THE HONEY GLAND AND TUBERCLES OF LARVÆ OF THE LYCÆNIDÆ

by GOWAN C. CLARK and C. G. C. DICKSON

A considerable amount of data having been gathered concerning the honey gland and its attendant tubercles of larvæ of the Lycænidæ, it is presented here to help anybody studying this interesting subject. The honey gland is an orifice dorsally placed on the 10th segment, which is capable of exuding a liquid much sought after by ants. It is, in some, a simple transverse slit on the surface, in others the slit is sunken in an elliptical trough, and in others it is raised above the surface on an elongated mole, while another form is an elongated mole sunk in a depression. The gland is placed in the centre of the segment, toward the posterior edge, or is tucked away in a fold between the 10th and 11th segments. It is often protected by spined setæ. When the larva exudes a bead of liquid, the gland of most species unfolds into a bulge before the liquid appears.

The tubercles, if they are present, are situated on the 11th segment, one on each side, in the vicinity of the spiracle. In a primitive form, they may be present in the first instar or they may not appear till some later instar, while in a few they are only present in the final instar. The table on pages 38-39 indicates the range of variation in the honey gland and tubercle characters in South African lycænids.

In the South African larvæ studied, there are two forms of tubercles, (a) what may be called warning beacons, and (b) what are definitely whips. Two species at least which possess the former type, namely of *Castalius* and *Syntarucus,* use their tubercles as whips. In both of these the spines are long and, with the tubercle half extended, they form a stiff cluster with which the vicinity of the honey gland is dusted. In (b) the tubercles are encased in protruding cylinders the rims of which are, in most cases, provided with hard spines to protect the bristles of the tubercles which are too long to be totally withdrawn. The portion of the rim facing the honey gland usually has no spines or has very small spines so as to allow full freedom of action to the tubercle. Cylinders which rise well above the surface are capable of swaying from side to side to give a bigger dusting range. The tubercles are eversible rods which are forced straight out, then bent over. The spines, some placed on the end and some on the side, sweep a large area as they unfold.

When an ant wishes to "milk" a lycænid larva, it generally takes a stance on the dorsum and caresses the vicinity of the gland with its antennæ. The larva responds by exuding a bead of liquid, which the ant removes. After swallowing this it again caresses the vicinity of the gland until satisfied or driven away by the tubercles.

The warning beacon type of tubercles are generally very sluggish and are normally drawn below the surface of the skin, but when the larva is annoyed by the attentions of insects other than its accustomed ants, the tubercles are fully extended after a few nervous tremblings and half-threatening attempts. The tubercles remain in the fully extended state for about 3 to 4 seconds and are then

withdrawn, but if the interference continues, out come the tubercles again. They can be operated independently. In some cases the tubercles may be made to extend by tickling the vicinity of the honey gland with a paint brush.

The whip type tubercles are all very active and shoot out in rapid determined flashes, one to two flashes per second, some slightly faster. When crawling about, the larva seldom has its tubercles completely dormant, and they are seen to be trembling in and out with occassional flashes as if in a state of nervousness or a warning to insects to keep away.

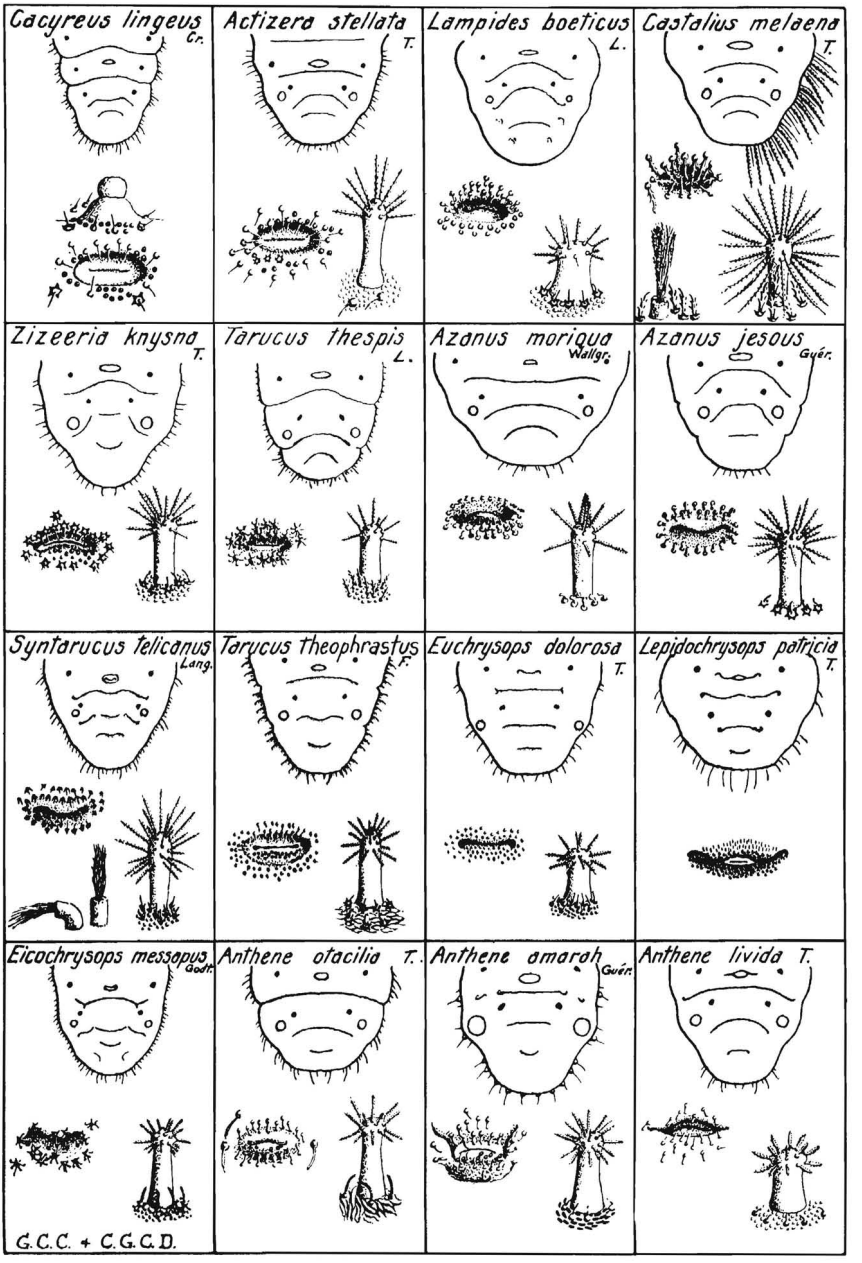
SPECIES	INSTAR OF FIRST APPEARANCE		NO. OF SPINES ON TUBERCLES (INSTAR)	
	GLAND	TUBERCLES	FIRST	LAST
Cacyreus lingeus Cram.	2nd	none	none	———
Cacyreus palemon Cram.	none	none	none	———
Cacyreus marshalli Butl.	none	none	none	———
Actizera stellata Trim.	3rd	3rd	?	16-20
Actizera lucida Trim.	2nd	3rd	?	?
Lampides bœticus Linné	3rd	3rd	?	20
Castalius melæna Trim.	penultimate	penultimate	?	36-40
Zizeeria knysna Trim.	penultimate	penultimate	?	24
Tarucus thespis Linné	2nd	3rd	?	18-20
Tarucus bowkeri Trim.	2nd	3rd	?	18
Tarucus theophrastus Fab.	2nd	2nd	?	24
Azanus jesous Guér.	2nd	3rd	?	30
Azanus moriqua Wallgr.	2nd	3rd	?	11
Azanus ubaldus Cram.	2nd	3rd	?	19-20
Syntarucus telicanus Lang	2nd	final	?	30
Syntarucus jeanneli Stpffr.	2nd	final	?	31
Lepidochrysops patricia Trim.	2nd	none	none	———
Lepidochrysops caffrariæ Trim.	2nd	none	none	———
Lepidochrysops methymna Trim.	2nd	none	none	———
Lepidochysops bacchus Riley	2nd	none	none	———
Lepidochrysops lacrimosa B. Bak.	2nd	3rd	?	?
Euchrysops dolorosa Trim.	2nd	3rd	?	18
Eicochrysops messapus Godt.	2nd	penultimate	?	20
Anthene otacilia Trim.	2nd	3rd	?	20-25
Anthene amarah Guér.	2nd	3rd	?	32
Anthene livida Trim.	2nd	2nd	?	20
Anthene lemnos Hew.	3rd	3rd	?	30-34
Anthene definita Butl.	2nd	3rd	?	18
Phasis sardonyx Trim.	?	1st	?	?
Phasis thero Linné	3rd	1st	?	11
Alœides aranda Wallgr.	3rd?	1st	4	?
Alœides almeida Feld.	3rd?	1st	6	?
Alœides pierus Cram.	3rd?	1st	6	15
Alœides thyra Linné	3rd?	1st	?	26
Alœides taikosama Wallgr.	3rd?	1st	10	10
Axiocerces bambana Gr.-Sm.	3rd	1st	?	5
Aphnæus hutchinsonii Trim.	3rd	1st	3	?

SPECIES	INSTAR OF FIRST APPEARANCE		NO. OF SPINES ON TUBERCLES (INSTAR)	
	GLAND	TUBERCLES	FIRST	LAST
Capys alphæus Cram.	4th	none	none	———
Deudorix antalus Hoff.	2nd	none	none	———
Deudorix diocles Hew.	3rd	none	none	———
Leptomyrina lara Linné	2nd	none	none	———
Thestor basutus Wallgr.	none	none	none	———
Thestor dicksoni Riley	none	none	none	———
Lachnocnema bibulus Fab.	none	none	none	———
Lachnocnema durbani Trim.	none	none	none	———
Durbania amakosa Trim.	none	none	none	———
Alæna amazoula Bdv.	none	none	none	———
Hypolycæna philippus Fab.	2nd	none	none	———
Epamera sidus Trim.	3rd	3rd	?	5 rows of 5-6
Epamera æmulus Trim.	3rd	3rd	?	18-20 rows of 8
Epamera mimosæ Trim.	final	final	—	40-45
Epamera alienus Trim.	2nd	3rd	?	40
Stugeta bowkeri Trim.	2nd	final	?	30
Argiolaus silas Westw.	2nd	2nd	?	75
Myrina ficedula Trim.	2nd	2nd	?	14 rows of 6
Myrina dermaptera Wallgr.	2nd	2nd	?	24 rows of 10
Pœcilmitis thysbe Linné	2nd	1st	2	8
Spindasis natalensis Dbl. & Hew.	3rd	1st	none	8
Crudaria leroma Wallgr.	2nd	1st	2	6

The majority of species illustrated have been studied with ants in attendance, and to obtain the detailed drawings larvæ have had to be killed in order to force out the tubercles for examination. The illustrations show: a semi-diagramatic view of the last four segments of the final instar; a scale drawing of the honey gland as seen from above; if present, the fully developed tubercles extended; and, where possible, the earliest form of the tubercle. All drawings are drawn more or less to one size for ease of comparison.

Referring to the illustrations, *Cacyreus lingeus* has no tubercle; the space is therefore utilized to show the honey gland bulged out and exuding a bead of liquid. The drawings of *Castalius melæna* include a view of the partially extended tubercle with spines bunched ready to be used as a brush, and the drawing of *Syntarucus telicanus* shows the method of brushing. The honey gland of *Epamera sidus* is difficult to detect as it resembles an ill-defined wrinkle between the 10th and 11th segements; consequently a side view of the larva is given with an enlarged view of the open gland. *Leptomyrina, Capys, Deudorix, Hypolycæna,* and *Lepidochrysops* have no tubercles, and only the honey gland is shown. In *Capys alphæus* two views are shown at right angles to each other, of the sunken gland, one showing the gland dormant, the other exuding a bead of liquid. The illustration of *Castalius hintza* shows the dormant tubercle and the spiracle.

In the whip type the tubercles are present in the 1st instar, and drawings of the 1st instar tubercles are shown in all except *Phasis thero, Axiocerses bambana,*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Anthene amarah Guén.
Anthene livida T.
G.C.C. + C.G.C.D.

and *Pœcilmitis*. The small tubercle in the illustrations of *P. felthami* is that of the second instar.

The protective rim spines of the cylinders of the tubercles are clearly shown, and in order not to foul these when extended, *Spindasis natalensis* has five spines on one side of the tubercle and only three on the other. In *Pœcilmitis thysbe* three illustrations are given to show the unfolding of the tubercle and one front view to show the spread of the bristles. The honey gland of the *Alœides* is tucked away under a fold of the junction of the 10th and 11th segments and is difficult to find until it functions. Its position in the drawings is marked by an arrow. The *Spindasis* and *Crudaria* have, in the centre of the segment, on the dorsum, a saucer-like dishing which suppurates a liquid similar to the honey gland, and ants are seen to take the liquid from these. These patches, called "dew patches" for want of a better name, first appear on the 5th segment in the 3rd instar of *C. leroma.* In the 4th instar the patch is prominent on the 5th segment, and there may be one on the 8th, though less developed, and there may be traces of patches on the 6th and 7th segments. In the final instar they are fully developed on segments 5 to 8, as shown in the illustration. In the *Spindasis* the first appearance of this patch is on the 5th segment of the penultimate instar, but in the final instar there is a fully developed patch on each of segments 5 to 8.

In captivity, the honey gland and "dew patches" of *C. leroma* suppurate freely, especially in the later instars, and unless ants are in attendance the liquid develops mildew which kills the larva. To prevent this, the liquid can be drawn off by a point of blotting paper. It may be as well to "wash" the glands with a very wet paint brush and thoroughly dry the larva with points of blotting paper.

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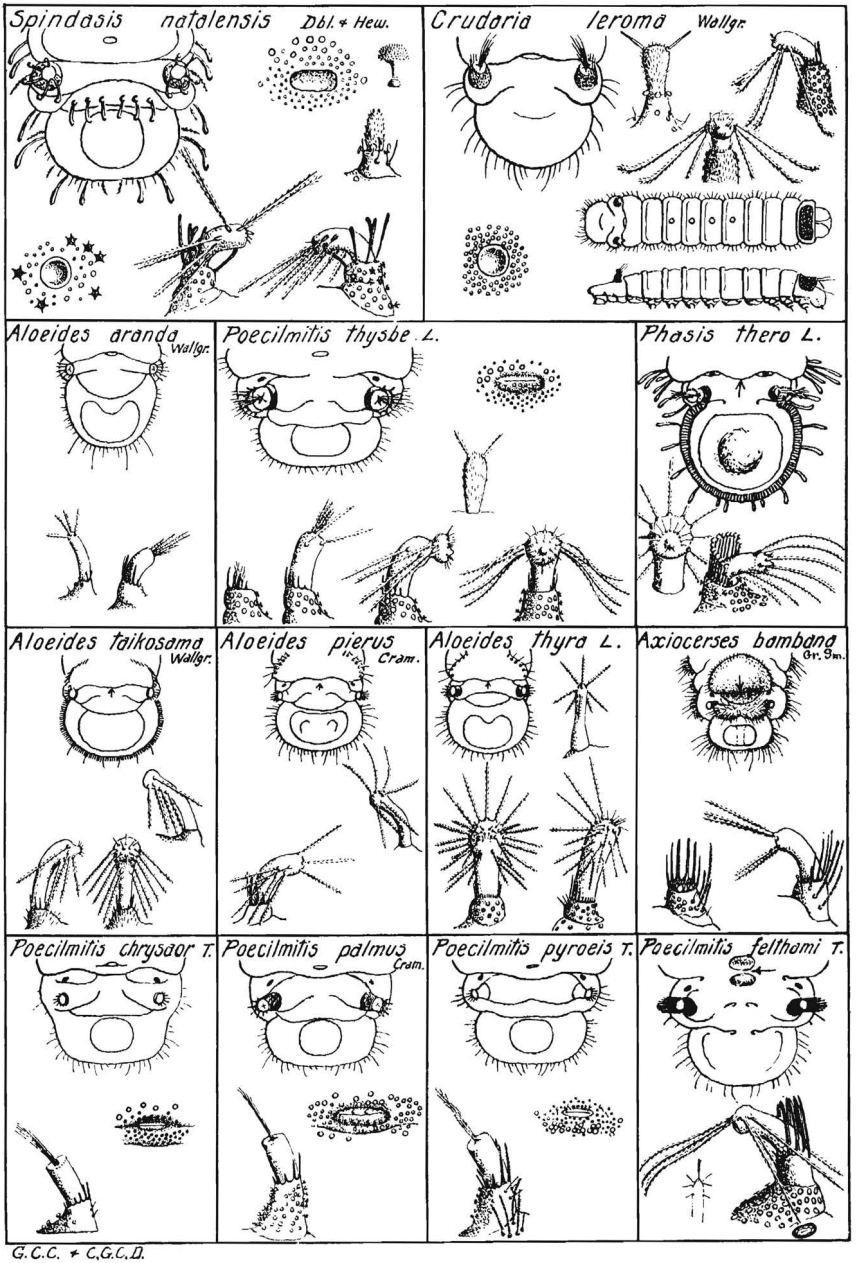
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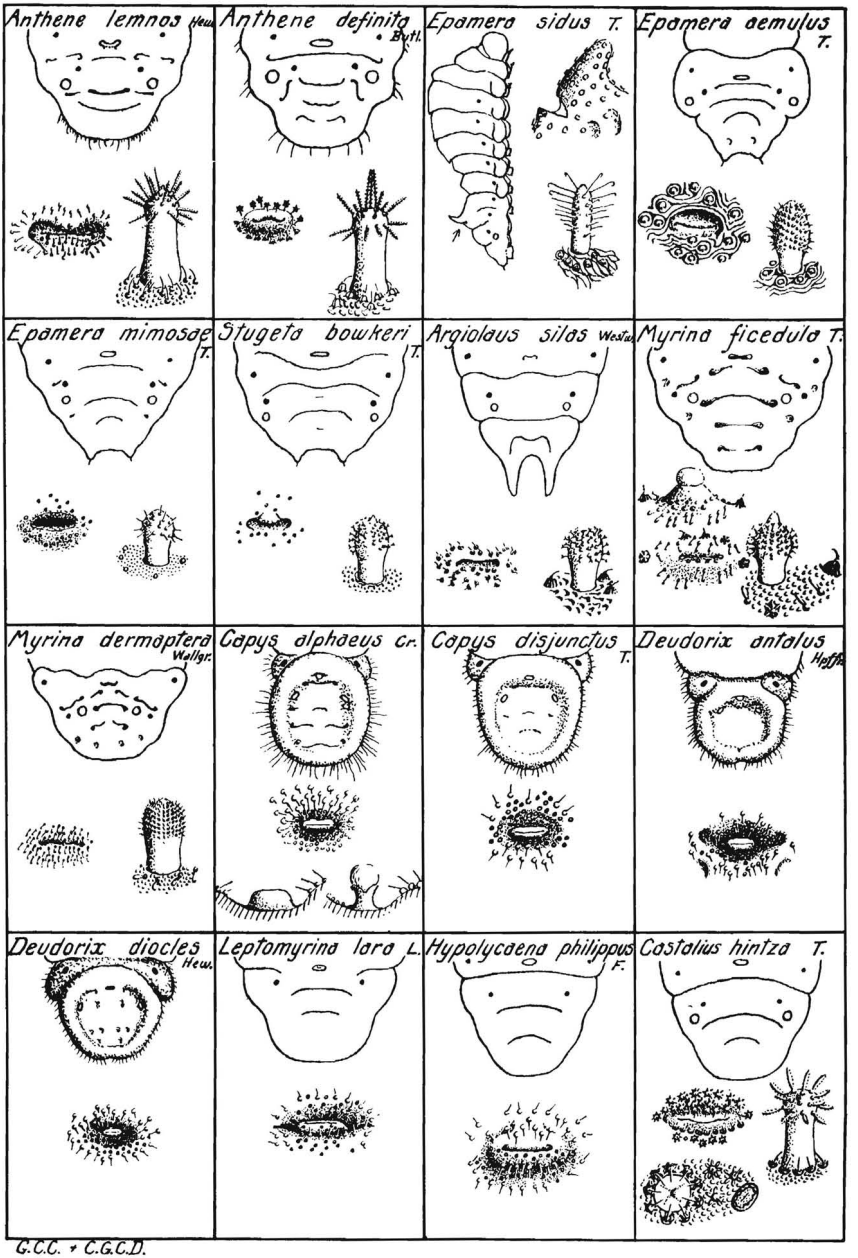
Poecilmitis pyroeis T.
Poecilmitis felthami T.

G.C.C. & C.G.C.D.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