Nymphs of the Genus *Rhopalimorpha* Dallas (Hemiptera, Acanthosomidae)

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Abstract

Descriptions and a key to the five nymphal instars of two species of *Rhopalimorpha* Dallas are presented.

In an earlier publication (1952) the author described the development and habits of the nymphs of two species of *Rhopalimorpha* Dallas. In the present paper, descriptions and measurements and a key to the five nymphal instars of these two species are presented. Under the name *Rhopalimorpha obscura* White, Myers (1926) described nymphs of four instars, but these descriptions fairly certainly belong to nymphs of *R. lineolaris* Pendergrast, the existence of which was unknown to Myers. Nymphs which he describes as third instar are probably fourth. Nymphs of *R.* (*Lentimorpha*) *alpina* Woodward, 1953, are unknown.

In the following descriptions, the colour and markings of the insects are included because, although variations occur and some of the colour may be lost after a time in preservatives, they do provide a quick means of identification of most living and newly preserved nymphs.

Rhopalimorpha lineolaris Pendergrast, 1950

First Instar

At this stage, the nymphs are usually inactive and probably do not feed. Myers (1926) has commented on the almost circular outline with the strongly arched dorsum, so that the insect approaches a hemisphere in shape. This character enables ready identification of first instar nymphs. Another characteristic is the lack of lateral expansions of the nota which develop in later instars.

Outline almost circular; head bent downwards so that in side view its dorsal surface is in line with strongly arched profile of remainder of dorsal surface. Head black or dark brown with white spot at vertex; eyes red, not as prominent as in later instars; ocelli inconspicuous in life, placed relatively further away from pronotum than in later stages; fine light ecdysial cleavage lines run mesad from eyes behind ocelli and meet at most posterior visible part of head.

Thorax dark brown or black dorsally, pronotum longest, metanotum shortest: proportional lengths in mid-line = pronotum 10: mesonotum 8: metanotum 3.

Abdomen dorsally pale translucent yellow suffused with orange and with three dark brown or black scent gland areas, edged with white; bright orange-red between areas; anterior area consists of two tear-drop shaped patches with narrow ends almost meeting in the mid-line; median stripe passing between them; two remaining areas bluntly elliptical; in front of anterior area two dark stripes run across abdomen, each divided in mid-line; behind last scent gland area a small rudimentary area may be present; lateral margins of abdomen marked by dark grey semicircular patches.

Ventral surface lighter than dorsal; head and thorax yellow suffused with black; abdomen pale yellow.

Antennae four-segmented, translucent smoky grey. Legs light yellow, sometimes smoky.

	Minimum	Maximum	Mean
Head Capsule Width	0.55 mm	0.67 mm	0.59 mm
Maximum Width Thorax	0.83 mm	1.00 mm	0.90 mm
Rostrum Length	0.71 mm	0.79 mm	0.78 mm

Second Instar (Fig. 2)

Nymphs of this instar are easily distinguished from those of the preceding stage by their active habit, less rounded form, black-tipped antennae, more prominent head without a white spot on the vertex, and light coloured expansions of the thoracic nota.

Head approaching adult form; rounded anterior end of anteclypeus prominent; juga cut off by deep grooves, lateral margins slightly concave; eyes conspicuous, close to anterior edge of pronotum; ocelli near thoracic border; ecdysial lines very faint with point of junction hidden beneath pronotum. Head brown, darkest near vertex, narrow raised margins lighter; sometimes faint indication of median light stripe posteriorly.

Thorax black or dark brown, with median light cream stripe with indistinct edges; margins of nota expanded, especially in mesothorax, cream or amber coloured; metanotum partly covered in mid-line by mesonotal expansion; proportional lengths in mid-line = pronotum 12: mesonotum 9: metanotum 2.

Abdomen bright orange-red, marked generally as in first instar; anterior end of median light line with indistinct patch of cream; second scent gland area not double as in Myers (1926); first (double) area dark brown, rarely black, others black, behind third area a small black rudimentary area; areas bordered laterally by a cream line.

Ventrally, head brown; thorax black, with lateral expansions amber; abdomen yellow with lateral orange strip and four dark patches in mid-line; pygophor black.

Legs distally smoky amber, proximally black; antennae smoky amber, greater part of terminal segment black.

	Minimum	Maximum	Mean
Head Capsule Width	0.78 mm	0.88 mm	0.81 mm
Maximum Width Thorax	0.99 mm	1.27 mm	1.11 mm
Rostrum Length	1.10 mm	1.25 mm	1.18 mm

Third Instar

Except for a considerable increase in size, insects of this instar resemble those of the preceding one in most respects, the chief structural difference being in the proportional lengths of the nota and the continued development of their lateral expansions.

Head colour as in second instar, but with narrow median light stripe usually more conspicuous.

Thorax dark brown, median stripe wider than in second instar, narrows anteriorly before continuing on to head; light expansions of pro- and mesonota further developed, metanotum now almost covered at three points—viz., laterally and at mid-line; proportional lengths in mid-line = pronotum 15: mesonotum 13: metanotum 1.

Abdomen as in preceding stage, but median stripe wider anteriorly where it passes between halves of first scent gland area.

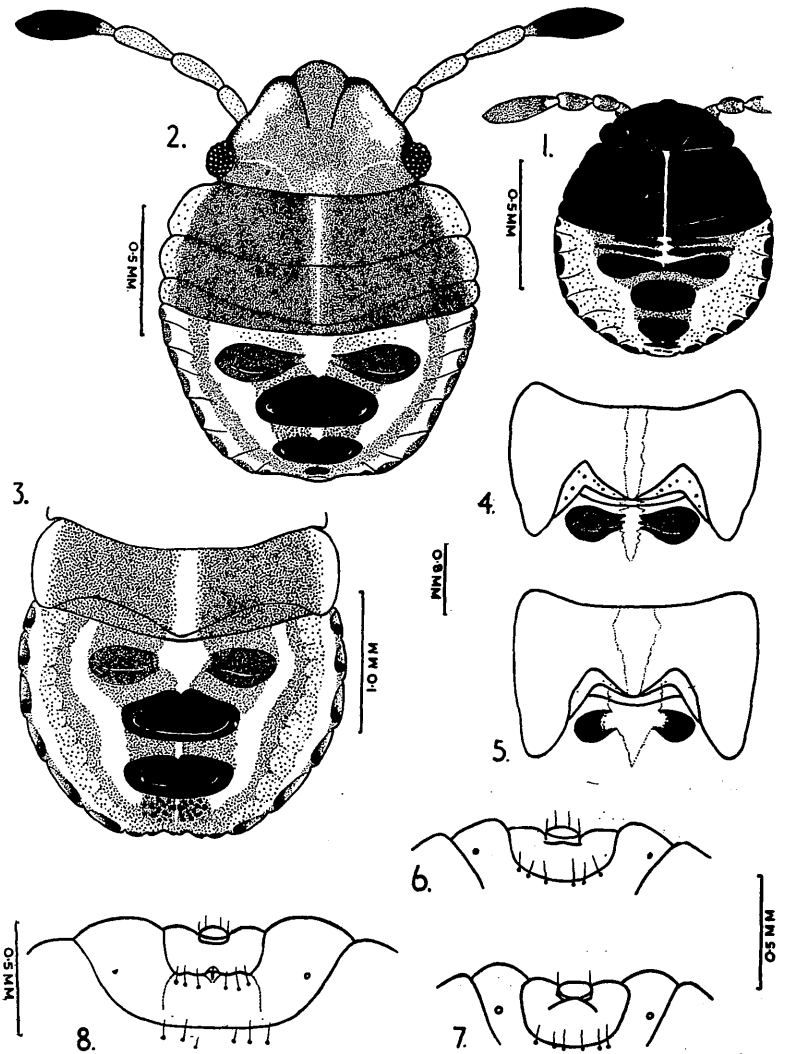
Ventrally head and thorax brown; thorax darker, margins cream; abdomen pale cream or yellow with three orange-red longitudinal stripes; black markings as in second instar. Appendages as in previous stage.

	Minimum	Maximum	Mean
Head Capsule Width	0.99 mm	1.16 mm	1.12 mm
Maximum Width Thorax	1.50 mm	1.80 mm	1.68 mm
Rostrum Length	1.35 mm	1.66 mm	1.54 mm

Fourth Instar (Fig. 3)

At this stage, rudimentary hemelytral pads are present, and the metathorax is covered almost or entirely by the backwardly-projecting developing mesoscutellum.

Head and thorax generally similar to those of third instar nymphs; metathorax covered laterally by developing hemelytral pads; metanotum (rudimentary hind-wings) with conspicuous punctures; proportional lengths in mid-line = pronotum 22: mesonotum 24: metanotum 0.9. Abdomen with rudimentary connexivum which may disappear after feeding; abdomen orange-red generally, amber near connexivum; scent gland areas bordered by two wide longitudinal cream bands, diffuse posteriorly and merging in mid-line to form patch of orange and cream stippling; connexivum cream with elliptical dark patch in each segment, red between patches. Abdomen light yellow or cream ventrally, with five longitudinal red stripes, one in mid-line, one near connexivum and a narrow one on connexivum interrupted by dark patches as on dorsal side; four dark brown or black markings in mid-line in last four segments.



FIGS. 1–8.—Fig. 1—*R. obscura,* 1st instar. Fig. 2—*R. lineolaris,* 2nd instar. Fig. 3—*R. lineolaris,* 4th instar, abdomen and rudimentary hemelytra. Figs. 4 and 5—5th instar, wing and hemelytral pads and anterior scent-gland. Fig. 4—*R. lineolaris.* Fig. 5—*R. obscura.* Figs. 6-8—5th instar, terminal abdominal segments, ventral view. Fig. 6—*R. lineolaris,* male. Fig. 7—*R. obscura,* male. Fig. 8—*R. lineolaris,* female.

Legs light brown, slightly darker proximally; antennae dark amber, greater part of terminal segment black, most of penultimate and distal end of second segment ochreous.

	Minimum	Maximum	Mean
Head Capsule Width	1.38 mm	1.64 mm	1.54 mm
Maximum Width Thorax	2.22 mm	2.75 mm	2.49 mm
Rostrum Length	1.92 mm	2.22 mm	2.05 mm

Fifth Instar (Figs. 4, 6, 8)

Myers (1926, Fig. 23) figures a fifth instar nymph which appears to be of this species.

By this instar the hemelytral pads have enlarged considerably, while the rudiments of the hind wings are visible in the angles between the hemelytra and scutellum. Sexual differences can be observed. The punctation of the thorax provides a useful means of distinguishing this species.

Head brown, with dark vertex marked by median cream stripe better developed than in earlier stages, raised jugal margins cream. Thorax brown, lateral margins cream; cream median stripe conspicuous. Hemelytral pads reach point at least half-way along second visible abdominal tergum, hind wing pads project from beneath inner margin of each hemelytral pad, each with more than three conspicuous punctures in area near rudimentary mesoscutellum and 1–4 beside inner border of hemelytral pad. Mesoscutellum with black punctures conspicuous against lighter brown background.

Abdomen bright orange-red especially between scent gland areas; first area brown, remainder black; cream median stripe narrow anteriorly and passes between halves of first area scarcely encroaching on darker pigment on each side; cream stripe bordering scent gland areas laterally becomes diffuse behind last area and two stripes merge forming easily recognized blotchy orange and cream patch; connexivum marked as in previous instar.

Ventrally head and thorax dark brown with lighter edges; abdomen coloration generally as in fourth instar.

Legs and antennae as in previous stage.

In the fifth instar it is possible to distinguish between the two sexes using the structure of the posterior parts of the abdominal venter. The true eighth sternum, which is the seventh visible one, is the last plate to bear a spiracle. In females, this plate is raised in the middle to form a somewhat rectangular dark-coloured area marking the future position of the first valvifers enclosing the genital chamber of the adult. The posterior margin of this is interrupted by a small cleft on the papilla, on each side of which are several setae. These are not constant in number, although in this species there are usually three long bristles and two or more shorter ones on each side of the mid-line. In males, this structure is missing, the corresponding part of the eighth segment being raised only slightly above the level of the ninth, and carries about six bristles near the mid-line at the posterior margin of the plate.

Males	Minimum	Maximum	Mean
Head Capsule Width	1.7 mm	2.0 mm	1.8 mm
Maximum Width Thorax	2.9 mm	3.5 mm	3.1 mm
Rostrum Length	2.4 mm	2.7 mm	2.6 mm
Females	Minimum	Maximum	Mean
Head Capsule Width	1.9 mm	2.1 mm	2.0 mm
Maximum Width Thorax	2.9 mm	3.8 mm	3.3 mm
Rostrum Length	2.6 mm	3.0 mm	2.8 mm

Rhopalimorpha obscura White, 1851

First Instar (Fig. 1)

At this stage, the nymphs have the same general form as those of *R. lineolaris,* but can be distinguished by the smaller size and certain differences in coloration, especially the absence of a light spot on the vertex.

Dorsally darker than in *lineolaris,* especially head and thorax, which are black; abdomen with deep red pigment and in young nymphs a suffusion of green; dark patches on abdomen border black and more conspicuous than in other species. Head without light spot on vertex; median light stripe along nota has form of narrow line, with distinct edges and without

indistinct white spot on pronotum; in abdomen median light line passes between halves of first scent gland area, but no further; scent gland areas black.

Ventrally head, thorax and proximal parts of legs almost black, abdomen deep orange or red. Antennae and distal parts of legs sooty.

	Minimum	Maximum	Mean
Head Capsule Width	0.46 mm	0.55 mm	0.49 mm
Maximum Width Thorax	0.78 mm	0.88 mm	0.85 mm
Rostrum Length	0.65 mm	0.75 mm	0.73 mm

Second Instar

In general the nymphs resemble those of *lineolaris,* the most obvious differences being a deeper coloration and the presence of a thin expanded abdominal margin or rudimentary connexivum with conspicuous dark patches.

Dorsally, head brown, vertex very dark. Thorax black often with red suffusion, notal expansions light brown; light median stripe narrow, expanded at anterior end of abdomen to form light blotch with a greenish hue in some specimens. Abdomen dark red, scent gland areas black, with thin cream or pale yellow line bordering them; rudimentary connexivum present, cream or light yellow, with conspicuous dark semicircular markings; margin usually with scalloped appearance; median stripe passes between halves of first scent gland area, but no further.

Ventrally head dark brown, thorax almost black, with light brown lateral expansions. Abdomen red ventrally, with light connexivum. Black patches in mid-ventral line as in *lineolaris.* Legs as in first instar; terminal antennal segment black.

	Minimum	Maximum	Mean
Head Capsule Width	0.66 mm	0.78 mm	0.70 mm
Maximum Width Thorax	0.96 mm	1.09 mm	1.04 mm
Rostrum Length	1.09 mm	1.24 mm	1.16 mm

Third Instar

The presence of the connexivum with conspicuous dark patches and usually scalloped margin, and the character of the mid-dorsal light line serves to distinguish the nymphs of this species.

Dorsally head brown, vertex very dark; thorax dark red-brown, notal expansions light brown; mid-dorsal light line narrow, with definite margins, not continued anteriorly on to head; at anterior end of abdomen line is expanded to form a diffuse patch of cream or light yellow sometimes faintly greenish; line passes between halves of first scent gland area and continues back as extremely fine line interrupted by remaining areas. In other respects abdomen as in last instar.

Ventrally head dark sooty brown; thorax deep red-brown; abdomen as in last instar, but with purplish line laterally just within connexivum. Appendages as in previous stage.

	Minimum	Maximum	Mean
Head Capsule Width	0.88 mm	1.00 mm	0.94 mm
Maximum Width Thorax	1.40 mm	1.55 mm	1.48 mm
Rostrum Length	1.35 mm	1.50 mm	1.40 mm

Fourth Instar

Fourth instar nymphs of this species can be distinguished from those of *lineolaris* by the appearance of the first scent gland areas. Here the areas are black and the medium light stripe encroaches on them. The hind wing rudiments lack the conspicuous punctation seen in the other species.

Dorsally head dark red-brown, lateral parts lighter, no median line. Nota same colour as head, median stripe wider and diffuse in middle of thorax than in earlier instars; notal expansions cream; hind wing rudiments without conspicuous punctures. General colour of abdomen dark red, scent gland areas black and bordered on each side by cream or light yellow band, but these do not fuse behind; abdominal median light stripe wide anteriorly and where it passes between halves of first scent gland area the light colour invades black pigment on each side; from here it passes back as faint light yellow or cream line interrupted by remaining areas; connexivum with conspicuous semicircular dark markings.

Ventrally head and thorax dark red-brown; abdomen cream suffused with red and with prominent purple-red band on each side just within connexivum; connexivum marked as on dorsal surface; last five segments each with dark red-brown or black patch in mid-line.

Most of femur and distal end of tarsus black; antennae dark amber with terminal segment black or dark red-brown, distal parts of penultimate segment dark red-brown.

	Minimum	Maximum	Mean
Head Capsule Width	1.20 mm	1.43 mm	1.30 mm
Maximum Width Thorax	2.02 mm	2.54 mm	2.20 mm
Rostrum Length	1.75 mm	2.01 mm	1.90 mm

Fifth Instar (Figs. 5, 7)

Live specimens of the two species can be fairly easily distinguished by means of their colour, but preserved or dried specimens where the colour is lost are more difficult to identify. The punctation of the wing rudiments may provide a useful character in such specimens.

Head dorsally dark red-brown, lateral parts dark cream, faint indication of median light line near posterior margin. Thorax dark red-brown, expansions of nota brown or amber; punctures on hind-wing rudiment inconspicuous, near scutellum usually four or fewer, sometimes absent, near hemelytron usually absent or one. Abdomen deep purplish red; all scent gland areas black, median light stripe wide anteriorly and encroaches on halves of first area, cream band on each side of areas, diffuse cream and orange-red patch behind last area in *lineolarias* absent here. Connexivum with black semi-circular patches, connexivum edge with distinct steps at intersegmental junctions.

Ventrally head and thorax dark red-brown; abdomen generally as in last instar. Proximally legs deeply pigmented, obscuring punctation, distal parts of tarsi black; antennae darker than in *lineolaris*.

As in *R. lineolaris*, it is possible to distinguish between the sexes in this instar. In females, the raised median area of the eighth sternum has a markedly convex posterior border and overlaps to a small extent the next sternum. The median cleft is usually not as conspicuous as it is in the other species. In males the terminal segments have much the same appearance as those of *lineolaris* although the ninth sternum may be raised higher in front of the anal tube than is the case in the other species.

Males	Minimum	Maximum	Mean
Head Capsule Width	1.46 mm	1.82 mm	1.71 mm
Maximum Width Thorax	2.35 mm	3.12 mm	2.85 mm
Rostrum Length	2.18 mm	2.57 mm	2.23 mm
Females	Minimum	Maximum	Mean
Head Capsule Width	1.64 mm	1.98 mm	1.80 mm
Maximum Width Thorax	2.70 mm	3.56 mm	3.12 mm
Rostrum Length	2.40 mm	2.73 mm	2.55 mm

Key to the Nymphal Instars of the Genus *Rhopalimorpha* Dallas

1.	Rounded hemispherical form; thoracic nota without lateral expansions	1st instar 3
2.	Thoracic nota with lateral expansions	5
3.	Light spot on vertex	*lineolaris*
4.	Vertex without light spot	*obscura*
5.	Metanotum not covered by mesonotum laterally and only partially so in mid-line	2nd instar 7
6.	Metanotum hidden or almost so by mesonotum laterally and in the mid-line	9
7.	First scent-gland area dark brown, rarely black, others black; median line on nota conspicuous, with indistinct edges	*lineolaris*
8.	All scent-gland areas black; median line on nota narrow; rudimentary connexivum	*obscura*
9.	Metanotum almost hidden laterally and in the mid-line; rudimentary hemelytra absent	3rd instar 11
10.	Rudimentary hemelytra present, covering metanotum laterally	13

11.	Median light line continues on to head; first scent-gland area dark brown	*lineolaris*	
12.	No median line on head; first scent-gland area black; rudimentary connexivum present	*obscura*	
13.	Hemelytral pads do not extend beyond first abdominal segment	4th instar	15
14.	Hemelytral pads extend beyond first abdominal segment	5th instar	17
15.	Anterior scent-gland areas dark brown, not black, and median light line does not encroach on them; cream bands bordering scent-gland areas merge behind to produce patch of orange and cream stippling	*lineolaris*	
16.	Anterior scent-gland areas black and encroached on by median light line; no stippled region behind last scent-gland area	*obscura*	
17.	First scent-gland area dark brown; median light stripe narrow and passes between halves of first area scarcely encroaching on brown pigment; stippled area behind last scent-gland area; hind wing rudiments with conspicuous punctures	*lineolaris*	
18.	First scent-gland area black; median stripe wide and encroaches on black pigment of first area; no stippled area behind last scent-gland area; hind wing rudiments without conspicuous punctures	*obscura*	

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