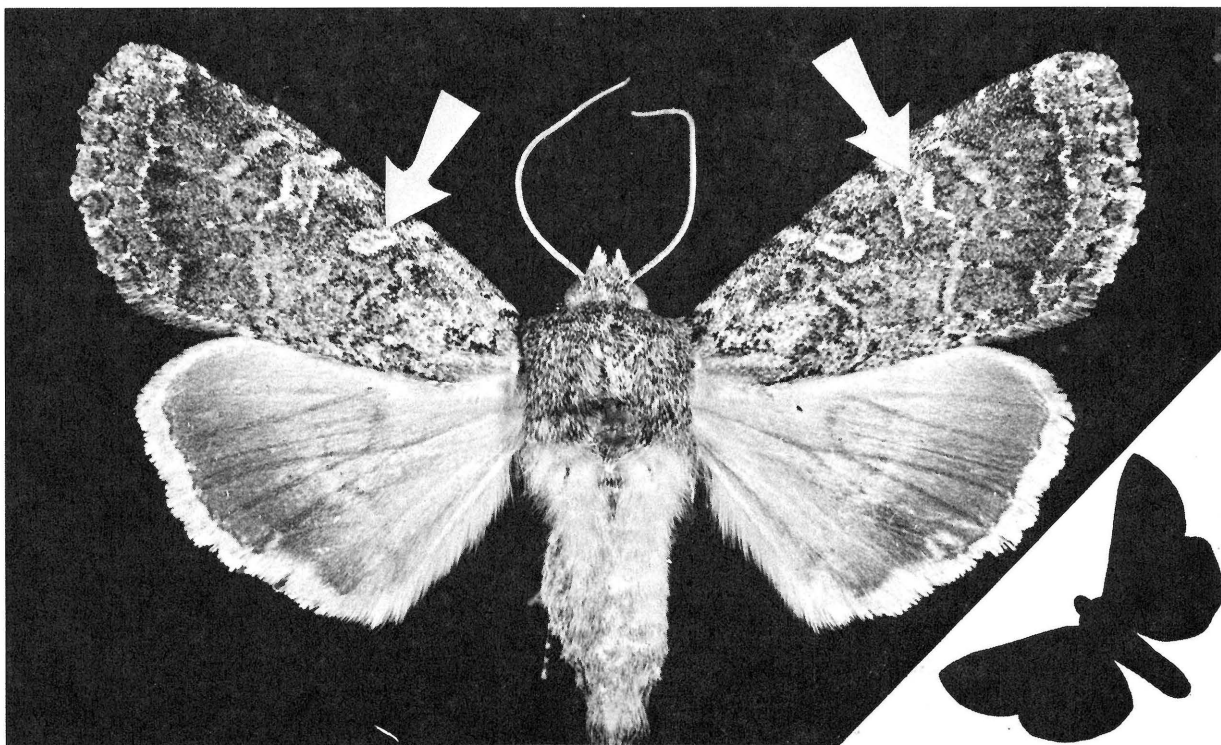


Figure 31.--Glassy Cutworm, *Crymodes devastator*

- 30B. Ground color not dark, brownish-gray; orbicular not oblique or absent; reniform not rectangular or may be absent..... 31
- 31A. Ground color purplish-brown; orbicular and reniform indistinct; antimedial, postmedial, and medial lines distinct only on the front edge of the wing (Fig. 32)..... Variegated Cutworm

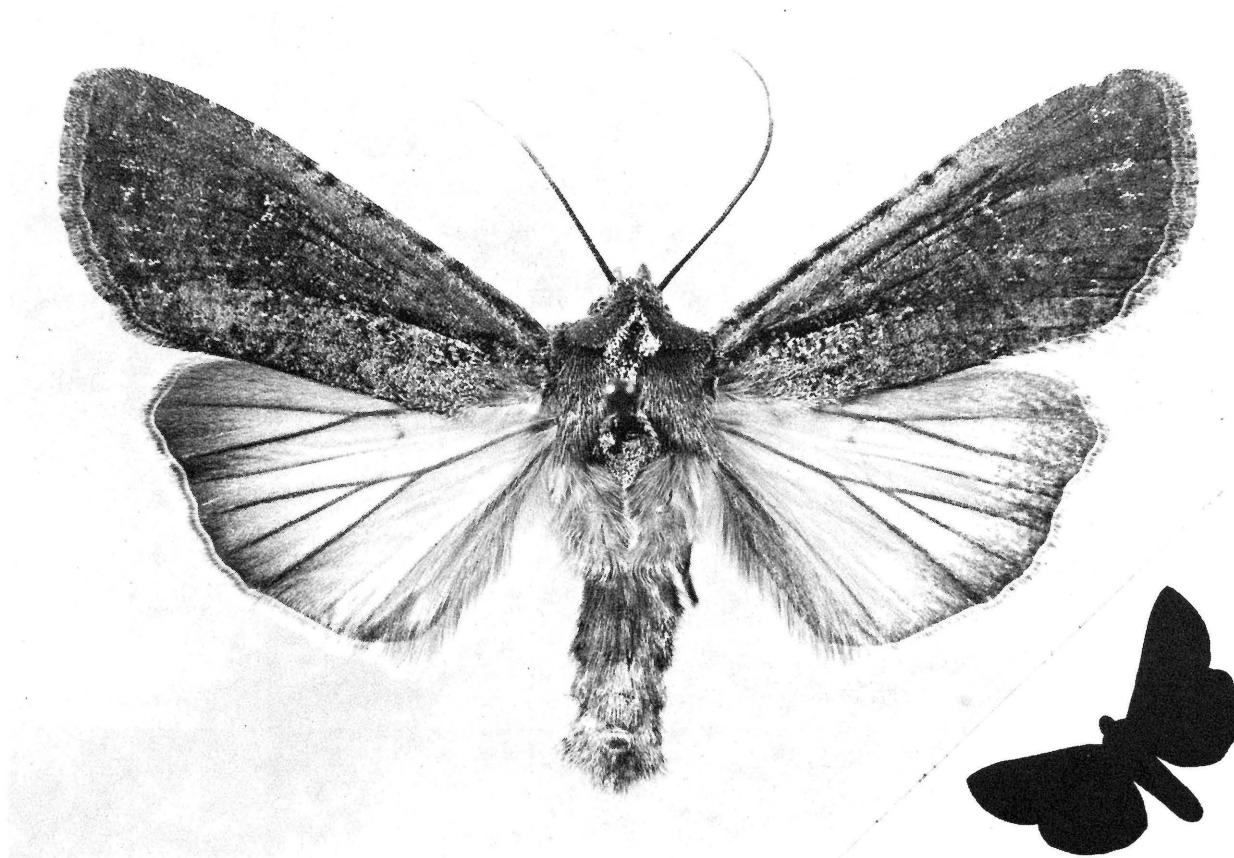


Figure 32.--Variegated Cutworm, *Peridroma saucia*

- 31B. Ground color pale-brownish or purplish-brown; orbicular and reniform distinct..... 33
- 32A. Ground color pale-brownish; line of blackish scales on inside of reniform; hind wing fuscous with a narrow border; wingspread 30 to 35 mm. (Fig. 33)..... Dark-sided Cutworm

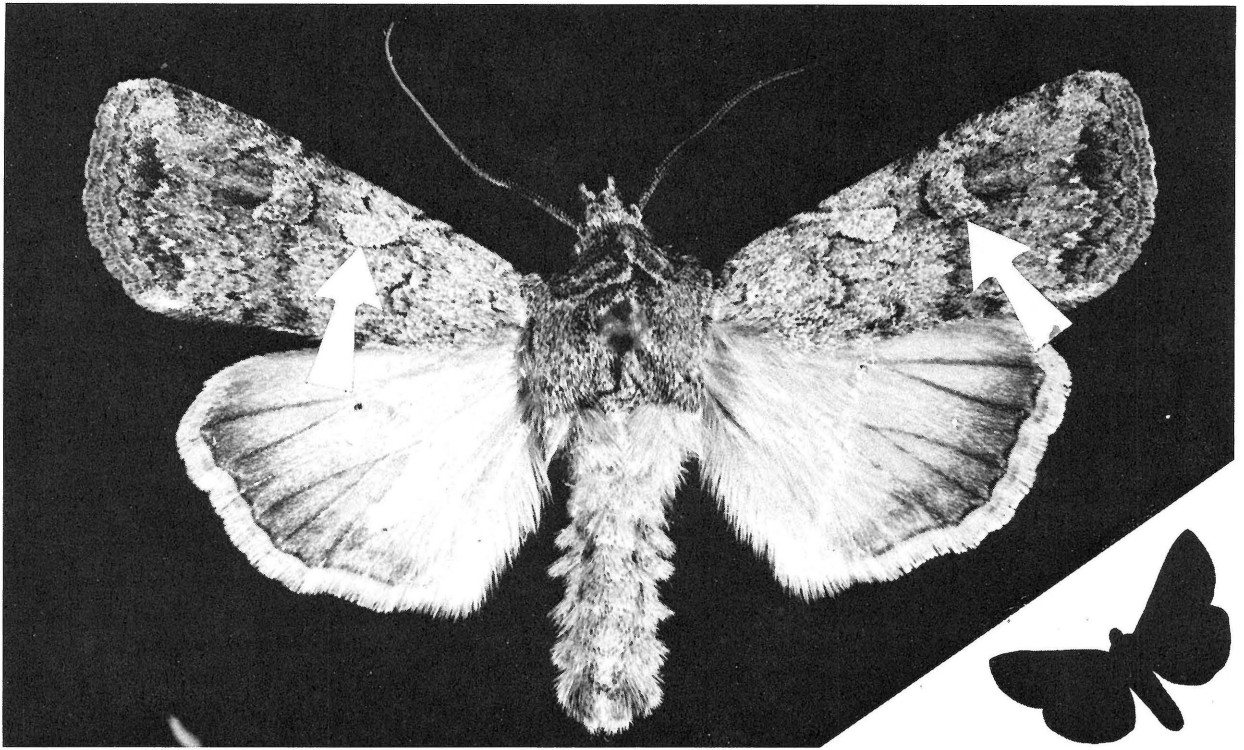


Figure 33.--Dark-sided Cutworm, *Euxoa messoria*

32B. Ground color purplish-brown; orbicular large and nearly round; reniform large and kidney-shaped; both markings faintly outlined in black; wingspread 32 to 45 mm. (Fig. 34)..... Variegated Cutworm

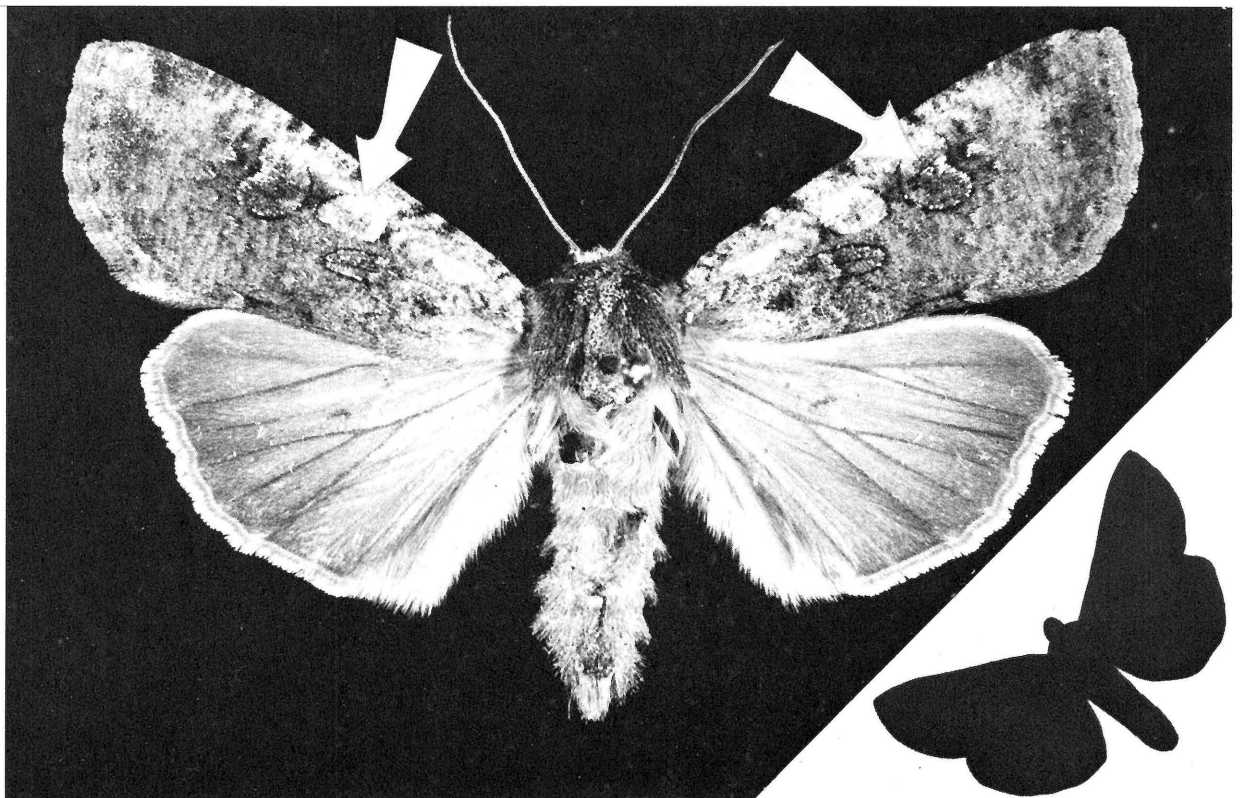


Figure 34.--Variegated Cutworm, *Peridroma saucia*

Detailed Descriptions of Moths Illustrated

The following section of this publication provides more detailed and technical information for verification or rejection of a species identified by sight or by using the key.

For each moth species, the wing pattern of both wings and the wingspread range are given. The seasonal distribution is also provided and in certain cases will assist in identification, particularly those species which appear only in autumn.

A very brief description is given for the full-grown larva or cutworm stage of each species. This will help the reader to recognize a given caterpillar following large flights of moths which may indicate outbreaks.

The host range is given so that scouts will know where to look for larvae if an outbreak is suspected.

Finally, the economic importance of each species is given to provide scouts with a general idea of what to expect from a particular armyworm, cutworm, or looper.

ARMY CUTWORM

Euxoa auxiliaris (Grote)

Moth description: The variation in wing pattern is extreme and at least four color forms are recognized. Usually it is gray-brown with a prominent orbicular and reniform. Normally there is a narrow, black basal dash. Antimedial line consists of two large waves. Postmedial line excurved above and nearly straight below. The area between the antimedial and postmedial lines a darker brown than the area beyond the postmedial line. Orbicular a broad, oblique ellipse outlined in pale brown scales. Reniform thick, usually with a blackish shade in the lower part. Claviform large, normally strongly outlined in black. Subterminal line moderately irregular and preceded by a series of black wedges. Hind wing grayish-brown, darker on the veins with a whitish fringe. A comparatively large noctuid with a wingspread of 40 to 45 mm. (Fig. 25)

Seasonal distribution: One generation per year in the North Central states. According to studies in Nebraska, the moths emerge from May to June and then migrate to the Rocky Mountains. In September the moths return to the Great Plains, aided by the winds of the Pacific cold fronts. Mating is believed to occur in the mountains just before the return migration.

Larval appearance: Pale greenish-gray to brown with the back pale-striped and finely mottled with white and brown but without prominent marks. The skin texture consists of fine, close-set, irregular granules.

Host plants: The larvae feed on a variety of plants, although winter wheat and alfalfa are the principal crops damaged.

Economic importance: The species is of major economic importance in the semi-arid regions of the Great Plains.

ARMYWORM

Pseudaletia unipuncta (Haworth)

Moth description: Fore wing dull brown, often with a reddish tint and dusted with fuscous scales. Orbicular and reniform somewhat paler and redder but not distinct. The reniform with a conspicuous white dot at its lower angle and surrounded by a narrow border of blackish scales. Postmedial line reduced to a row of small black dots. Hind wing brownish-gray with veins covered with darker scales. Wingspread 35-45 mm. (Fig. 23)

Seasonal distribution: Three generations. Appearing in light traps from late March to the middle of November. Peak flight of the first generation occurs in May and the second generation peak occurs in July. The third generation peak may occur in August, September, or even October.

Larval appearance: Normal phase dull yellow-brown or greenish with a fine, white dorsal stripe. A prominent, orange subspiracular stripe unmottled and edged with white.

Host plants: Grasses, small grains, and corn.

Economic importance: The armyworm is of major importance, frequently occurring in outbreaks on wheat, oats, corn, barley, and rye. At times the larvae disperse from small grains in tremendous numbers which give the insect its common name.

BLACK CUTWORM

Agrotis ipsilon (Hufnagel)

Moth description: Basal two-thirds of fore wing dark; the outer third much paler. Orbicular tear-shaped. Reniform with a distinct black wedge or dagger-shaped, black marking on outer margin. Claviform small, dark, oblong, and filled with dark scales. A zig-zag line of pale scales on dark background in subterminal area. Male antennae "feathered"; female antennae filiform. Wingspread 30 to 42 mm. (Fig. 10)

Seasonal distribution: Appears in light traps throughout the season from late March to early November. Three generations; the first peaking in mid-May, the second in mid-July, and the third in August or September.

Larval appearance: General color pale gray to black without distinct stripes or markings. Skin granulose and hair-bearing tubercles heavily pigmented with black. Also known as the "greasy" cutworm or "overflow worm."

Host plants: This cutworm has an extremely wide range of hosts but seedling corn and vegetables with edible roots or tubers are most seriously damaged. It also feeds on grasses and weeds.

Economic importance: This species is of major economic importance in corn production. Outbreaks occur infrequently, particularly in river valley situations.

BRISTLY CUTWORM

Lacinipolia renigera (Stephens)

Moth description: Ground color of fore wings dark grayish-brown. In fresh specimens there are patches of green scales in the middle of the wing at the anti-medial line, at the postmedial line, and in the reniform. Orbicular obscure but normal. Reniform usually prominent with a central, green bar, a white crescent around its lower end, and some white scaling around the upper part. Claviform black, short, and contrasting. Hind wing in males white and in females dark gray. In the form *infecta* Walker, the white in the reniform is lacking. Wingspread 20-25 mm. (Fig. 19)

Seasonal distribution: Two generations. The first generation occurs from the latter part of May to the end of July, with a peak in June. The second generation of moths is active from the last of August to the end of October, with a peak in September.

Larval appearance: Ground color dull grayish-brown with prominent lateral stripes. A paler dorsal design of inconspicuous, dark, diamond-shaped markings. The prominent enlarged setae give the species its common name.

Host plants: A wide range of hosts including fruit and vegetable crops, corn, clover, tobacco, and weeds.

Economic importance: This species is of minor importance. Even though this is one of the most abundant species in the region, it is seldom reported as a pest since it feeds primarily on non-economic plants or upon hay, grasses, and legumes which do not ordinarily show damage.

BRONZED CUTWORM

Nephelodes minians Guenée

Moth description: Ground color of fore wing variable and may be dull ochre, olive, rosy, or purplish when fresh and changing to uniform dull brown in preserved specimens. Medial area darker and olive-tinted. Antimedial line double and curved outwards. Postmedial line double and sinuous. Orbicular and reniform large diffused patches of the paler ground color. Hind wing dull grayish-brown, frequently with pink fringe. Wingspread 34-50 mm. (Fig. 28)

Seasonal distribution: One generation. Moths appear in light traps from early September to early October, with peak flight in mid-September.

Larval appearance: Ground color dull brown. Easily recognized by broad, yellowish dorsal, subdorsal, and subspiracular stripes. Cervical shield and anal plate glossy brownish-black, with creamy dorsal and subdorsal stripes conspicuous.

Host plants: Corn and grasses.

Economic importance: Frequent outbreaks of this pest occur throughout the region on turf, pastures, and corn.

BROWN CUTWORM

Rhynchagrotis cupida (Grote)

Moth description: Ground color of fore wing grayish or brownish, varying from purplish-gray to chocolate. Antimedial and postmedial lines faint, dark, and double, prominent at costa. Subterminal line luteous, sometimes punctiform or obsolete, almost always preceded by a dark, triangular marking extending to the costa. Orbicular small and rounded, covered with scales, slightly darker than ground color. Reniform moderate in size and even-colored as in orbicular. Hind wing fuscous; fringes tricolored. Wingspread 32-40 mm. (Fig. 22)

Seasonal distribution: One generation. Moths active from the latter part of June to the end of October, with a peak in July.

Larval appearance: Head pale brown, reticulated with black and with black submedial arcs. Dorsal area of body light red-brown finely flecked with gray. A segmental series of elongated, black markings on dorsum of abdomen becomes more distinct and wedge-shaped on seventh and eighth abdominal segments.

Host plants: Apple, grape, and peach.

Economic importance: Only one outbreak of the species has been reported and that occurred in 1924 in Ohio.

CABBAGE LOOPER

Trichoplusia ni (Hübner)

Moth description: Fore wing without any gloss, heavily shaded and mottled with two shades of gray and blackish zig-zag stripes. Stigma normally a short oblique U next to an oval spot. Some silver in the outline of the very oblique orbicular and broad reniform, which are indistinct. Subterminal line with two, sharp, inward teeth in middle of wings preceded by black dashes. Hind wings dark brown, basally paler between veins. Male with a comb or perpendicular spines on basal portion of inner side of hind metatarsus. Wingspread 28 to 35 mm. (Fig. 4)

Seasonal distribution: Light trap catches are difficult to interpret; however, it appears there are two generations each year. The first flight occurs in late June or July and a much larger second flight occurs in late July, August, or early September.

Larval appearance: Grass-green with double dorsal white stripe, faint subdorsal, and conspicuous spiracular stripe. Functional, ventral prolegs on fifth, sixth, and anal segments, which make it crawl with a looping motion.

Host plants: Feeds primarily on cabbage, cauliflower, broccoli, kale, and brussels sprouts, but also damages asparagus, beet, lettuce, pea, parsley, rutabaga, potato, and tomato. Also a pest of greenhouse tomato, carnation, and many other ornamental plants.

Economic importance: A major pest of vegetables.

CELERY LOOPER

Anagrapha falcifera (Kirby)

Moth description: Ground color of fore wings light gray (spring generation) or dark brown (summer generation). Stigma a heavy curved bar with rounded, outer end and a short, silver spur at upper end of base. A fine, silvery-white, curved line extending from stigma to hind edge of fore wing. Hind wing pale brown with broad, dark brown border; veins and postmedial line contrastingly darker brown. Wingspread 35 to 40 mm. (Fig. 2)

Seasonal distribution: Appears in light traps from May to September, with stragglers in October and November. Apparently two generations, the first peaking in late May or early June and the second in July or August.

Larval appearance: Translucent green with a double dorsal stripe, narrow subdorsal, and broad spiracular white longitudinal stripes. Setae black. Spiracles white, ringed with black.

Host plants: Bean, beet, cabbage, lettuce, grass, and low weeds.

Economic importance: Of minor importance on vegetables.

CLAY-BACKED CUTWORM

Agrotis gladiaria (Morrison)

Moth description: Fore wing brownish-gray with the costal area more grayish. Antimedial line excurved in fold, double, extending in a long tooth above inner edge, normally reaching the postmedial line and sometimes represented by a black dash. Postmedial line cut by the markings along the veins. Subterminal line represented by a row of pale dots, preceded by black wedges. Terminal line black and broken. Veins mostly fine, black, and accompanied by double pale streaks. Orbicular very small, sometimes merely a pale dot. Reniform large, especially in lower half, where it may be confused with the vein lining. Hind wing pale gray-brown in males; whiter in females. Wingspread 28-35 mm. (Fig. 26)

Seasonal distribution: One generation. Appears in light traps from the first of September to the middle of November, with a peak in late September.

Larval appearance: Ground color pale, translucent, grayish, with a broad, contrasting, yellowish-brown dorsal stripe. Head gray-brown with bars on front of face.

Host plants: Clover, corn, tobacco, vegetables, strawberry, blackberry, raspberry, and various weeds.

Economic importance: Although this species is not frequently a pest of economic importance, local outbreaks of serious proportions have occurred in many states east of the Mississippi River.

CLOVER LOOPER

Caenurgina crassiuscula (Haworth)

Moth description: This species is similar to the forage looper and the males and females are not strikingly different. It differs from the forage looper in that the inner dark brown bar and the outer bar join and the loop which is formed touches the hind margin of the front wing. Wingspread 28 to 35 mm. (Fig. 8)

Seasonal distribution: Appears in light traps throughout the season from April to October, with two or three overlapping generations. Most abundant in May and again in July.

Larval appearance: General color reddish-brown and without the very distinct, bright yellow stripe on the sides of the back as in the forage looper. The dark shades on incisures on first and third abdominal segments distinct.

Host plants: Clover, lupine, grasses, and storks bill (*Erodium*).

Economic importance: This species is of no known importance in the North Central region.

CORN EARWORM

Heliothis zea (Fabricius)

Moth description: Body buff to tan. Fore wing pale buff to dark brown. Post-medial line wavy when distinct. Orbicular a blackish dot. Reniform, when distinct, vague and blackish. Hind wing buff with a broad diffuse border. Underside cream with the blackish spot representing the reniform, orbicular dot, and heavy sub-terminal shading. Wingspread 35 to 40 mm. (Fig. 6)

Seasonal distribution: Appears in light traps from the middle of August to October, with stragglers into November. One flight each season in the north peaking usually in September, sometimes in October. The species probably breeds continuously in the south and is believed to work its way north by stages from the Gulf of Mexico area.

Larval appearance: The ground color varies greatly from a light greenish-yellow to deep brown or nearly black. The dark stripes on the dorsal aspect are due in part to the presence of numerous, pigmented microspines. A magnification of about 250 times is required to see these microspines. Hair-bearing tubercles enlarged, especially the side ones on first segment of abdomen. Head brown. True legs, cervical shield, and tubercles black.

Host plants: Edible portions of corn and tomato and many other plants. The larvae feed on both field and sweet corn on the kernels near the end where the silks emerge.

Economic importance: The corn earworm is of major importance, particularly on sweet corn, in the North Central region. The greatest damage is done when sweet corn is silking and the larvae burrow at the tip of the husk, preventing pollination and introducing pathogens into the ear. Ground cherries, tomatoes, beans, and peppers are also attacked.

DARK-SIDED CUTWORM

Euxoa messoria (Harris)

Moth description: The wing patterns in this species are extremely variable, making identification very difficult. Fore wing usually light, powdery, grayish-brown. Orbicular and reniform filled with ground color and finely outlined in black. Claviform usually distinct. Antimedial and postmedial lines double and wavy. Hind wing grayish-white and darker on the outer margin and on veins. Wingspread 30 to 35 mm. (Fig. 33)

Seasonal distribution: One generation. Appears in light traps in August and September.

Larval appearance: Dull gray, faintly striped but with the sides noticeably darker than the back. More specifically the "dark-sided" refers to the more heavily pigmented, broad supraspiracular stripe.

Host plants: Deciduous tree fruits, vegetables, field crops, tobacco, flowers, and ornamentals.

Economic importance: The dark-sided cutworm is of minor importance because outbreaks seldom occur and when they do large areas apparently are not involved. Probably most important as a pest of flue-cured tobacco.

DINGY CUTWORM

Feltia ducens Walker

Moth description: Costa and subterminal area light gray, frosted with whitish. Orbicular V-shaped, open to costa, pale gray. Reniform elliptical, partly filled with reddish or tawny brown. Base of submedial area blackish, crossed by an inwardly oblique, white fragment of the basal line. Claviform very large, contrasting, filled with deep brown, extending out almost opposite reniform. Postmedial area with black wedges between veins ending abruptly in a line which represents the postmedial line. Smaller black wedges between veins in terminal area. Hind wing in male whitish with a broad, dark border on outer margin; in female uniform dark gray. Wingspread 26 to 33 mm. (Fig. 20)

Seasonal distribution: One generation. Moths first become active in early August and fly until mid-October, with peak activity in September.

Larval appearance: Head shining, pale brown and reticulated with dark brown. Body fuscous, mottled with cream. Cervical shield dark brown, with paler dorsal and subdorsal stripes. Dorsal area pale with traces of oblique shading.

Host plants: Alfalfa, clover, vegetables, grasses, tobacco, wheat, apples, and raspberries.

Economic importance: This species is probably of greater economic importance than the literature would indicate. Because it is difficult to recognize in the larval stage, it is most often reported simply as "a cutworm."

DUSKY CUTWORM

Agrotis venerabilis Walker

Moth description: Body dark brown, head and collar darker; thorax paler and grayer, shading into whitish at the shoulders in the male. Ground color of wings variable, from brownish-gray to nearly black. In well-marked specimens, fore wing brownish-gray with fine black lines on veins and brownish shades between veins; shading into black towards costa and outer margin. Orbicular a horizontal ellipse, nearly or actually touching the reniform, which is large, broad, and dark brown. A small, black wedge at outer edge of reniform. Claviform elongated and narrow, filled with gray scales. Hind wing dark brownish-gray, paler between veins. Female with less contrasting pattern than males. Wingspread 30-40 mm. (Fig. 27)

Seasonal distribution: One generation. Moths appear in light traps from mid-September to mid-October, with a peak flight the last of September.

Larval appearance: Head pale brown, sparsely reticulated, with heavy, black submedial arcs. Dorsal area paler than lateral. Traces of pale lines middorsally and subdorsally. Two pale lines in suprspiracular area and a band of flecks sub-ventrally. Spiracles black.

Host plants: Alfalfa, clover, corn, oats, tobacco, grasses, and vegetables.

Economic importance: This species is of minor importance in this area. No outbreaks have been reported.

FALL ARMYWORM

Spodoptera frugiperda (J. E. Smith)

Moth description: The males appear much different from the females in this species. In general the males are very similar to the yellow-striped armyworm, while the females lack the prominent diagonal markings.

Male: The prominent, pale, diagonal marking over the orbicular not extending below the cell but extending through to the costa. The white spot below the reniform not distinctly forked. The subterminal line farther from the margin, and without the distinct contrast between gray-brown and blue-gray areas as in the male *ornithogalli*. Hind wings whitish, without black veins, and with a violaceous tinge. (Fig. 14)

Female: Fore wing dull gray-brown with no contrasts. Orbicular a small oblique, oblong; inconspicuous. Postmedial line double and easily traced. Wingspread 25 to 40 mm. (Fig. 15)

Seasonal distribution: Appears in light traps as early as the middle of July and extending to mid-November, with peak flight activity in August and September.

Larval appearance: Dark brownish, striped, with paler back and with enlarged tubercles bearing setae. Tapering from rear to front; posterior segments larger.

Host plants: A general feeder on low plants, especially grasses.

Economic importance: In the North Central states, greatest damage is done to corn and the injury resembles that of the corn earworm. Young winter wheat is also frequently attacked in the fall.

FORAGE LOOPER

Caenurgina erechtea (Cramer)

Moth description: Males and females have different patterns on their wings.

Males: Fore wing with two contrasting dark brown to black bars, the lower portions of these bars at least completely outlined, not touching the hind margin or each other. Fore wing pale buff with two or three dark brown markings, the two mentioned above and a faint subterminal line preceded by two black spots at fore edge of wing. Wingspread 30 to 35 mm. (Fig. 9)

Females: Fore wing darker brown without two contrasting dark brown bars, but their outline sometimes traceable as a fine pale line. Subterminal line usually consisting of a series of dark dots, paler toward the fore edge of the wing. Wingspread 35 to 40 mm. (Fig. 7)

Seasonal distribution: Appears in light traps throughout the season from April to October. There are two to three generations each year but these overlap to such an extent it is difficult to define generations. Winter is passed in the pupal stage.

Larval appearance: General color varying from shades of green through brown to almost black. There is a great deal of variation in markings and color intensity, even among the offspring from one female. There are prominent pale brownish or yellowish stripes down the middle and sides of the back. Spiracles yellow or white. Skin smooth. Head with a stripe over the ocelli. Mandible with two, small obscure teeth.

Host plants: Clover, lupine, alfalfa, grasses, and ragweed.

Economic importance: The forage looper is of minor importance throughout the North Central states.

GLASSY CUTWORM

Crymodes devastator (Brace)

Moth description: Ground color of fore wing dark gray with a mixture of light gray and blackish markings and areas. Antimedial, postmedial, and subterminal lines double and distinct on the costal margin. The subterminal line is more obvious, paler, and irregular. Orbicular oblique and ellipsoid. Reniform large and distinct with pale outlines. Hind wing dark clay colored with darker gray-brown scales on wing veins and outer margin. Wingspread 30 to 35 mm. (Fig. 31)

Seasonal distribution: One generation. Moths in flight from late June to early September.

Larval appearance: Head and neck shield reddish brown. Body pale, translucent, greenish.

Host plants: Vegetables, small grains, tobacco, grasses, and corn.

Economic importance: This is principally a sod-infesting species which attacks roots and basal stems. If corn or vegetables follow sod, meadow or pasture problems can develop.

GREEN CLOVERWORM

Plathypena scabra (Fabricius)

Moth description: The males and females have different wing patterns.

Males: The males are generally much larger than the females. Wingspread 30 to 33 mm. The fore wing is blackish with the outer portions of the wing only slightly paler. Males have shorter palpi.

Females: The blackish ground color of the wing is mottled with shades of gray and brown. There is some white scaling outside the postmedial line, especially just beyond it. Postmedial line black, preceded by brownish and followed by whitish areas. Hind wing dark brown or dark gray. Wingspread 25 to 28 mm. (Fig. 29)

Seasonal distribution: Two to three generations each year. Apparently the moths fly throughout the year and the moth is the overwintering stage.

Larval appearance: The caterpillar is green, with fine, longitudinal, whitish lines which fade out in the last instar.

Host plants: Clover, alfalfa, soybeans, strawberry, garden beans, peas, corn, and various weeds.

Economic importance: This species is a major pest of soybeans in some parts of the North Central region.

MOTTLED GRAY CUTWORM

Abagrotis alternata (Grote)

Moth description: Fore wing ground color dull, light brown to dull, dark brown; variable; dotted with blackish scales. Antimedial and postmedial lines blackish and punctiform. Reniform and orbicular large, distinct, darker than ground color, and outlined in pale scales. Subterminal and terminal areas much paler than rest of wing. Hind wing dark, fuscous; veins outlined in dark brown; fringe tricolored. Wingspread 34 to 40 mm. (Figs. 21 and 24)

Seasonal distribution: One generation. Appears in light traps from late June to the middle of October, with a peak flight in July.

Larval appearance: Head pale, reticulated with brown and with black submedial arcs. Body heavily mottled with dark brown with dark, oblique dorsal shades. A prominent, broken, white mesal stripe with whitish markings on sides to form diamond-shaped, white markings on dorsal areas.

Host plants: A very general feeder on fruit, forest and shade trees, deciduous shrubs, and vegetables.

Economic importance: Frequently causes damage in Michigan to orchard crops and in neighboring states to vegetables.

PLANTAIN LOOPER

Plusia precatationis (Guenée)

Moth description: Ground color of fore wing normally dark brown, mottled, partly glossy, with bronze and violet areas in oblique light. Basal line white, narrow, distinct. Stigma divided into two parts or whole; sometimes a short silver spur at upper end of base. An indistinct, very fine, silvery-white, curved line extends from stigma almost to hind edge of fore wing; sometimes absent. Hind wing dark, brownish-gray with darker gray veins and outer third of wing darker. Wing-spread 33 to 38 mm. (Fig. 3)

Seasonal distribution: Appears in light traps from May to October, with stragglers in November. Apparently two or three generations each year; the first peaks in May or June, the second in July, and the third in August or September.

Larval appearance: Translucent green with white medial, subdorsal, and subspiracular white stripes. Head with black side stripes.

Host plants: Plantain and other low-growing vegetation.

Economic importance: Of no economic importance.

SPECKLED CUTWORM

Polia subjuncta (Grote and Robinson)

Moth description: Ground color of fore wings dull, dark purplish-gray, slightly shaded with rust. The orbicular, reniform, and subterminal areas paler. Orbicular prominent, round, oval, or almost square, partially or fully outlined in black scales. Reniform large, upper and outer sections filled with pale brown scales, remainder with grayish scales; outlined in black. A heavy, wedge-shaped, black basal dash and a median dash extending from the antimedial to postmedial lines. Subterminal line conspicuous, whitish, and defined with black on both sides. Hind wing brownish-gray with grayish wing veins. Wingspread 30 to 35 mm. (Fig. 17)

Seasonal distribution: Two generations each year. First generation in flight from first of May to last of June. Second generation of moths appears from late July to late September.

Larval appearance: Ground color greenish, mottled with brown. Faint, oblique, dark subdorsal bands and a curved transverse band on the eighth abdominal segment. Spiracles white.

Host plants: Cabbage, corn, and blueberry.

Economic importance: Occasionally damaging as a climbing cutworm but of minor importance in the region.

SPOTTED CUTWORM

Amathes c-nigrum (L.)

Moth description: Head and thorax dark gray, almost blackish, basal half or more of collar and shoulders contrastingly pale. Fore wing dark brown, the antimedial and terminal areas contrastingly blackish. Subterminal costal spot triangular and conspicuous. Orbicular pinkish, triangular, large, and conspicuous. Reniform moon-shaped, nearly all one color; its basal half somewhat reddish. Hind wing gray shading to darker grayish-brown in veins and at margin. Wingspread 30 to 40 mm. (Fig. 5)

Seasonal distribution: Appears in light traps from May to October, with stragglers in November. Two generations. The first generation peaks in early to mid-June and the second in late August or September.

Larval appearance: Head reticulated with brown. Ground color dull gray-brown with a broad subspiracular stripe. A series of black trapezoidal wedges on posterior segments, growing larger anally, the last wedge on eighth abdominal segment.

Host plants: Vegetables, deciduous tree and small fruits, cereal crops, tobacco, and many other crops.

Economic importance: Common and often injurious to agricultural crops. Occasionally climbs fruit and shade trees at night to feed.

SPOTTED-SIDED CUTWORM

Agrotis badinodis Grote

Moth description: Head and thorax pale brown with upper half of collar shading into black. Fore wing light brown with a violaceous tinge. Antimedial and post-medial lines prominent, pale brown, edged with black. Orbicular and reniform spots extremely large, not prominent, filled with pale brown scales the same color as the adjacent area but outlined in pale scales. Orbicular touching the antimedial line, the juncture being marked with a small, dark triangle. The space between the orbicular and reniform filled with dark brown scales. Claviform represented by a black dot at its apex. Hind wing dull gray with grayish veins. Wingspread 28-35 mm. (Fig. 18)

Seasonal distribution: Moths appear in light traps late in the season beginning the last of August and continuing through September, with a peak flight in mid-September.

Larval appearance: In addition to the series of wedge-shaped, black markings on the dorsal area, there is a similar lateral series on abdominal segments one to eight.

Host plants: Clover, tobacco, aster, chickweed, dock, apple, crabapple, cherry, alfalfa, wheat, and pin oak.

Economic importance: The species is generally of minor importance in the North Central states but occasionally attracts attention as a climbing cutworm in orchards.

VARIEGATED CUTWORM

Peridroma saucia Hübner

Moth description: Ground color of the typical common form (*saucia*) evenly gray-brown with no contrasts. Orbicular large, nearly round, scales the same as ground color or lacking. Reniform thick, kidney-shaped, also with concolorous scales or lacking. In all forms the antimedial and postmedial lines double and prominent on the costa. Hind wing light to dark gray; darker on the veins and outer margin. Form *margaritosa* has the costal area pale. Form *semifusca* has the costa and forward half of wing blackish with rest of fore wing buff. Extremely variable but easily recognized with experience. Wingspread 32 to 45 mm. (Figs. 32 and 34)

Seasonal distribution: Moths may be active from the first of April to the first of December. Three generations. The first peak flight usually occurs about mid-June to the first of July, the second generation peak flight usually occurs in mid-August, while the third generation may peak in September or October.

Larval appearance: Ground color variable, usually brown, ventral areas cream colored. Most often recognized by the broken dorsal stripe which consists of small, yellow spots down the middle of the back.

Host plants: An extremely wide range of host plants including field, forage, fruit, vegetable and ornamental plants; at times becomes a climbing cutworm.

Economic importance: The variegated cutworm is the most important cutworm on vegetables and is particularly damaging to potatoes and tomatoes.

WHEAT HEAD ARMYWORM*

Faronta diffusa (Walker)

Moth description: Fore wing light tan with a dark brown, triangular marking in subterminal area. A white stripe in center of wing without a black dot but with two small black dots above it just beyond the middle of the wing. Below the white stripe is a black stripe which is most prominent just beyond the middle of the wing. A black, narrow basal dash. Hind wing gray with slightly contrasting, pale fringe. Wingspread 24 to 30 mm. (Fig. 11)

Seasonal distribution: Moths begin to appear in light traps in mid-May (first generation) and fly through mid-July. The second generation occurs from mid-July to mid-October.

Larval appearance: General color greenish or yellowish, with distinct longitudinal stripes. Back of larva uniformly dark and includes a broad, paler line down the middle of the back. A broad, well-defined, pale subventral stripe. Skin smooth.

Host plants: Barley, timothy, rye, rice, sorghum, wheat, oats, and grasses. The larvae seem to have a preference for the heads of these grains.

Economic importance: The species is rarely of economic importance and, although common, it feeds primarily on grasses.

*Also known as the wheat armyworm, *Leucania diffusa* (Walker), and *Protoleucania albilinea* Hübner.

WHITE CUTWORM

Euxoa scandens (Riley)

Moth description: Ground color pale gray, very lightly dusted with black scales. Orbicular and reniform ringed with pale scales and a fine brown line. Reniform with a dark gray dot in lower part. Subterminal line a somewhat irregular series of white lunules, sometimes defined with black dots at outer edge. Hind wing creamy white with pale grayish veins and border. Wingspread 35 mm. (Fig. 16)

Seasonal distribution: Appears in light traps from late June to early August, with peak flight activity in mid-July.

Larval appearance: General color pale gray; translucent. Dorsal area whitish and a white spiracular stripe. Spiracles black. Head and cervical shield mottled buff.

Host plants: A wide range of hosts is known but it is notorious for attacking asparagus and in many cases climbs fruit trees to feed on the fruit buds.

Economic importance: A persistent pest of asparagus in Michigan but elsewhere occurs in sporadic and infrequent outbreaks.

YELLOW-HEADED CUTWORM

Apamea amputatrix (Fitch)

Moth description: Ground color of fore wing dark reddish-brown. Antimedial line distinct and only moderately waved. Postmedial line double and sinuous. Subterminal line whitish and irregular. Orbicular large and elliptical, filled with greenish-gray scales. Reniform large and squarish but sometimes is reduced to a broken line. Hind wing brown with darker brown on wing veins and at outer margin. Wingspread 35 to 47 mm. (Fig. 30)

Seasonal distribution: . One generation. Appears in light traps from June to August.

Larval appearance: Head tawny. Body smoky-gray without prominent, longitudinal stripes.

Host plants: A wide range of hosts including vegetables, corn, small grains, currants, and roses.

Economic importance: Because of its subterranean habits, it is not often detected as the damaging pest. Probably of minor importance in the North Central states.

YELLOW-STRIPED ARMYWORM

Spodoptera ornithogalli (Guenée)

Moth description: Fore wing with a very complex pattern. Prominent, pale, diagonal bar varying in color from pale buff to brown, covering the narrow, oblique orbicular and extending almost to front edge of wing and postmedial line. Ground color dark brown with bluish or violaceous tints in outer third of fore wing. Sub-terminal brown area usually prominently marked with a whitish, longitudinal patch. Hind wing pale with a violaceous tinge with fine blackish veins and a very narrow border, the discal vein white. Wingspread 30 to 35 mm. (Fig. 13)

Seasonal distribution: Appears in light traps from the middle of May to the middle of November, with a flight peak in August or September.

Larval appearance: The dorsal coloration is made up of dark strands on a pale background. A series of prominent, black, subdorsal, triangular markings on all segments but the prothorax. Just below the prominent black markings there is usually a bright, yellow stripe.

Host plants: The larvae feed on a wide range of host plants including field and vegetable crops, tobacco, and occasionally fruit trees.

Economic importance: An important cutworm in the Southern United States, not overwintering in the North Central states, but dispersing by flight northward. The species is of minor importance in the Great Plains area.

ZEBRA CATERPILLAR

Ceramica picta (Harris)

Moth description: Fore wings with general color dark chocolate-brown. Usual lines absent. Orbicular varying from a minute circle to a long, horizontal ellipse. The reniform spot irregular and not kidney-shaped. Hind wing white with a narrow but contrasting brown and fuscous border. Wingspread 27 to 30 mm. (Fig. 12)

Seasonal distribution: Infrequently trapped from late May to September but very commonly in August. Apparently two or more generations per year.

Larval appearance: General color black with numerous broken, vertical, yellow bars. Subventral area mixed black and yellow. Head and underside dull yellow; head glossy.

Host plants: A general feeder on vegetable, field, ornamental, fruit, and forage crops.

Economic importance: This species is of minor importance in the North Central states.

Glossary

Antimedial line: A transverse line near the basal third of the fore wing of moths (see Fig. 1).

Asymmetrical: Without symmetry; uneven.

Basal dash: A heavy, dark marking extending from the base of the fore wing to the antimedial line (see Fig. 1).

Basal line: A transverse line on the fore wing of moths which is halfway between the base of the wing and the antimedial line (see Fig. 1).

Cervical shield: A heavily pigmented, flat, oval plate just behind the top of the head in caterpillars.

Claviform: A spindle-shaped spot on the fore wing of moths (see Fig. 1).

Costa: The front edge of the wings in moths.

Costal: Pertaining to the costa.

Dash: A heavy, black line parallel to the costa in the fore wing of moths.

Dorsal stripe: In caterpillars, the line down the center of the back.

Filiform: Having the form of a thread or filament.

Fringe: The hair-like scales on the outer edge of moth wings.

Fuscous: Dark in color; dusky.

Granulose: A surface of a caterpillar which is roughened by the development of granules.

Incisures: Having the appearance of being cut as in the separating lines between body segments in caterpillars.

Labial palps: One component of the mouth parts of insects (see Fig. 29).

Mandible: Paired biting jaws of caterpillars.

Medial dash: A heavy, black line parallel to the costa in moth fore wings (see Fig. 1).

Medial or median line: In caterpillars, the line down the middle of the back.

Medial stripe: Same as above.

Metatarsus: The terminal segments on the hind legs of moths.

Microspine: A minute, spine-like structure.

Ocelli: Darkly pigmented, small, oval eyespots on each side of a caterpillar's head.

Orbicular: A prominent, oval spot on the fore wing of moths (see Fig. 1).

Postmedial line: An irregular line on the outer third of moth wings just beyond the reniform (see Fig. 1).

Reniform: A prominent spot on the fore wing of moths which is usually kidney-shaped (see Fig. 1).

Reticulated: A pattern of narrow lines resembling the threads of a net.

Spiracle: An oval, breathing pore on the sides of the thoracic and abdominal segments of caterpillars.

Spiracular stripe: A longitudinal stripe on caterpillars which includes the spiracles.

Stigma: A silvery-white, prominent spot on the fore wing of moths (see Fig. 2).

Subdorsal stripe: A longitudinal stripe on caterpillars just below the dorsal or medial stripe.

Submedial arcs: Heavily pigmented, crescent-shaped markings on the head of caterpillars.

Subreniform: A spot sometimes present on moth fore wings below the reniform (see Fig. 1).

Subspiracular stripe: A longitudinal stripe on caterpillars just below the spiracles.

Subterminal line: An irregular line on the outer edge of a moth fore wing (see Fig. 1).

Subventral stripe: A longitudinal stripe on caterpillars between the lateral and ventral areas.

Terminal line: The outermost line on the fore wing of moths (see Fig. 1).

Thorax: The middle body segments of insects which bear the wings and legs as opposed to the head and abdomen.

Trapezoidal: A plane figure with four sides, two of which are parallel.

True legs: Sharp-pointed, tapering structures on ventral thoracic segments of caterpillars, two on each of three segments.

Tubercles: Small, rounded projections or bumps on caterpillars.

Vein lines: A series of wing veins parallel to the costa in moth wings, sometimes branching on the outer edge of the wing (see Fig. 1).

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