

FURTHER NOTES (No. 3) ON THE EARLY STAGES OF  
HETEROCERA BRED IN THE NAKURU DISTRICT.

By A. L. H. TOWNSEND.

ARCTIIDAE.

*Diacrisia jacksoni* Roths.

FOODPLANTS.

Almost any low-growing plant; such as Sodom apple (*Solanum incanum*), macdonaldi (*Galinsoga parviflora*), black-jack (*Bidenis pilosa*), etc.

LARVA.

This very common and very conspicuous larva is well known for the urticating quality of its hairs, which affect even a black skin. It is dense black, covered with long silky grey hair. Spiracles conspicuous white; head, legs and claspers bright red. When travelling it can get up a remarkable pace.

PUPA.

In a large cocoon spun among leaves. It is dark-brown, naked, with granulated surface. Cremaster consists of two small leaf-like processes placed centrally at the tip of the terminal segment. Duration of pupal stage very variable — up to six months.

*Diacrisia investigatorum* Karsch.

FOODPLANTS.

Many low-growing plants, including macdonaldi (*Galinsoga parviflora*), *Oxygonum*, etc.

LARVA.

Each segment has a raised black transverse band, studded with small blue tubercles, which emit long grey-white hairs. Between the bands, when the larva is extended, the skin is dull green. The bands are broken on the back by the yellow dorsal line. On either side of the black band is one of sulphur-yellow. The hair on the front half of the larva has often a fulvous tinge. Head, legs and claspers red. The larva stands with both ends raised.

PUPA.

In a flimsy cocoon among leaves, etc. It is stout, short, nearly black. The terminal segment is a blunt dome, having a small excrescence just out of centre on the dorsal side. From

the point of this spring a bunch of seven or eight stout stems, of circular section, slightly tapered, but not pointed. They terminate each in a circle of minute radiating points. Duration of pupal stage up to three months.

*Seirarctia clara* Holl.

FOODPLANTS.

A great number of low-growing plants.

LARVA.

A very typical "Woolly-bear." Stout, very hairy; ground colour black, greyish in lateral area. Length up to  $2\frac{1}{2}$  inches. The dorsal hair on the front part of body is bright tawny, with a few long white hairs in it. The rest of the hair-coat is dark grey or black. The hair springs, in star-formation, from transverse rows of bright blue tubercles; these tubercles being "staggered" in the rows. There is a chain of small white spots on the dorsal line, and others latero-dorsal. Occasionally, there are tawny-yellow latero-dorsal and lateral lines. Spiracles white, legs and claspers red. Head red or yellow, with a black transverse bar, and black frontal spots.

PUPA.

In a web among stems, etc., on or near ground surface. It is dark brown, short and stout; girth at centre greater than at head. Terminal segment a short dome, from the central point of which springs a short pointed shank, ending in a sort of rosette. Duration of pupal stage may extend to nine months.

*Secusio pustularia* Wlk.

FOODPLANT.

*Gymna scandens*.

OVA.

Spherical, pearly-white: turning grey before hatching; laid in small batches on leaf surface.

LARVA.

Is very delicate, slender, transparent-looking. It is very strongly indented between the segments. When young, ground colour is pale, transparent green. A double black dorsal line has small black rings on either side. Head small, transparent brown, with a pencil of fine hair pointing forwards on either side. A good deal of fur on the body; some black, some silvery-grey. Ventral claspers ground colour: anal pair long, transparent white.

Later the ground colour becomes almost white: the dorsal line is seen to be a series of marks, roughly diamond-shaped, joined into a chain. Star-clusters of white hairs spring from small

tubercles all over the body, those tubercles on either side of the dorsal stripe being ringed and spotted with black. The larva eats patches of the surface of the leaf, both upper and under-sides, leaving the membrane intact. It feeds by night, and falls very readily, without a thread.

PUPA.

Is in a thin web between two leaves. It is dark red—almost claret colour—shiny, with black crossbars on abdomen, and black wing-venation. There is a cluster of many fairly long, separate hooks at the extreme tip of the terminal segment. Pupal stage lasts about fifteen days.

NOTE.—On June 17th, I took larva, pupa and a ♀ laying ova; on the same plant, at the same time.

*Sommeria (Digama) meridionalis* Swh.

FOODPLANT.

*Carissa edulis*.

LARVA.

Stout, smooth, except for a few scattered bristles. Colour drab, with a black interrupted dorsal thread-line, and a black transverse "smear" on Segment 4. There is a series of paler marks on each side of the central line, becoming more conspicuous towards the rear end: and ending in a long, oval, pale area on Segments 10, 11, and 12. Spiracles small, black: Head small, black: legs and claspers pale.

PUPA.

Is subterranean, in a flimsy cell. It is brown, with a rugose terminal segment having a bunch of several, rather long, separate hooklets on the dorsal edge. Duration of pupal stage about eight weeks.

LASIOCAMPIDAE.

*Odontocheilopteryx myxa* Wallengr.

FOODPLANTS.

Acacia, wattle.

LARVA.

Length 1 inch. Stout, much flattened below. First few segments thicker. A very short larva for its width and girth. Colour, in different specimens, bright umber-brown, greenish-ochreous, or dark brownish-grey. A dark grey dorsal patch on Segment 4. Dorsal line very narrow, black. Pairs of latero-dorsal tubercles on all segments, those on Segment 12 being larger, and springing from a common base. Below these is a row of smaller tubercles. A lateral tubercle on each segment

emits a thick downward-pointing tuft of greyish fur. Dorsal transverse slits on 3 and 4 show orange or scarlet slips with black and white spots when distended. Pronounced thoracic lappets; the first and second clothed in grey fur. Above the third is a thin pencil of dark hair, which is held out horizontally when the larva is on a leaf, but vertically downwards when it is on a twig. Head ground-colour with grey blotches; rather retracted into Segment 2. Ventral area grey, with a complicated central stripe of black, orange, and white spottings.

PUPA.

In a thin web among leaves. It is short and thickset, grey, with a thick crop of short, rather curly, blonde fur all over abdomen, and longer tufts on head and thorax. Antennae, legs, and wing-venation black. Abdomen covered with minute black spots, with a few larger ones among them. Terminal segment flattened at end; from the dorsal side project very many, short, brown hooklets, bunched closely together. Duration of pupal stage up to three weeks.

LYMANTRIIDAE.

*Chilena donaldsoni* Holl.

FOODPLANT.

Various grasses; most commonly found on "Watergrass."

LARVA.

Length 2 inches, stout, furry. The fur is mostly silver-grey, that on the dorsal area being tinged with yellow. The dorsal area is cream colour, with a square, black, velvety patch on each segment. Those on Segments 3 and 4 carry upright tufts of black hair, and there is a similar, but less compact, tuft on Segment 11. Divisions between segments black. Lateral area black, with a narrow, interrupted, white line. Ventral surface stained with orange-brown. Head, legs, and claspers yellow-brown.

PUPA.

Subterranean.

*Psalis pennatula* F.

FOODPLANT.

Various grasses.

LARVA.

Length  $1\frac{1}{4}$  inches, tapering slightly towards rear. A black dorsal line is interrupted by the usual four brush-tufts, which are white-sided, fulvous-tipped. Dorsal area chiefly canary-yellow, with narrow black cross-lines, and deeper yellow latero-

dorsal patches. There are three whitish crossbars, with black edges, on the segments behind the brush-tufts. Where these cross the dorsal line, there are, on each segment, two white spots: and the last two of the three segments carry red central studs. Lateral stripe broad, dove-grey, black-edged. Area below it, salmon-pink. Ventral area grey and black. A pair of dark pencils of hair point forwards from Segment 2, and a similar one points backwards from Segment 12. Lateral tufts of grey bristles. Legs and claspers red.

**PUPA.**

In a rather transparent, oval, cocoon on grass stem. It is black, polished, covered with fairly short, thick, grey fur. Dorsum has a double line of lozenge-shaped, yellow marks; and there are similar marks on venter. Terminal segment has a long tapering process, not sharply pointed on dorsal side, flattened on the ventral side, set with a number of stiff bristles throughout its length. It ends in a close-set bunch of short, stout hooklets. Duration of pupal stage about three weeks.

*Stilpnotia parva* Plotz.

**FOODPLANT.**

*Wedelia menotriche.*

**LARVA.**

One inch in length. Ground-colour whitish, with dorsal and latero-dorsal stripes consisting of many small black spots. There is a pinkish shade in the latero-dorsal area. Half-rings of yellow tubercles emit thin tufts of grey hairs, the lateral hair being longer than the dorsal. The tubercles on Segments 5 and 6 are larger and cone-shaped. There are two thicker tubercles, pointing slightly forwards, on Segment 2. Head grey, mouth-parts yellow. Legs yellow; claspers yellow with a dark streak.

**PUPA.**

Pale green or sometimes yellow, legs and antennae outlined in black. On the two first abdominal segments are ventral, dark brown stains. There is a ring of black spots on each segment; those in the dorsal area join to form a black line on the last two segments. A row of yellow blotches in the latero-dorsal area. Tufts of whitish hair all over, mixed with black, especially at head and tail. Cremaster—a long stout black shank with a bunch of small hooklets at the extremity. Duration of pupal stage is three weeks.

*Pteredoa monosticta* Btlr.

**FOODPLANT.**

*Grewia similis.*

#### OVA.

Smooth, greyish-green; circular as seen from above; two depressed, concentric circles on upper surface.

#### LARVA.

Length  $1\frac{1}{4}$  inches, slightly tapered to rear end. General colour, pinkish down to spiracles, green below. Two dorsal tufts of white hair on all segments, side by side: those on Segments 3, 4, 7, and 12 being larger and more compact; those on 8 to 11 lying closely to body, pointing backwards. On 5 and 6 there is a rectangular, grey patch, in which stand four, pale-grey mastoid tubercles, surrounded by short, dark bristles. From the tips of these tubercles a clear bead can be extruded at will. Behind the grey patch, the dorsal area is sparsely marbled with brown and black; except on Segments 10 and 11, where the colour is pale-grey, with a most inconspicuous, grey, central stud on each of the two segments. In lateral area the black and brown marblings are concentrated into the semblance of a stripe; below which a conspicuous swelling on each segment, salmon-pink or scarlet, emits a tuft of white hairs: those tufts on Segments 5 and 6 being horizontal pencils. Other smaller tufts spring from the bases of claspers. On the thoracic segments there is an extra, red swelling, with a tuft of shorter, white hair between the lateral swellings and the dorsal tuft. Anal tuft is dark-grey, and so are those pointing forwards beside the head. Head, legs, and claspers yellow-brown.

#### PUPA.

Spun on stem, or in leaf. Pale green; eyes, legs, antennae, and wing-margins strongly outlined in black. Rows of dorsal and latero-dorsal black spots; and two similar spots on venter. Covered with tufts of pale hair, mixed on head and thorax with stronger, black hairs. Cremaster—a long black shank with a number of small hooklets at the extremity. Duration of pupal stage about twelve days.

*Laelia hemippa* Swh.

#### FOODPLANT.

*Acacia* sp. (? *A. abyssinica* Hochst.)

#### LARVA.

One inch long. There are four wide, compact, dorsal brush-tufts. These are very variable in colour: being sometimes tawny, and at other times scarlet, dark brown, or greenish. Their sides are usually black or dark-brown, sometimes with a dark green tinge, especially in the hind pair. The dorsal area in front of the tufts is dark brown; between them (when the larva is extended) white. Behind them it is black. Segment-divisions reddish-yellow. The dorsal studs on Segments 10 and

11 are white, or very pale yellow. On Segment 12 is an upright tuft, light-grey in front, dark smoky-grey behind. Two very dark grey forward-pointing pencils of hair on Segment 2. Dorsal area is bounded by a grey interrupted line, below which is a mottled grey and brown area with a thin, interrupted, black line. Thick lateral fur, grey. Ventral area yellow with red dashes. Head, legs, and claspers red.

PUPA.

Is in a thin cocoon spun among leaves. Duration of pupal stage is one month.

NOTE.—In Vol. XIII, No. 3, p. 119 of this *Journal*, I described the larva of what was then considered to be a sub-species of *L. hemippa*. It now appears that that species is *L. promissa* Her. (I am much indebted to Col. Stoneham of Kitale for help with the determination of these two species, *hemippa* and *promissa*; and of several others dealt with in these notes.) The larvae of these two species are very difficult to distinguish, particularly when nearly full-fed. The main differences seem to be:—

- (1) In *hemippa* the brush-tufts are wider and more compact than in *promissa*.
- (2) In *promissa* the tips of the hairs of these tufts are, as a rule, lightly powdered with golden-yellow.
- (3) In my experience so far (and I have bred large numbers of both), *promissa* is always found on *Acacia xanthophloea*, while *hemippa* is always on *A. abyssinica*. Neither will touch the other's foodplant; and if both are put in a cage with the two kinds of food, they very quickly sort themselves out, each on its appropriate species of *Acacia*.

EUPTEROTIDAE.

*Phiala flavina* Gaede.

OVA.

Spherical, pale butter-yellow; with a small circle of deeper colour at the micropylar area.

LARVA.

When young, the larvae are gregarious. They live in a wide-flung web among grass, of which they feed on various species. Ground-colour black, with eight lemon-yellow lines. Each segment has a ring of tawny fur, with darker hairs among it. There are two, long, latero-dorsal pencils of black hair, pointing forwards and upwards beside the head. Similar but smaller pencils point backwards from Segments 11 and 12.

When full-fed, the length is  $2\frac{3}{4}$  inches or more. General colour greenish-yellow, thickly sprinkled with black dots. A very conspicuous, lateral stripe, thick and rather wrinkled, sulphur-yellow. Between this stripe and its fellow are six longitudinal lines of the same colour; the central two in the dorsal area being close together. There are nine transverse, black, velvety cushions: but except when the larva is curled, these are hidden between fringes of blonde hair, one fringe in front of, and one behind, each velvet patch. The front fringes contain each two pencils of tawny-red hairs, black-tipped. These fringes, except the last pair, are held with all the hairs converging upwards to a central point. The segments that carry the second and third pairs of legs have similar pencil-tufts; but these do not converge, and are longer than the others. There is a good deal of whitish hair pointing forward round the head, and tufts of similar hair spring from the bases of the claspers. Head is reddish-yellow; face black with yellow markings. Legs reddish-yellow; claspers brown with yellow vertical stripes; spiracles white with a dark ring. A yellow plate over anal claspers. The larva is of a very thirsty habit, and will drink up a surprising number of raindrops after an evening shower.

#### PUPA.

The short thickset pupa is in a loose and flimsy cocoon just underground, or sometimes among grass stems. It is light-brown. The terminal segment, which is slightly darker, is a blunt dome, with a small, knobby excrescence on the ventral side; and on the dorsal two short, nearly flat, horns or leaves diverging at once, and curved back until their ends are at right angles to the length of the pupa. Duration of pupal stage very variable, lasting sometimes over a year, and sometimes for less than three months.

### SATURNIIDAE.

*Cirina forda* Westwood.

#### FOODPLANTS.

Wattle, acacia, pepper-tree (*Schinus molle*), *Carissa edulis*.

#### OVA.

Pale greenish-white, without visible markings or sculpture. Roughly oval, but sharply tapered to one end; polished; laid in very large piles on leaves or stems. These ova are much subject to a small parasitic fly.

#### LARVA.

When about half-fed, is  $1\frac{1}{4}$  inches long, fairly stout, black with a rather greasy-looking skin. Latero-dorsal lines yellowish-white. (In some specimens these are complete; in others they are represented by a few dots on each segment.) Upper and



lower lateral lines deeper-yellow; interrupted. Tufts of scanty white bristly hairs spring from the lower lateral line, and from latero-dorsal area. Head and Segment 2 shining black.

When full-fed, nearly  $3\frac{1}{2}$  inches long. Lateral area has a broad stripe consisting of small yellow plates, or scales, close together. A few similar scales are scattered on ventral surface. At the rear end of each segment is a narrow transverse band of similar scales, but white. Scanty tufts of coarse white hair rise from these bands, and from the area in front of them. There are two lateral rows of similar tufts, a few hairs on claspers, and shorter ones on the black head-lobes. Spiracles black. A black horny plate on Segment 2. Legs and claspers black. A pronounced lateral wrinkle. These larvae are sometimes so numerous as to amount to a plague.

**PUPA.**

Subterranean; black, horny. Duration of pupal stage very variable: from six weeks to five months.

*Lobobunaea tyrrhea* Cr.

**FOODPLANT.**

*Acacia*, various species; pepper-tree (*Schinus molle*).

**LARVA.**

Stout; spiny. Head, legs, and claspers, when fresh-moulted, bright claret. Later, black. Body covered with small scale-plates, yellow except in the latero-dorsal area, where they are pale but vivid blue. A velvety, black, dorsal stripe, of irregular width, interrupted by a narrow transverse band, on each segment, of the yellow scales. Transverse half-rings of six short claret-coloured spines, with reddish bristles on them. (NOTE.—The central spines on Segment 12 do not combine to form one spine; but they are very close together.) When full-fed, spines are very short, claret-colour, situated in a half-ring of light blue scales, interrupted dorsally, and shading off to green in the spiracular region. On each side of this blue half-ring, the scales are bright yellow; shading off to pale yellow towards the segment-divisions. The ring behind the spines is complete; that in front is interrupted dorsally by the black dorsal stripe. Lateral wrinkle very pronounced, covered with yellow and blue scales, with black top edge. Spiracles black. Dorsal stripe velvety black, devoid of scales, except for a few blue ones on the thoracics, the black spreading out at right angles to the dorsal line at the segment-divisions. The black skin also shows as an interrupted latero-dorsal line. Ventral surface black, with a few yellow scales. Legs and head black; claspers and horny plates maroon. Thick, short, white bristles on claspers, spines, head, and Segment 2.

PUPA.

Subterranean, black, horny. Cremaster—a short tapered shank on dorsal side of the terminal segment. End slightly bifid; lateral serrations. Duration of pupal stage is three months.

*Ludia hansali* Fldr.

FOODPLANT.

“Leleshwa” (*Tarchonanthus camphoratus* L.).

OVA.

Laid in contiguous rows around twig. Shape—a short cylinder (length= $1\frac{1}{2}$  diam.), with domed end. Colour dirty-white, spotted and clouded with pale brown.

LARVA.

Length when full-fed about 2 inches. Covered with white fur, not very long, including thicker tufts on each segment, one on each side of the dorsal line, and others in lateral area. Those on thoracic and anal segments have a few black hairs mixed in them. Head black; legs and claspers brown. Dorsal area largely black or dark grey, with two black, transverse lines, enclosing a narrow grey area, at each segment-division. Lateral wrinkle yellow. In the last instar there is an interrupted, black lateral line, with a yellow stain on the hinder part of each segment, and various, small, black spottings above the actual line. Below the lateral line also are small, scattered, black spots, and there is a conspicuous, black line across the base of each clasper. The dark dorsal area of the earlier instars has disappeared, and the whole larva is pale greyish-green.

PUPA.

In a stout silk cell, either among the leaves of the plant, or more generally, among trash on the ground. Pupa is dark purplish-brown, granulated. Wing-sheaths more reddish, smooth. A stout shank on dorsal edge of terminal segment ends in a flat rosette of short points or spikes. Duration of pupal stage very variable: may last ten months.

NOCTUIDAE.

*Anomis sabulifera* Guen.

FOODPLANT.

*Grewia similis*.

LARVA.

When full-fed is nearly 2 inches long: bright velvety-green. Smooth, but with a few, short, black bristles rising from black, pale-ringed warts arranged in two irregular transverse rows on each segment. The skin at the segment-divisions is yellow. On

Segment 2 is a collar consisting of two, deep rose, latero-dorsal patches; with a smaller, ochreous patch on their upper-side. Head large, round, green. Above the anal claspers is a transverse yellow bar, with a deep rose stain at each end. Three wavy, indistinct, yellow lines run the whole length of the body on either side. Spiracles oval, buff, black-ringed. Ventral claspers four pairs, but the first pair small.

PUPA.

Subterranean, red-brown, rather slender. A cone on the dorsal edge of the terminal segment, fluted on its dorsal side, is furnished with two stout prongs at its extremity: and several slender hooks spring from its base. Duration of pupal stage about one month.

*Diaphone eumela* Cram.

FOODPLANTS.

Amaryllis lilies, *Crinum Kirkii*, *Anthericum* sp.

LARVA.

Length  $1\frac{1}{2}$  inches or more. Stout; tapers slightly to anal end. Smooth. Ventral claspers four pairs. Ground-colour cream, sometimes with a slightly greenish tinge. Head yellowish-red, with two black marks behind the lobes. Each segment has a black, velvety, transverse band of very irregular width. The widest part is in dorsal area, where it forms two, almost rectangular patches, one on each side of the central line. Between these is a reddish blotch, bisected by a short, transverse line of the same colour. Each blotch is larger than the one in front of it. That on Segment 12 occupies almost the whole of the area that on the other segments is black. The black, transverse bands thicken also in the lateral area; and again just above the claspers. There are black latero-dorsal spots at the segment-divisions; a ring of black spots on Segment 2, and another above the anal claspers. Legs black; claspers tawny-red.

PUPA.

The red, stout pupa is in a very strong earthen cell underground. Duration of pupal stage about five months.

*Diaphone lampra* Karsch.

FOODPLANT.

Amaryllis lilies, *Anthericum* sp., *Albuca* sp.

LARVA.

Length  $3\frac{1}{2}$  inches to  $3\frac{3}{4}$  inches; obese, smooth-skinned, cream colour with a slight greenish tinge. Each segment has a black transverse band consisting of a large, roughly rectangular, dorsal patch, with an irregularly-shaped extension (rather like a map

of Africa!) on its hinder side, stretching down to, and including the spiracles. In front of each of these extensions, except the last two, is a black lateral spot: and below them, at the base of each leg and clasper, is a roughly circular, black spot, with its outer edge stained with red. On Segments 5 and 6 the black band is continued completely round the body, and on the segments behind the fourth pair of claspers it is continued as a line of dots on the ventral surface. Head, and plate on Segment 2 red-brown, with a row of black dots in front of the latter. A similar small plate over anal claspers. Legs black; claspers reddish-yellow; a black spot on the anal pair. Transverse rings of short, sparse, black bristles. Head partly retractile; thoracic segments tapering; Towards maturity, all the black markings acquire a maroon tinge; especially the extensions to the transverse bands.

PUPA.

Subterranean, in a hard earthen cell. Stout; nearly black. Terminal segment has, on the dorsal side, a short, stout cone, with a very short central spike. Duration of pupal stage is from three to four months.

*Eutelia discistriga* Walk.

FOODPLANT.

*Maerua* sp.; pepper-tree (*Schinus molle*).

LARVA.

When full-fed is 1 inch long. Rather slug-shaped. Greyish or bluish-green, with conspicuous, white, latero-dorsal lines. Body is sprinkled with small, white spots; those in the lateral area seeming to be quite irregularly spaced, while those in the dorsal area are in a sort of crescent formation. On the last few segments there are vestiges of a white dorsal line. Legs and claspers green. (When full-fed, this larva is very difficult to distinguish from that of *E. adulatrix*. When young, they are much more distinct; the main differences being the bluish tinge of the present species, and the absence of yellow transverse lines.)

PUPA.

In a very tightly-fitting, earthen cocoon underground. It is bright brown, with slightly granulated surface; terminal segment a smooth dome, with no sign of cremaster.

*Eublemma decora* Walk.

FOODPLANT.

*Albica* sp.

#### LARVA.

Length  $\frac{3}{4}$  inch. Stout, with Segments 5 to 8 somewhat swollen; tapering off fore and aft. Ground-colour variable—greenish-white, yellowish-white, or pale-green. Each segment has a double, transverse half-band of red-brown, extending almost down to the spiracles. The hinder edges of these bands reach right down to the sub-lateral area. On the thoracics, and the two segments having claspers, there is a detached spot just below the lower end of the dark band. In a very few specimens this spot is visible on all segments. In the middle of these double bands the ground-colour is stained yellow; deeper in the lateral area. Sparsely scattered, short, black bristles over the body, thicker and shorter over anal claspers. Head black, polished; lobes slightly separated. Legs dark brown. Claspers orange-brown. Ventral claspers two pairs only.

#### PUPA.

Larva lives in the seed-vessels, boring a small hole near the base. It pupates either in the vessel, or in a cocoon attached to stem. The cocoon is somewhat boat-shaped, tapering to a sharp point at each end. It is formed of grey-white silk, plastered with fragments of the plant. Duration of pupal stage is from twenty-two to twenty-eight days.

*Hadena fuscirufa* Hmps.

#### FOODPLANTS.

Various, including blackjack (*Bidens pilosa*) and macdonaldi (*Galinsoga parviflora*).

#### OVA.

Laid in a large patch on the under-side of leaf.

#### LARVA.

When full-fed, is  $1\frac{1}{2}$  inches long. Stout, smooth; tapers slightly to front. The interrupted, white dorsal line, which has greenish-brown edges, has on each side a rusty-brown area bounded by the white, dotted, latero-dorsal lines. Below this a dark green area, having a very indeterminate, white, dotted line in it. A broad lateral stripe; dull light green with white edges. Just above the latero-dorsal line there is a white spot on each segment; a few specimens have pairs of black spots astride the dorsal line. Spiracles yellowish, black-ringed. Ventral area pale green.

#### PUPA.

Red-brown; in a very slight subterranean cell. Terminal segment short, with a pair of stout prongs on the extreme dorsal side. Grouped round the base of these are four hooklets on shorter and more delicate stalks. Duration of pupal stage about four weeks.

*Heliothis (Chloridea) peltigera* Schiff.

FOODPLANT.

*Withania somnifera*: occasionally on antirrhinum.

LARVA.

Length  $1\frac{1}{2}$  inches. Stout. Dull-green, sprinkled with small white pustules that emit very short white bristles. In the lateral and latero-dorsal areas are a few longer, white bristles. Dorsal line darker green than ground-colour. Lateral wrinkle pale, with a darker area below it. Head small, green, completely retractile. Legs and claspers green. In some specimens each segment has a pinkish flush, and there are darker green latero-dorsal lines.

PUPA.

In a slight subterranean cell. It is light red-brown, with two slender almost parallel spikes at the tip of the terminal segment. Duration of pupal stage is about twenty-five days.

*Lycophotia albifrons* Geyer.

FOODPLANTS.

Roots and leaves of very many, low-growing plants.

LARVA.

When half-fed is  $1\frac{1}{4}$  inches long: stout, smooth. Pale but bright-green, minutely mottled with white. Dorsal and latero-dorsal stripes dull red with pale centres. Between these stripes are a few, pale, dark-edged spots. Lateral stripe wide, dull red above, bright pinkish below; with an ochreous centre line. Segment 12 very slightly swollen dorsally. In the lateral area of the thoracics are a few, small, black spots. Ventral area paler green than the dorsal. Spiracles ochreous, black-ringed; those on 2 and 12 conspicuously so. When full-fed is obese,  $1\frac{1}{2}$  inches, with pinkish-green dorsal area, a faint, dark, interrupted dorsal line, blackish latero-dorsal lines, and a pink lateral stripe. Below this, bright-green.

PUPA.

Subterranean. Duration of pupal stage is from six to seven weeks.

*Phlegetonia catephiodes* Gn.

FOODPLANT.

Pepper-tree (*Schinus molle*) is the only food that I know for this species.

LARVA.

When full-fed is  $1\frac{1}{4}$  inches long. Colour bright magenta, with a lateral line consisting of bright yellow, more or less

circular patches, containing conspicuous, black spots. Dorsal area contains very many, narrow, transverse lines of yellow and white. These are of irregular width, and the yellow ones thicken in the latero-dorsal area. Segment 2 has a white leading edge. Head magenta, partly retractile. Legs and claspers same colour. The larva is entirely smooth except for a few, short, pale bristles in the ventral area and round the mouth. A most brilliantly coloured and unusual looking larva.

PUPA.

In a tight earthen cocoon just below earth surface. Duration of pupal stage is two months.

*Phytometra limbirena.*

FOODPLANTS.

Very many: *Vernonia* sp., *Tinnea aethiopica*, lettuce, macdonaldi (*Galinsoga parviflora*), etc.

LARVA.

Pale bluish-green, smooth except for a few bristles. Ventral claspers two pairs. Dorsal line dark green, with three, wavy, white lines each side of it. On these white lines are a few, small pustules, emitting each a single bristle. A black shiny dot on each segment above the spiracular line, and two latero-dorsal, black spots on Segment 12, which has a slight dorsal hump. Transverse rows of black dots on the thoracics. Head light, polished green, with black spots on crown, and larger, black marks on cheeks. Legs green with black spots: the third pair most heavily spotted. Claspers and ventral area plain green.

PUPA.

In a web of very fine white silk. Pale green, with black, transverse bars on abdomen. Legs, antennae, and venation outlined black. Terminal segment ends in a wrinkled mastoid process with small hooklets. Duration of pupal stage is from three to five weeks.

*Plusia ni* Hubn.

FOODPLANT.

Frequently found on lettuce: will eat blackjack (*Bidens pilosa*).

LARVA.

Length when extended  $1\frac{3}{4}$  inches. Ventral claspers two pairs only. Rather transparent pale bluish-green. The only markings are very faint, pale, dorsal and latero-dorsal lines, and a slightly more distinct, whitish, lateral stripe. There is a slight anal hump. Head very small, retractile; shiny yellow-green.

**PUPA.**

Is in a very flimsy cocoon in a partly-curved leaf. Duration of pupal stage is three weeks.

*Pseudophia tirrhaca* Cram.

**FOODPLANTS.**

*Maerua* sp., *Carissa edulis*, pepper-tree (*Schinus molle*).

**LARVA.**

When full-fed is 3 inches long, or more; much flattened and rather tapered. Ventral claspers four pairs; but the first pair rather small, and seldom used. Ground-colour various shades of grey, much marked with bright umber-brown. Head large, streaked with brown; two brown "bumps" on crown. (Head is held stretched out, with palpi horizontal and crown behind.) Legs long, brown. Claspers brown; anal ones long; held out straight behind body, often in mid-air. Wavy and irregular, light brown, latero-dorsal lines, with a yellowish patch on those segments between legs and claspers. On Segment 9 a central dark brown patch, including a black spot. On 12 a pair of light brown, backward-pointing tubercles, on a slight hump. A similar but much smaller pair on 13. Very small, latero-dorsal warts on all segments except thoracics. Dorsal area has brown hieroglyphic marks (almost lyre-shape) on the six central segments, with vestiges of a double dorsal line joining them. A number of very fine, interrupted, dark lines and streaks all over the lateral area. Below the pronounced, lateral wrinkle the colour is light-brown. Ventral area the same; grey centrally. Spiracles dark-grey in a black ring. Inside of claspers orange; large black patches between them. Inside of legs pinkish. A most peculiar looking larva; very sluggish; extremely well-protected by its resemblance to a partly-withered twig.

**PUPA.**

In a thick cocoon, covered with leaves, on ground surface. It is dark-brown, with a thin grey bloom. Terminal segment much wrinkled and fluted; cremaster two short, stout, slightly diverging prongs, with a few small hooks grouped round the base. Duration of pupal stage is two months.

*Tarache apatelia* Swh.

**FOODPLANT.**

*Indigophora* sp.

**LARVA.**

One inch, or slightly more; smooth; ventral claspers two pairs. General colour of skin pale olive-green, shading through dark green to black. Dorsal and lateral areas thickly-sprinkled with small, lemon-yellow markings gathered into broad dorsal



and lateral stripes. The lateral stripe has, on each segment, a large, oval mark, reddish-ochreous; and other lateral marks of the same colour, but smaller, occur near the legs and claspers; and dorsally on Segment 12. Between the bands of yellow markings the latero-dorsal area is dark grey, shading to black on the lower edge; especially dark just above the ochreous lateral marks. Thoracic segments rather swollen. Ventral area greyish-green, with faint markings of yellow. Head speckled-green, yellow, and white.

PUPA.

Subterranean.

*Ulothricopus primulinus* Hmspn.

FOODPLANT.

*Acacia* sp.

LARVA.

When young, is light-brown with a greenish tinge, and has a narrow, white, dorsal line. Head slightly notched, square, greyish, with brown and white marbling round the lobes, and a brown spot at the top of each lobe. A row of small latero-dorsal tubercles, two pairs per segment, emit short, pale bristles. Two red-brown spikes stand side by side on Segment 11. A close crop of very short, grey bristles below spiracular line. Four pairs of ventral claspers, but the front pair is little used, and the larva half-loops when walking. When it moves, a black, transverse, dorsal streak appears between legs and claspers. Legs long and slender, brown. Claspers greenish, brown-tipped. Above the fourth pair, and running down the stem, is a brown stain. Ventral area pale, with large, circular, red-brown or purple patches. When half-grown, a dorsal swelling appears above the second and third pairs of claspers; and a dark-grey, extensile horn emerges from it. There are vestiges of greyish latero-dorsal lines; and many, small, yellowish warts in the lateral area. (On more than one occasion I have seen larvae of the same species biting, and apparently eating off, the dorsal horn from one of their number; apparently without discomfort to the owner, and certainly without prejudice to the successful emergence of the imago.)

PUPA.

Dark-brown, covered with a pale-grey bloom. In a loose cocoon covered with particles of earth, leaves, etc.; usually attached to a twig lying on the ground. Cremaster consists of a few, separate hooklets at the point of the terminal segment, and others further up the segment. Duration of pupal stage from one to two months.

*Spodoptera mauritia* Boisd.

OVA.

I have found these on a number of occasions, always in a large patch covered with anal fur, on the leaf of a fig-tree. Fig, however, is not their food; and I lost several batches before I discovered the following habit of the species.

LARVA.

When clear of the eggs, the young larvae immediately spin a thread, and drop to the grass below; which is their food. When very young they are yellowish-green, sprinkled all over with black spots. White dorsal line. When full-fed, the larva is  $1\frac{1}{4}$  inches long, stout, smooth. Ground-colour dull-green, with a pinkish, dark-edged dorsal line. Latero-dorsal lines pale-green with a black, roughly triangular mark above them on each segment. The area below these lines is rather brighter green than ground-colour, and below it is a pinkish-green lateral stripe with paler upper edge. Another pale stripe below this, at the top of which are the black spiracles. Below this, and ventral area, green. Legs and claspers green. A small white mark, and a small black one, above each spiracle. The larvae lie about above ground, among the grass, and are very sluggish.

PUPA.

Subterranean. Duration of pupal stage about six weeks.

GEOMETRIDAE.

*Ascotis reciprocaria* Walk.

FOODPLANTS.

Very many; including *Maerua* sp., wattle, castor oil (*Ricinus communis*), pepper-tree (*Schinus molle*), *macdonaldi* (*Galinsoga parviflora*), etc.

OVA.

Pale-green, longish-oval, flattened at one end, covered with fine, raised, hexagonal reticulation. Hatched on the seventeenth day.

LARVA.

The young larva is very pale greenish-grey, with a pronounced, white dorsal stripe. After the first moult it becomes very dark greenish-brown, with a conspicuous bunch of bright yellow tubercles on Segment 6. In later instars it is very twig-like, and most variable in colour. It is sometimes pale greenish-grey, but may be greenish-ochreous, reddish-ochreous, buff, dark red-brown, or almost black. The intensity of markings also varies considerably. Skin is rough, with a few bristles, springing from tiny warts. On Segment 6 is a very conspicuous

ring of four tubercles; two dorsal, and two, smaller, lateral. These four tubercles are ochreous, sometimes bright-orange. They are always black-centred, sometimes black-ringed. There is a black patch behind the lateral ones, and in front of the dorsal pair is a small black V or U. Segment 12 has a pair of dorsal tubercles like those on 6 but smaller. The intermediate segments have each a pair of small latero-dorsal warts. Some larvae are almost devoid of markings. In others a series of pale, dorsal and latero-dorsal dashes almost form longitudinal lines. Others, especially those with pale ground-colour, have, on each segment, four, dark, linear patches; and these, together with the pale dashes and pale segment-divisions, give a chequered appearance. Head light brown, speckled with black. Legs brown, with a black ring. Length of full-fed larva is  $2\frac{3}{4}$  inches.

PUPA.

Subterranean. Bright brown. On the extreme edge of the dorsal side of terminal segment is a short, thick, tapering shank, ending in two rather long prongs. Duration of pupal stage is about six weeks.

*Ectropis ocellata* Warr.

FOODPLANT.

Castor oil (*Ricinus communis*).

OVA.

Oval; pale green; reticulated surface.

LARVA.

When young is dark grey, with a wide, white, dorsal stripe and narrow, white, lateral stripes. When full-fed, there are two types: one brown, and the other pale green. Length  $1\frac{1}{4}$  inches. Dorsal stripe yellowish, of irregular width. Lateral wrinkle very pronounced, yellowish-brown, with a swelling on Segment 6, white in front, dark behind. On the same segment are dark-brown latero-dorsal tubercles. A small anal tubercle is dark behind, whitish in front. A yellowish-white lateral mark above the ventral claspers, and a streak of the same colour on the claspers themselves. Anal claspers yellow-brown. Ventral surface brown, with grey central line. Head brown, with a white bar across the face. Base of third pair of legs much swollen. These legs are held out at right angles to the body, while the first and second pairs are held close to the head.

PUPA.

Loose on the ground among leaves, etc. Duration of pupal stage about fifteen days.

*Nothobraxas commaculata* Warr.

FOODPLANT.

*Lantana* sp.

OVA.

Pea-green; very long oval.

LARVA.

Stout, fleshy; up to 2 inches in length. Ground colour purplish-brown. Conspicuous, pale-mauve lateral stripe, with a white, black-edged line above and below it. (When nearly full-fed, the lower line turns yellow.) Interrupted latero-dorsal lines consist of minute, white, black-ringed spots. There is a pair of orange warts on each segment except the thoracics; on Segment 6 these warts are larger. Similar warts are in the sublateral area. A pair of very small, black tubercles above the anal claspers. Spiracles orange, black-ringed; surrounded by a purple-brown area. Lateral area spotted with black and white. Ventral area has three irregular yellow and white stripes, black-edged; or sometimes dark reddish-yellow stripes on a purple ground. Collar orange. Head mauve with a black spot on each lobe. Legs mauve, black-tipped; claspers mauve.

PUPA.

Subterranean; purple-brown. Terminal segment rugose, with a stout tapering shank on the dorsal side, ending in two short prongs. Duration of pupal stage about five months.

*Omphaluca extorris* Warr.

FOODPLANT.

*Gymnosporia buxifolia*.

LARVA.

A stout, wrinkled and bulgy larva, with the thoracic segments very much swollen. Ground colour whitish, but very thickly mottled and marbled with black and yellow. It has a rather shiny, enamelled appearance. Most conspicuous feature is a row of raised, crimson, lateral spots, associated with black patches. On Segments 6, 7, and 8 there are two similar spots in the latero-dorsal area, with white patches between them. Rings of small yellow patches on each segment. A brilliant yellow patch on ventral surface between the claspers. Head mottled black and yellow. Legs yellow and black-ringed. The larva sits doubled up, head to claspers, and is very well hidden among the buds of the foodplant.

PUPA.

Subterranean. Duration of pupal stage about five weeks.

*Paragathia albimarginata* Warr.

FOODPLANT.

*Carissa edulis*.

LARVA.

When full-fed is about  $1\frac{1}{2}$  inches long, rather stout, smooth, shiny. Bright green, with four, brownish-ochreous, dorsal marks, somewhat shield-shape, on Segments 5, 6, 7, and 8. On 9, 10, 11, and 12, similar marks, but lighter in colour, join up to form a long dorsal patch, whitish-ochreous in centre, with brown edges. A similar coloured patch on the base of the ventral claspers is joined by a brown, vertical line to the dorsal patch. On the ventral surface, from Segment 5 to Segment 12, is a wide stripe of the same colours as the dorsal patch. A few, very small pustules, emitting very short bristles, are scattered over the body. Two widely diverging, rough-surfaced spines emerge from Segment 2; almost black, with a whitish patch between them. Head small, black, shiny: with lobes very slightly separated. Anal claspers green.

PUPA.

Is spun up in a curled leaf. Duration of pupal stage about three weeks.

*Protosteira spectabilis* Warr.

FOODPLANT.

*Maerua* sp.

LARVA.

Length  $1\frac{1}{4}$  inches: very much flattened: translucent green, paler below spiracular line and on ventral area. The only marking is a red-brown, or sometimes bright-red lateral wrinkle. This colour is carried on along the sides of the head, and over the crown: and since the head is held with the face pointing downwards, and the crown advanced, the red line appears from above as a very narrow ellipse. In its final instar the larva develops reddish mottlings all over the top-half of the body.

PUPA.

The long, narrow cocoon, covered with scraped fragments of bark, is attached to a stem. It is pointed at each end; and after the first few days a slit appears on the dorsal part, through which the buff-coloured, black-spotted pupa is visible. Duration of pupal stage is about three weeks.

*Semiothisa trinotata* Warr.

FOODPLANT.

*Acacia* sp.

LARVA.

Ground-colour green. Four, white, longitudinal stripes, dorsal and latero-dorsal. Yellow lateral stripe, with red spots on it. Segment 2 shiny, the white latero-dorsal lines being carried across it. Head transparent-green.

PUPA.

In a flimsy cocoon of silk and earth on ground surface. It is brown, with dark green wing sheaths. A short cone on dorsal side of terminal segment ends in a long, stout shank tipped with two, short, diverging prongs. Duration of pupal stage about four weeks.

*Xanthorhoe exorista* Prout.

FOODPLANTS.

Many low-growing plants; most commonly on *macdonaldi* (*Galinsoga parviflora*).

LARVA.

Length about  $\frac{7}{8}$  inch. Rather wrinkled. A few, very short, pale, scattered bristles. Colour, when young, pale yellowish-green, with yellow segment-divisions. A very indistinct, greyish latero-dorsal line. Head small, brownish. Legs same colour as head. In the final instar the larva changes considerably. Dorsal area is red-brown, with an interrupted, black central line. There are fine, greyish-white, irregular lines in this area which has a lower edge of white, with a black mark above the white on each segment. Below this white edge the body is green. Segment-divisions are reddish, and the ventral area has a reddish flush on the green ground-colour. The larva stands curled like a "?", and falls very readily.

PUPA.

Subterranean. Duration of pupal stage is from ten to twelve days.

*Xylopteryx interposita* Warr.

FOODPLANT.

*Gymnosporia buxifolia*.

LARVA.

Length 1 inch. Greyish or reddish-brown. Skin rather rough. Head small, square, with two white spots on crown. Almost black dorsal line over the thoracics, and again over anal claspers. The three central segments have silver-white dorsal marks, shaped like pairs of brackets, containing small twin brown tubercles, with a black V behind each pair. The next segment has a white diamond, and behind this are two smaller marks, roughly diamond-shape, outlined in white. A

pair of very small dorsal tubercles over anal claspers. Ventral area greyish-green, with a central line of brown spots.

**PUPA.**

In a loose earth cocoon, subterranean. Cremaster—a short cone, ending in a spike with two short prongs. Duration of pupal stage one month.

**PTEROPHORIDAE.**

*Agdistis malitiosa* Meyr.

**FOODPLANTS.**

*Vernonia* sp., *Solanum* sp., *Lantana* sp., and very many other plants.

**LARVA.**

Length up to  $\frac{3}{4}$  inch. Colour, darkish brown, mottled vaguely with darker brown. Double spines on Segments 2 and 3: one on Segment 11, and two again on Segment 12. These emit short bristles. There is a lighter lateral dash on the three last segments, and very faint, dark, diagonal streaks on the lateral area of the central segments. A few small, scattered tubercles emit backward-pointing bristles. Ventral claspers three pairs complete, one rudimentary. The larva usually stands with head and body thrown backwards in a sharp curve.

**PUPA.**

Tail-attached to stem; remarkably thin and elongated; with external sheaths almost wholly detached. Duration of pupal stage is about eighteen days.