Keys to Some Lepidopterous Larvae Found in Gardens and Homes in Hawaii*

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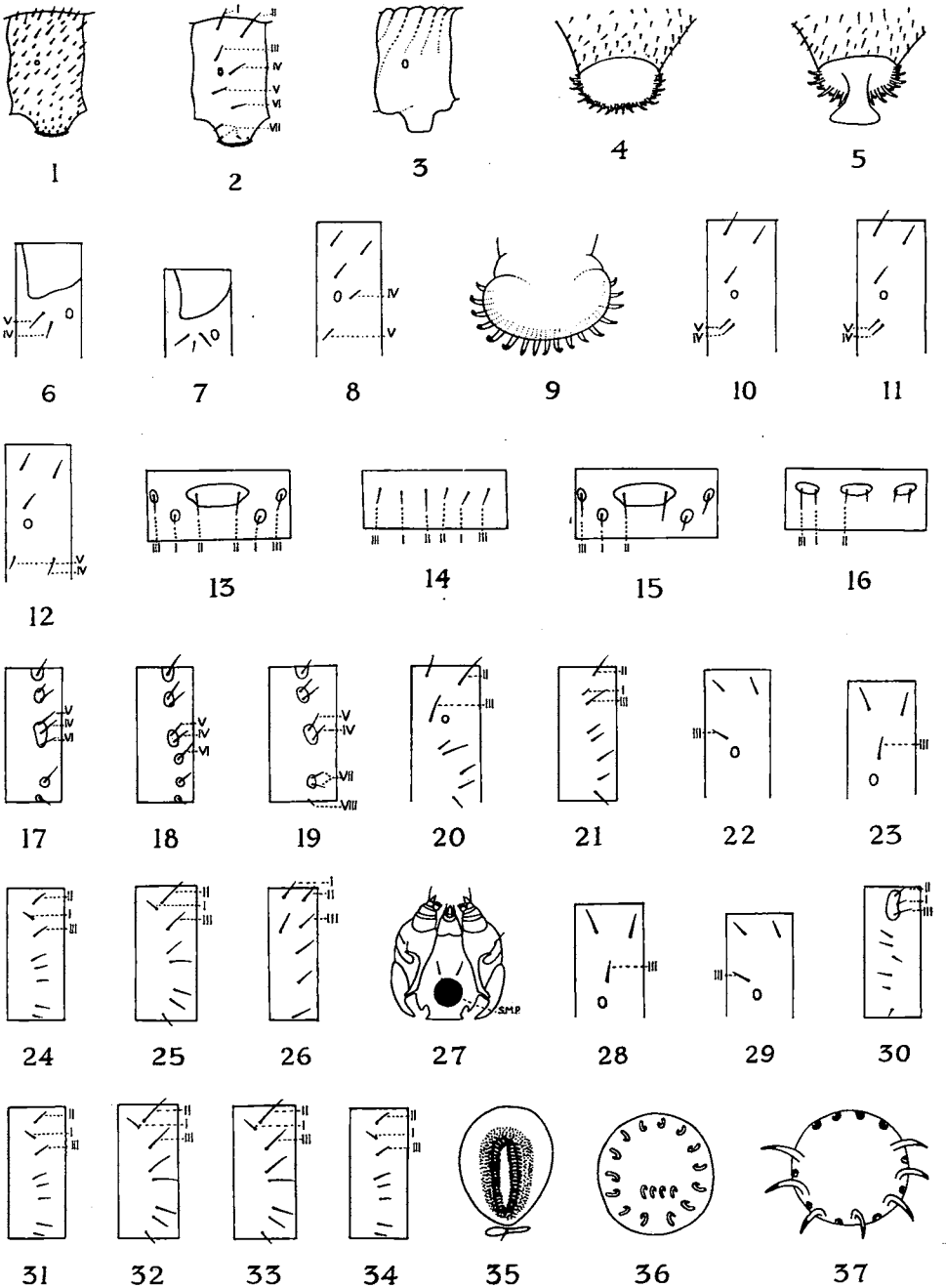
KEY TO FAMILIES

1. Caterpillars large, more than two inches; a long pointed dorsal horn on 8th abdominal segment ..... **Sphingidae**
   Caterpillars less than two inches 2
2. A pair of long soft moveable black horns or appendages on mesothorax, a shorter pair of similar appendages on 8th abdominal segment ..... **Danaidae**
   Without above appendages; body more or less hairy and with the usual setae represented by branching spines; skin minutely shagreened ..... **Nymphalidae**
   Not as above 3
3. Body with numerous short secondary setae (See fig. 1) 4
   Body without numerous short secondary setae (See fig. 2) 5
4. Body cylindrical, not depressed, segments divided into 6 or fewer annulets; crochets in a continuous mesoseries not interrupted by a spatulate lobe (See figs. 3, 4) ..... **Pieridae**
   Body depressed, fusiform (spindle-shaped), segments not divided into annulets; crochets in a mesoseries interrupted at center by a spatulate lobe (See fig. 5) ..... **Lycaenidae**
5. With more than one pair of abdominal prolegs 6
   With abdominal prolegs absent except on 6th segment ..... **Geometridae, Hydriomenidae, Selidosemidae**
6. Two setae in prespiracular group of prothorax (See fig. 6) 7
   Three setae in prespiracular group of prothorax (See fig. 7) 8
7. Proleg-bearing segments with setae IV behind, and V below the spiracle; crochets in a longitudinal mesoseries (See figs. 8, 9) ..... **Noctuidae**
   Proleg-bearing segments with setae IV and V close together below the spiracle; crochets in a continuous ring or a penellipse (fig. 10) ..... **Pyralididae**
8. Setae IV and V of proleg-bearing segments close together below the spiracle (fig. 11) 9
   Setae IV and V of proleg-bearing segments distant from each other and below the spiracle (fig. 12) 16
9. Paired setae II of 9th abdominal segment on a sclerotized plate (fig. 13) 10
   Paired setae II of 9th abdominal segment not on a sclerotized plate (fig. 14) 12

* Adapted from keys devised by Hahn W. Capps of the Division of Insect Identification of the U. S. Bureau of Entomology and Plant Quarantine (E-475), May 1939.



Lepidopterous Larvae: Arrangement of Setae, Crochets, etc. (diagrammatic) [after Capps].

10. Seta I of 9th abdominal segment approximately equidistant from setae II and III (fig. 15).....**Tortricidae**
    Seta I of 9th abdominal segment closely associated with seta III, on a single sclerotized plate (fig. 16).....11
11. Seta VI present on 9th abdominal segment (figs. 17, 18)..... ..... **(Olethreutidae) Eucosmidae**
    Seta VI absent from 9th abdominal segment (fig. 19).....**Phaloniidae**
12. Seta III of 8th abdominal segment directly in front of spiracle; seta I of 9th abdominal segment approximate to seta III but not on same plate (figs. 20, 21).....**Cosmopterygidae**
    Seta III of 8th abdominal segment not directly in front of spiracle; seta I of 9th abdominal segment not closely associated with seta III (figs. 22, 23, 24, 25, 26).....13
13. Submentum with a large oval pit; seta III of 8th abdominal segment above and slightly behind the spiracle (figs. 27, 28)..... .....**Blastobasidae**
    Submentum without an oval pit; or, if pit is present, seta III of 8th abdominal segment is above and in front of spiracle (fig. 29) 14
14. Setae I, II and III of 9th abdominal segment on a sclerotized plate (fig. 30).....**Hyponomeutidae** (part) **(Argyresthia)**
    Setae I, II and III of 9th abdominal segment not on a sclerotized plate (figs. 31, 32).....15
15. Seta I closely associated with II on 9th abdominal segment (fig. 33).....**Oecophoridae** (part) **(Endrosis** and **Hofmannophila)**
    Seta I of 9th abdominal segment not closely associated with seta II, approximately equidistant from setae II and III (fig. 34)..... .....**Gelechiidae**
16. Crochets of abdominal proleg in multiserial rings (fig. 35)..... .....**Tineidae** (part) **(Acrolophus)**
    Crochets of abdominal proleg in a complete ring, enclosing a short longitudinal series, or in a pseudocircle (figs. 36, 37)..... .....**Hyponomeutidae** (part) **(Acrolepia** and **Plutella)**

DANAIDAE

Body with scattered minute short secondary setae; skin with numerous minute flattened granules; body banded segmentally with black, white and yellow rings; spiracles black, situated in the black rings. Caterpillars on milkweeds: *Asclepias, Gomphocarpus* and *Calotropis*. Monarch butterfly.....**Danaus plexippus** (Linn.)

NYMPHALIDAE

Two round white spots dorsally on abdominal segments 2-8; sparsely hairy. Caterpillar on *Gnaphalium*. Hunter's butterfly..... .....**Vanessa virginensis** Drury

Without the above dorsal white spots; more hairy, hairs white. Caterpillar on thistle, *Malva,* burdock and hollyhock. Thistle butterfly, or painted lady.....**Vanessa cardui** (Linn.)

PIERIDAE

Body light green, with a yellow middorsal stripe; proleg-bearing segments with yellowish or whitish pigmented longitudinal band, discontinuous shortly posterior to the spiracle; larger seta-bearing tubercles of abdominal segments higher than their width at base. Caterpillars on cabbages and related plants; also on *Nasturtium* and *Capparis sandwichiana*. Cabbage butterfly.....**Pieris rapae** (Linn.)

LYCAENIDAE

1. Body densely covered with short, fine setae.....2
   Setae of body fewer, larger, and of uneven size, some being longer. Feeds on lantana flowers.....**Thecla agra** Hewitson
2. Spiracles circular, black, conspicuous. Feeds mostly on lantana flowers, but has also been found on eggplant, berries of *Solanum nigrum* and fruit of *Cordia sebestena*.....**Thecla echion** (Linn.)
   Spiracles pale, inconspicuous. Feeds in flowers and pods of pigeon pea, *Crotalaria*, and several kinds of beans.....**Cosmolyce boetica** (Linn.)

SPHINGIDAE

Body yellowish, with large black segmental spots on dorsum tending to form transverse bands; usually a distinct middorsal longitudinal yellow line or stripe; prothoracic shield brownish yellow, with numerous white dots. Caterpillars feed especially on *Portulaca lutea*, also on *Boerhaavia diffusa*, *Fuchsia* and *Godetia*.....**Celerio lineata** (Fabr.)

Body green, which is sometimes obscured by fuscous markings or mottling; spiracles situated in circular dark spots; an oblique dark streak above each spiracle, slanting backward, and sometimes a conspicuous longitudinal dark streak connecting the oblique streaks on dorsum, and middorsal pale streak; prothoracic shield concolorous. Caterpillars feed on morning-glory and sweet potato vines.....**Herse cingulata** (Fabr.)

Body varying from yellowish green to dull greenish fuscous, sometimes pinkish; numerous pale specks in transverse lines on dorsum; spiracles oval, dark, surrounded by a narrow pale ring; above each abdominal spiracle a pale streak extending obliquely backwards; two vertical nearly parallel black streaks on front of head; prothoracic shield brownish or black; caudal horn black, curved. Caterpillars feed on tobacco, tomato, and more particularly on *Nicotiana glauca*.....**Protoparce quinquemaculata blackburni** (Butler)

AGROTIDAE

1. Prolegs absent on abdominal segments 3 and 4, present on segments 5 and 6.....2
   Prolegs present on abdominal segments 3 to 6.....3
2. A wide whitish longitudinal stripe on each side of the dorsal vessel and including setae I and II, or sometimes separated into three crinkly white lines; a conspicuous longitudinal white line just above spiracles and occupying nearly all of the space between

the spiracles and setae III. About 30 to 40 mm. in length. Feeds on nearly every kind of garden plant and weeds..... .....**Plusia chalcites** (Esper)

The dorsal longitudinal white lines not so conspicuous; the longitudinal white line above the spiracles occupying only one-third to one-half of the space between the spiracles and setae III. About 25 to 30 mm. in length. Feeds on cabbage and other cruciferous plants. It has been recorded on lettuce also. .....**Autographa brassicae** (Riley)

3. A yellowish middorsal spot on metathorax and on abdominal segments 1 to 4....Variegated cutworm, **Lycophotia margaritosa** (Haw.)
Without the above spots.....4

4. Skin with numerous short, sharp spines..... .....Corn earworm, **Heliothis armigera** (Hübn.)
Skin with numerous minute irregular-shaped sclerotized plates, or granulose.....Greasy cutworm, **Agrotis ypsilon** (Rott.)
Skin without the above structures.....5

5. Surface covered with numerous small white irregular spots and scrawly lines; usually longitudinally darker striped.....6
Surface without the above white spotting.....7

6. Color varying from green to nearly black; spiracles black, at the lower margin of a dark longitudinal stripe; a conspicuous white spot behind spiracle and a little higher; two dorsal longitudinal dark stripes separated by a narrower pale middorsal stripe....Nutgrass armyworm, **Laphygma exempta** (Walker)
Color varying from green to nearly black; spiracles pale with black rim, at the lower margin of a broad dark longitudinal stripe; a conspicuous small white spot behind spiracle and a little higher; dorsal area pale with a median darker narrow longitudinal stripe which is traversed by middorsal broken pale line.....Beet armyworm, **Laphygma exigua** (Hübn.)

7. Lobes of head pale testaceous with brown meshes; wide dorsal area pale with a mottling of light brown and some fuscous, and a middorsal longitudinal white line, the outer margins bordered with a white line; also white lines bordering the outer margins of the dorsal area; spiracles black, at the lower margin of a longitudinal fuscous stripe which is somewhat interrupted segmentally....Common armyworm, **Cirphis unipuncta** (Haw.)
Head dark brown in front, paler on vertex and laterally; body dark with a velvety appearance; two dorso-lateral darker spots on abdominal segments 6 and 7; spiracles black..... .....**Elydna nonagrica** (Walker)

PYRALIDIDAE

1. Seta IIb of mesothorax with a dark sclerotized ring at base.....2
Seta IIb of mesothorax without above ring.....4

2. Setae I and II of abdominal segments with strongly sclerotized and moderately large plates at base. Feeds in *Ceratonia* pods, also *Acacia farnesiana* and pigeon pea.....**Myelois ceratoniae** Zeller
Setae I and II of abdominal segments with definite small pigmented plates at base, not in white circles.....3
Setae I and II of abdominal segments with definite small pigmented plates at base and situated in white circles; upper surface

more or less fuscous. Feeds in corn silks, sorghum heads, and as a scavenger on cane leaves where there has been an infestation of aphis.....**Cryptoblabes aliena** Swezey

3. Seta IV of 8th abdominal segment separated from spiracle by about one diameter of spiracle; caterpillar smaller, about 13 mm. and about 1.5 mm. in width. Feeds in cereals and dried fruits, and in stored feed products.....**Ephestia cautella** (Walker)

Seta IV of 8th abdominal segment separated from spiracle by about 2 or 3 diameters of spiracle; caterpillar larger, about 16 mm. and 2 mm. in width. The Mediterranean flour moth. Often found in imported nuts.....**Ephestia sericaria** (Scott)

4. Meso- and metathorax each with a pair of sclerotized plates (without setae) on posterior dorsal margin. Feeds on seeds in lima bean pods, and some other beans also.....**Maruca testulalis** (Geyer)

Metathorax without the above plates; setae of abdominal segments situated in large brown sclerotized plates. Borer in sweet potato vines and tubers.....**Omphisa anastamosalis** (Guen.)

Meso- and metathorax without the above plates.....5

5. Ocellus I distinctly larger than ocellus II; head blackish or fuscous, with a distinct whitish area along adfrontal suture, extending to vertex. Body with pinkish longitudinal stripes. Feeds on cabbage and some other cruciferous plants....**Hellula undalis** (Fabr.)

Sclerotized plates at base of setae I and II of abdominal segments not pigmented, except a few of them on margins; prothoracic shield with two black marks laterally, the posterior one larger. Feeds on beet and amaranth leaves.....**Hymenia recurvalis** (Fabr.)

Sclerotized plates at base of setae I and II of abdominal segments not pigmented; head light brown; prothoracic shield testaceous, unmarked. In stored foods: cereals, nuts, dried fruit, etc.....**Plodia interpunctella** (Hübn.)

GELECHIIDAE

1. Abdominal prolegs rudimentary; each proleg usually with not more than 3 or 4 crochets.....Angoumois grain moth, **Sitotroga cerealella** (Oliv.)

Abdominal prolegs normal; each proleg with more than 3 or 4 crochets 2

2. Setae on prespiracular shield of prothorax triangularly arranged, shield not encircling the spiracle; crochets of anal legs uniordinal or biordinal, not interrupted at center; anal fork absent....3

Setae on prespiracular shield of prothorax in longitudinal line on the shield, which is elongate, the posterior end lying below and not connected with it.....5

3. Setae Adf_1 and Adf_2 of head close together, decidedly anterior to apex of front; P_1 but slightly above level of Adf_1 and with P_2 laterad of P_1.....4

Setae Adf_1 and Adf_2 not closely associated, anterior to apex of front; seta P_2 posterior to P_1; prothoracic shield light brown, with a pale reniform spot posterior to seta Ib; seta III of 8th abdominal segment above and in front of spiracle; crochets of abdominal prolegs uniordinal and arranged in a penellipse; skin smooth.....Pink bollworm, **Pectinophora gossypiella** (Saunders)

4. Prothoracic shield pale, whitish, with dark fuscous shading along lateral and posterior margins.....Tomato pinworm, **Keiferia lycopersicella** (Busck)

   Prothoracic shield entirely dark brown or blackish.....Potato tuber moth, **Gnorimoschema operculella** (Zeller)

5. Prothoracic shield yellowish brown; setae I and II of abdominal segments situated in a minute dark ring; seta III in a larger conspicuous dark ring situated just above spiracle; spiracle minute, pale with a dark rim. Caterpillar with a slight pinkish tinge when alive. About 15 mm. in length. In dead plant tissues: stems of castor oil plant, lantana, fibrous matter at base of palm leaves, stems of old capsules of *Ipomoea tuberosa,* etc. .....**Autosticha pelodes** (Meyrick)

   Prothoracic shield dark brown to fuscous. Whole caterpillar dark with velvety appearance when alive. Seta III just above spiracle, not in a conspicuous dark ring as above. About 16 mm. in length. In decaying leaves, etc., on ground beneath pigeon peas, beans, etc., also in the decaying leaves, etc., of turf..... .....**Stoeberhinus testaceus** Butler

PLUTELLIDAE

Plate at base of seta III enclosing abdominal spiracle; all setae situated in conspicuous black pigmented plates; crotchets in a complete circle. Larvae in onion leaves.....**Acrolepia assectella** (Zeller)

Plate at base of seta III not enclosing abdominal spiracle; setae not in conspicuous pigmented plates; abdominal prolegs long and slender, crotchets in a pseudocircle. Larvae on cabbages and other cruciferous plants.....**Plutella maculipennis** (Curtis)

COSMOPTERYGIDAE

Seta IIa of prothorax above level of seta Ia; crochets of abdominal proleg uniordinal, in a complete ring.....**Pyroderces** spp.

Body slightly pinkish on dorsum; head light brown; prothoracic shield dark brown; all body setae situated in pigmented sclerotized plates; seta III of 8th abdominal segment directly in front of spiracle; on other segments III is above spiracle; IV and V together in same sclerotized plate below spiracle; paired setae II of 9th abdominal segment on a transverse sclerotized plate. Caterpillars occur abundantly in the male inflorescence of *Pandanus*..... .....**Pyroderces incertulella** (Walker)

Body pink; head testaceous; prothoracic shield black; setae as above, except that the sclerotized plates are pale, and setae II of 9th segment are not together in the same plate. Caterpillars common in cotton bolls, corn silk and tassels, old pods of *Acacia farnesiana* and other legumes.....**Pyroderces rileyi** (Walsingham)

TORTRICIDAE

Prothoracic shield with black lateral margin. Leafroller on many kinds of garden plants and weeds.....**Amorbia emigratella** Busck

Prothoracic shield without black lateral margin. Leafroller on many kinds of garden plants and weeds.....**Archips postvittanus** (Walker)

EUCOSMIDAE (OLETHREUTIDAE)

(Skin minutely granulate; 10th abdominal segment distinctly and completely sclerotized in the following species.)

1. Body short, plump, pinkish tinged; sclerotized plate of 10th abdominal segment wider than long.....2

   Body elongate, greenish tinged; setae in very small sclerotized plates; sclerotized plate of 10th abdominal segment longer than wide. Borer in stems and corms of nutgrass (*Cyperus rotundus*).....**Bactra truculenta** Meyrick

2. Head with wide black streak behind eyes; setae in pale sclerotized plates. Feeds in lantana flowers and bores in stem..... **Crocidosema lantana** Busck

   Head without black streak behind eyes; setae in conspicuous brown sclerotized plates. Feeds on seeds in pods of *Acacia koa* and *Acacia farnesiana,* also in *Sapindus, Dodonaea* and occasionally in beans.....**Argyroploce illepida** (Butler)