

// SECTION - II //

SALIENT FEATURES OF SARCOPHAGID LARVAE

Larvae of different size and shape generally white in colour but in some cases reddish to brown; body segmented, cylindrical, tapering anteriorly and blunt posteriorly, and with or without spines or tubercles; spinose bands generally present on anterior and posterior borders; three pairs of dorsal and four pairs of ventral tubercles always present on last segment; outer ventral tubercle always smaller than the middle one; anterior spiracles present, except in 1st stage larvae, paired; posterior spiracles paired, always situated in a deep depression on the posterior plate; spiracular slits slender; peristome open, divided into four arcs, the ends of inner arcs are of two types—one tapering or without a swollen end and the other with a swollen end - the inner arcs are straight or slightly curved; button absent; mouth hook separated, symmetric, articulates with H-shaped hypostomal sclerites; accessory sclerite absent; parastomal sclerite present; dorsal cornu distinctly longer than the ventral cornu, the former always with long and wide window. // Plate XXXIII, Figs. 1-5 // (Typical immature forms)

KEY TO THE IMMATURE FORMS OF SARCOPHAGID LARVAE FROM WEST BENGAL

Key to Larval Instars

- | | |
|--|-------------------|
| 1. Anterior spiracles present | ... 2 |
| Anterior spiracles absent | ... First instar |
| 2. Posterior spiracles with two slits each | ... Second instar |
| Posterior spiracles with three slits each | ... Third instar |

Key to First Instar

1. Anterior spine bands on segment 12 confined only
to ventral surface ... 2
Anterior spine bands on segment 12 confined only
to ventral and ventrolateral surfaces ... 4
2. Upper part of dorsal cornu well pigmented throughout;
ventral cornu bifurcated at end ... 3
Upper part of dorsal cornu only pigmented on lower
part; ventral cornu pointed at end ... albiceps
(Meigen)
3. Spine bands on segment 2 very broad on ventral surface
... ruficornis
(Fabricius)
Spine bands on segment 2 not broad on ventral surface
... archides
(Böttcher)
4. Posterior spine bands on segments 5 to 6 confined to
ventral and ventrolateral surface ... brevicornis(Ho)
Posterior spine bands on segments 5 to 6 confined to
ventral surface ... dux (Thomson)

Key to Second Instar

1. Openings of anterior spiracles arranged in a single row
... 3
Openings of anterior spiracles arranged in double or
irregular rows ... 2
2. Distance between posterior spiracles about half to one-third
the width of one spiracle; upper part of pharyngeal sclerite
less pigmented ... 4

- Distance between posterior spiracles about one-fourth the width of one spiracle; upper part of pharyngeal sclerites well pigmented ... dux (Thomson)
3. Posterior spiracles with well developed inner arcs ... ruficornis (Fabricius)
- Posterior spiracles with ill developed inner arcs ... brevicornis (Ho)
4. Openings of anterior spiracles arranged in double rows ... orchidea (Boettcher)
- Openings of anterior spiracles arranged in irregular rows ... albiceps (Meigen)

Key to Third Instar

1. Openings of anterior spiracles arranged in single row ... 2
- Openings of anterior spiracles arranged in double or irregular rows ... 3
2. Window of dorsal cornu short and narrow; upper and lower margins of pharyngeal sclerite heavily pigmented ... 4
- Window of dorsal cornu long and wide; upper and lower margins of pharyngeal sclerite poorly pigmented ... dux (Thomson)
3. Ventral arc prominently long and heavily pigmented; incision between cornua shallow ... albiceps (Meigen)
- Ventral arc not so long, poorly pigmented; incision between cornua deep ... orchidea (Boettcher)

4. Ventral are long; ventral cornu about half the length of
dorsal cornu ... ruficornis (Fabricius)
- Ventral are short; ventral cornu two-thirds the length of
dorsal cornu ... brevicornis (Ho)

Parasarcophaga (s.str.) albiceps (Meigen)

// Plate XXXIV, Figs. 1-8 //

First stage larva : White, muscidiform; length 2 to 2.3 mm., and diameter 0.5-0.8 mm; cuticle smooth; spines on segments prominent, dark brown; segments 1 to 11 each bordered anteriorly by a complete band of spines; anterior band of spines on segment 12 confined to ventral surface; band on segment 2 very broad; segments 6 to 14 each bordered posteriorly by a complete band of spines, posterior band on segments 5 to 6 confined to ventral and ventrolateral surface; larva metapneustic; prothoracic spiracles not functional but may be seen beneath the integument, especially before moult; posterior part of each spiracle, with two elongated spiracular openings lying side by side is situated in a hollow cavity; peritreme absent; posterior tubercles weakly developed.

Cephalopharyngeal skeleton : Labial sclerite long and heavily pigmented, about one-fourth as long as the pharyngeal sclerite; hook part as long as basal part, extending forwards, slightly curved and pointed; basal piece elongated and almost blunt; hypostomal sclerite

long, broad posteriorly and pointed anteriorly; dental sclerite not separated from basal part of labial sclerite; parastomal sclerite broad and blunt at end; pharyngeal sclerite moderately developed and mostly pigmented on lower part; incision between dorsal and ventral cornua very broad; dorsal and ventral cornua pointed posteriorly, divergent and without any window; anterodorsal process of pharyngeal sclerite long, pointed, curved downwards.

Second stage larva : White, muscidiform, amphipneustic; length 6 to 8 mm., and diameter 0.7 to 1.5 mm.; cuticle smooth; spines on segments brown, not so prominent; anterior and posterior bands on segments 2 to 11 same as in first stage larva.

Anterior spiracles : Anterior spiracles located near posterior margin of 2nd segment; openings of the spiracle, with 20 to 24 branches, arranged in irregular rows, each terminating in a small oval spiracular opening.

Posterior spiracles : Posterior spiracles large, paired, higher than wide, each composed of two slit-like openings situated in a deep cavity just above the anal opening; inner projections of peritreme well developed; button absent; distance between posterior spiracles about one-fourth the width of one spiracle; ventral arcs curved and pointed.

Cephalopharyngeal skeleton : Labial sclerite long, heavily pigmented, about one-fourth as long as the pharyngeal sclerite; basal piece of mouth-hook four cornered, about two-thirds of hook part; hook part pointed and curved backwards; dental sclerite short, with pointed end; posterodorsal process of basal part long; hypostomal sclerite roughly rectangular, slightly narrowed, blunt anteriorly and pointed below; subhypostomal sclerite narrow and pointed; parastomal sclerite short and pointed; incision between cornua deep, not so broad; upper part of pharyngeal sclerite less pigmented on upper sides; ventral cornu almost two-thirds the dorsal cornu, the latter with long, wide longitudinal window; ventral cornu short and with long window; anterodorsal process of pharyngeal sclerite straight and pointed at apex.

Third stage larva : White, muciform; length 13 to 17 mm., and diameter 2 to 3 mm.; segments 3rd to 12th entirely covered with poorly pigmented spines; microtubercles on 3rd to 12th segments very small, knob-shaped, generally equal in size; tubercles on the last segment prominent and fleshy; inner and outer tubercles small and horn-shaped, middle one very small, one-fourth the outer dorsal tubercle; middle ventral tubercles more prominent and less pointed; inner and outer tubercles equal, conical in shape; anal tubercles stout, finger-like, longer than the tubercles of the last segment, surrounded by short spines; inner pair of ventral tubercles on upper border of anal segment separated by a distance almost equal to the distance between inner and outer tubercles.

Anterior spiracles : Anterior spiracles broad with 20 to 24 branches; openings of spiracles arranged in irregular rows.

Posterior spiracles : Posterior spiracles D-shaped, large, situated in a deep cavity, higher than wide; peritreme thin and open, with well developed projection between slits; slits long; button absent; inner are relatively straight and with loop-shaped tail not touching the inner slits; ventral are well developed and pointed; posterior spiracles separated by a distance one-third the width of one spiracle.

Cephalopharyngeal skeleton : Labial sclerite strongly developed and heavily pigmented; basal piece of mouth-hook four-cornered; hook part well developed, longer than basal part, pointed sharply downwards; posterodorsal process short and blunt; dorsal sclerite strongly developed and pointed at end; hypostomal sclerite roughly rectangular, more narrowed anteriorly; parastomal sclerite almost pointed; subhypostomal sclerite nearly oval; upper margin of pharyngeal sclerite poorly pigmented; window of dorsal cornu long; ventral cornu less than half the dorsal cornu, with a short, weakly developed ventral window; the length of labial sclerite about one-fifth that of pharyngeal sclerite.

Puparium : Length 6 to 9 mm., and diameter 2.5 to 3 mm.; cylindrical in shape with tapering both ends; colour light brown; anterior spiracles with short stalks; posterior spiracles situated in

a deep cavity; spine bands on segments not so much prominent; no transverse bands are found between the segments.

Parasarcophaga (s.str.) orchidea (Böttcher)

// Plate XXXV , Figs. 1-5 //

First stage larva : White, muscidiform, metapneustic; length 2 to 3 mm., and diameter 0.5 to 0.6 mm.; cuticle smooth; spines on segments prominent, dark brown; segments 2 to 11 each bordered anteriorly by a complete band of spines; anterior band of spines on segment 12 confined to ventral surface; band on segment 2 not so broad; segments 6 to 11 each bordered posteriorly by a complete band of spines; posterior bands on segments 5 to 6 confined to ventral and ventrolateral surfaces; prothoracic spiracles not functional; posterior spiracles are situated in a hollow cavity and each consists of two elongated spiracular openings laying side by side; peritreme absent; posterior tubercles not so developed.

Cephalopharyngeal skeleton : Labial sclerite long, heavily pigmented, about one-fourth as long as pharyngeal sclerite; hook part, long, longer than the basal part, pointed and curved sharply; basal piece long and slightly pointed; hypostomal sclerite long, broad posteriorly and narrow anteriorly; dental sclerite pointed ventrally, not separated from basal part of labial sclerite; parastomal sclerite narrow, slightly pointed at apex; pharyngeal sclerite moderately developed and pigmented on the lower part; incision between dorsal and ventral cornua very broad; dorsal cornu pointed posteriorly; both are

convergent; anterodorsal process of pharyngeal sclerite long, pointed and slightly curved upwards.

Second stage larva : White, musciform, amphipneustic; length 6 to 8 mm., and diameter 1.5 to 2 mm.; cuticle almost smooth; spines on segments same as in first stage larva.

Anterior spiracles : Anterior spiracles near posterior margin of 2nd segment; openings of each anterior spiracle arranged in double rows with 28 to 30 branches, each terminating in a short oval opening.

Posterior spiracles : Posterior spiracles large, paired, each composed of two slit-like openings situated in a deep cavity, higher than wide; inner projections of peritreme short; distance between the posterior spiracles a little more than half the width of each spiracle; ventral arc not differentiated; inner arc almost straight.

Cephalopharyngeal skeleton : Labial sclerite very long, heavily pigmented, about one-fourth as long as the pharyngeal sclerite; basal piece of mouth-hook four-cornered and about two-thirds of hook part, pointed and slightly curved; dental sclerite short, with pointed apex distally; hypostomal sclerite roughly rectangular, slightly narrow anteriorly; subhypostomal sclerite narrow and slender; parastomal sclerite narrow and pointed; incision between cornu deep; upper part of pharyngeal sclerite less pigmented; ventral cornu about three-fourths the dorsal cornu, the former with a short and the latter with a long and wide window; anterior process of pharyngeal sclerite straight and pointed at apex.

Third stage larva : White, muscidiform; length 14 to 16 mm., and diameter 3 to 3.5 mm.; segments 3rd to 12th entirely covered with poorly pigmented spines; microtubercles on the 3rd to 11th segments conical and equal; tubercles on the last segment fleshy; each outer dorsal tubercle horn-shaped, large, more pointed and two times longer than the inner one and three times the middle one, middle ventral tubercles prominent and stout; outer ventral tubercles more pointed and conical; inner ventral tubercles on the upper margin of anal segment is separated by a distance equal to the distance between the inner and outer tubercles; anal tubercles long and pointed, longer than the rest of the tubercles on the last segment and surrounded by short spines.

Anterior spiracles : Anterior spiracles broad each with 28 to 30 branches; opening of spiracles are terminating in long oval spiracular openings and arranged in two rows.

Posterior spiracles : Each posterior spiracle D-shaped, large, situated in a deep cavity, higher than wide; peristome thin, open and with well developed projections between slits; slits not so long; button absent; inner are long, straight and with loop-shaped tail not touching the inner slits; ventral are poorly pigmented; posterior spiracles separated by a distance about half the width of one spiracle.

Cephalopharyngeal skeleton : Labial sclerite strongly developed and heavily pigmented; basal piece of mouth-hook roughly four-cornered, hook part well developed, longer than basal part, pointed and curved backwards; posterodorsal process blunt; dental sclerite long and pointed at apex; hypostomal sclerite triangular almost pointed ventrally; parastomal sclerite long, blunt at apex and curved dorsally; subhypostomal sclerite long, pointed; upper margin of pharyngeal sclerite poorly pigmented; window of dorsal cornu very long and wide; ventral cornu about two-thirds the dorsal one, poorly pigmented ventrally, its ventral window long; anterodorsal process of dorsal cornu long, pointed and with bifurcated apex; the length of labial sclerite about one-fourth that of pharyngeal sclerite.

Capacium : Length 8 to 10 mm., and diameter 2.5 to 3 mm.; cylindrical in shape with more tapering on the posterior end than the anterior end; colour very light brown; anterior spiracles with short stalks; posterior spiracles situated in a deep cavity; spine bands on segments are prominent; transverse bands are not so much prominent between the segments.

Parasarcophaga (Liosarcophaga) dux (Thomson)

// Plate XXXVI, Figs. 1-8 //

First stage larva : White, muscidiform, metapneustic; length 2 to 2.5 mm., and diameter 0.4 to 0.5 mm.; spines on segments dark brown; segments 2 to 11 each bordered anteriorly by a complete band of spines; anterior band of spines on segment 12 confined to ventral

and ventrolateral surfaces; band on segment 2 is only broad ventrally; segments 5 to 11 each bordered posteriorly by a complete band of spines; posterior band on segments 5 and 6 confined to ventral surface; prothoracic spiracles not functional but may be seen beneath the integument especially before moult; posterior pair of spiracles situated in a hollow cavity, each consists of two elongated spiracular openings lying side by side; peritreme absent; posterior tubercles weakly developed.

Cephalopharyngeal skeleton : Labial sclerite large and heavily pigmented throughout; hook part as long as basal part, extending forwards, not so pointed and slightly curved; basal piece blunt; hypostomal sclerite short and curved posteriorly; dental sclerite short and curved, parastomal sclerite broad and blunt at apex; pharyngeal sclerite well developed and heavily pigmented; dorsal and ventral cornua pointed posteriorly, convergent; incision between the two broad; dorsal cornu with long longitudinal slits; anterodorsal process of pharyngeal sclerite long, pointed and curved ventrally.

Second stage larva : White; muscidiform, amphineustic, length 7 to 9 mm., and diameter 1 to 2 mm.; cuticle smooth; anterior and posterior bands on segments 2 to 11 same as in first stage larva.

Anterior spiracles : Anterior spiracles are arranged near posterior margin of 2nd segment; openings of anterior spiracles each with 16 branches and each terminating in an oval spiracular opening; spiracular openings are arranged in a row.

Posterior spiracles : Posterior spiracles large, paired, higher than wide, each composed of two slit-like openings situated in a deep cavity above the anal opening; inner projections of peritreme well developed; button absent; distance between the posterior spiracles about one-third the width of one spiracle; ventral are short; inner are long, curved and pointed.

Cephalopharyngeal skeleton : Labial sclerite very long, heavily pigmented about one-fourth as long as the pharyngeal sclerite; basal piece of mouth-hook four cornered its length half that of hook part, the latter pointed, curved backwards; dental sclerite curved and pointed at both ends; hypostomal sclerite roughly rectangular and narrowed anteriorly; subhypostomal sclerite narrow and pointed, parastomal sclerite long and blunt; incision between cornua not so broad; upper part of pharyngeal sclerite well pigmented; ventral cornu about two-thirds the dorsal cornu, the former with a short and the latter with a long longitudinal window; anterodorsal process of pharyngeal sclerite long, pointed at apex.

Third stage larva : Milky white, muscidiform; length 13 to 15 mm., and diameter 3.5 to 4 mm.; spine bands on anterior margin of segments 3 to 11 encircled completely; bands on 12 segment restricted to ventral surface; posterior margin of segments 5 to 11 each bordered by a complete band of spines; 5th and 6th in addition with a row on ventral surface and 7th and 8th on ventral and ventrolateral surfaces; tubercles on the last segment prominent and fleshy; inner and middle dorsal

tubercles blunt and short; outer dorsal tubercles long, two times the inner ones; ventral tubercles horn-shaped, equal to inner dorsal tubercles; inner ventral tubercles are placed on the upper border of anal segment, and one shorter than the middle ones; anal tubercles long, longer than the rest of the tubercles of the last segment and are surrounded by short spines.

Anterior spiracles : Anterior spiracles broad each with 16 branches, their openings are arranged in regular rows.

Posterior spiracles : Posterior spiracles D-shaped, large, nearly as wide as high, situated in a deep cavity; peritreme thin, open and with well developed projections between slits; slits not so long; button absent; inner arc long, bifurcated at one end, with loop-shaped tail touching the inner slits; ventral arc well developed and blunt at apex; posterior spiracles separated by a distance about one-fourth the width of one spiracle.

Cephalopharyngeal skeleton : Labial sclerite strongly developed and heavily pigmented; basal piece of mouth-beak three-cornered; beak part well developed, longer than the basal part, pointed and curved backwards; posterodorsal process present but not well developed; dental sclerite strongly developed, U-shaped; hypostomal sclerite roughly triangular, blunt at apex; parastomal sclerite triangular and blunt at end; subhypostomal sclerite long and slender; upper and lower

margins of pharyngeal sclerite poorly pigmented; window of dorsal cornu narrow; ventral cornu slightly longer than half the length of dorsal cornu and with a narrow window; the length of labial sclerite about one-fourth that of pharyngeal sclerite.

Puparium : Length 9 to 11 mm., and diameter 2.5 to 3 mm.; cylindrical in shape with tapering both ends; colour brown; anterior spiracles with short stalks; posterior spiracles situated in a deep cavity; spine bands on segments not so much prominent; numerous transverse bands are found between the segments.

Parasarcophaga (Liosarcophaga) brevicornis (He)

// Plate XXXVII, Figs. 1-8 //

First stage larva : White, muscidiform, metapneustic; length 2 to 2.3 mm., and diameter 0.5 to 0.7 mm.; cuticle smooth; spines on segments prominent, dark brown; segments 2 to 11 each bordered anteriorly by a complete band of spines; anterior band of spines on segment 12 confined to ventral and ventrolateral surfaces; band on segment 2 not so broad; segments 5 to 11 each bordered posteriorly by a complete band of spines; segments 5 and 6 in addition with a band on ventral and ventrolateral surfaces and segment 11 on dorsal and dorsolateral surfaces; prothoracic spiracles not functional but may be seen beneath the integument before moult; posterior pair of spiracles situated in a hollow cavity, each with two elongated spiracular openings lying side by side; peritreme absent; posterior tubercles weakly developed.

Cephalopharyngeal skeleton : Labial sclerite long, heavily pigmented, its length nearly one-third that of pharyngeal sclerite; hook-part as long as basal part, extended forwards and pointed abruptly at apex, basal piece elongated and pointed; hypostomal sclerite long and slender; dental sclerite short; parastomal sclerite not so broad, blunt at apex; pharyngeal sclerite less developed but well pigmented on lower part; dorsal and ventral cornua convergent, not so pointed, incision between the two wide, the dorsal with a wide longitudinal strip and the ventral bifurcated; anterodorsal process of pharyngeal sclerite not long, curved and pointed backwards.

Second stage larva : White, muscidiform, amphipneustic; length 7 to 9 mm., and diameter 1.5 to 2 mm.; cuticle smooth; spines on segments slightly brown, prominent; anterior and posterior spine bands on segments 2 to 11 same as in first stage larva.

Anterior spiracles : Anterior spiracles located near posterior margin of 2nd segment; openings of each anterior spiracle with 16 branches arranged in a single row, each terminating in a small oval spiracular opening.

Posterior spiracles : Posterior spiracles large, paired higher than wide, each composed of two slit-like openings situated in a deep cavity; inner projections of peritreme not developed; button absent; distance between posterior spiracles about one-third the width of one spiracle; ventral arc absent.

Cephalopharyngeal skeleton : Labial sclerite moderately long heavily pigmented, its length about one-fifth that of pharyngeal sclerite; basal piece of mouth-hook three-cornered, about two-thirds the hook part; hook part not so pointed, slightly curved backwards; dental sclerite short and nut shaped; posterodorsal sclerite roughly triangular, broad anteriorly; subhypostomal sclerite narrow and curved; parastomal sclerite pointed; accessory sclerite pointed and curved backwards; incision between cornua deep; upper part of pharyngeal sclerite less pigmented; dorsal cornu with a long longitudinal window; ventral one with a short window; anterodorsal process of pharyngeal sclerite curved and pointed at apex.

Third stage larva : White, muscidiform, amphineustic; length 13 to 16 mm., and diameter 2 to 3 mm.; 2 to 11 with a complete band of spines on anterior border; bands on 12th segment restricted to ventral surface; posterior border of segments 7 to 11 encircled completely; segments 5 to 6 with the spines on posterior border restricted to ventral surface; tubercles on the last segment fleshy; inner and middle dorsal tubercles knob-shaped; outer dorsal tubercles large and conical; outer ventral tubercles not so pointed; middle ventral tubercles conical; microtubercles on segments 3 to 11 quite obscure on the dorsal surface but large on ventral and lateral surfaces; distance between inner tubercles is more than the distance between inner and outer tubercles.

Anterior spiracles : Anterior spiracles broad, each with 16 branches; openings of the spiracle arranged in a single row.

Posterior spiracles : Medium size, D-shaped higher than wide, situated in a deep cavity; peritreme relatively thin, open, with short projections between slits; slits not so long; inner are almost straight with loop-shaped tail not touching the inner slits; ventral are absent; posterior spiracles separated by a distance almost equal to the width of one spiracle.

Cephalopharyngeal skeleton : Labial sclerite strongly developed and heavily pigmented; basal piece of mouth-hook three-cornered; hook part well developed, long, pointed, length almost equal to that of the basal part; posterodorsal process blunt; dental sclerite short; hypostomal sclerite roughly rectangular, broad anteriorly; parastomal sclerite short and blunt; subhypostomal sclerite long and pointed; upper and lower margins of pharyngeal sclerite poorly pigmented; window of dorsal cornu long; ventral cornu about two-thirds the dorsal cornu and with a short window; the length of labial sclerite about one-fourth that of pharyngeal sclerite.

Puparium : Length 7-9 mm., and diameter 2.5 to 3 mm.; cylindrical in shape with tapering on posterior end and slightly rounded at anterior end; colour dark brown; anterior spiracles with long stalks; posterior spiracles situated in a deep cavity; spine bands on segments prominent; numerous transverse striations are found between the segments.

Parasarcoptaga (Liopygia) ruficornis (Fabricius)

// Plate XXXVIII, Figs. 1-8 //

First stage larva : White, muscidiform, metapneustic; length 2 to 2.4 mm., and diameter 0.4 to 0.6 mm.; cuticle smooth; spines on segments brown; segments 2 to 11 each bordered anteriorly by a complete band of spines; anterior band of spines on segment 12 confined to ventral surface; band on segment 2 very broad on ventral surface; segments 5 to 11 each bordered posteriorly by a complete band of spines; segments 5 to 7 in addition with a band on ventral surface; prothoracic spiracles not functional, posterior pair of spiracles situated in a deep cavity, each with two elongated spiracular openings placed side by side; peritreme absent; posterior tubercles weakly developed.

Cephalopharyngeal skeleton : Labial sclerite long, heavily pigmented, its length about one-fourth that of pharyngeal sclerite; hook part longer than basal part, extending forwards, pointed and curved abruptly backwards; basal piece elongated and pointed; hypostomal sclerite long, broad at posterior end and pointed anteriorly; dental sclerite not separated from basal part of labial sclerite, pointed ventrally; parastomal sclerite well developed; pharyngeal sclerite less pigmented especially on the dorsal side; dorsal cornu pointed posteriorly, ventral one bifurcated, both convergent and without any window; anterodorsal process of pharyngeal sclerite long and almost pointed.

Second stage larva : White, muscidiform, amphipneustic; length 5 to 7 mm., and diameter 1.5 to 2 mm.; anterior and posterior bands on segments 2 to 11 same as in first stage larva.

Anterior spiracles : Anterior spiracles are located near the posterior margin of 2nd segment; openings of each spiracle with 11 to 12 branches arranged in a single row, each branch terminating in an oval spiracular opening.

Posterior spiracles : Posterior spiracles large, paired higher than wide each composed of two slit-like openings situated in a deep cavity just above the anal opening; inner projections of peritreme short; button absent; distance between posterior spiracles about half the length of each spiracle; ventral are short; inner are long, curved and pointed at apex.

Cephalopharyngeal skeleton : Labial sclerite very long, heavily pigmented; basal piece of mouth-hook three-cornered, its length more than two-thirds that of hook part, hook part pointed and curved ventrally; posterodorsal process of basal part long and pointed; hypostomal sclerite rectangular, blunt at apex; subhypostomal sclerite narrowed posteriorly; parastomal sclerite long and pointed; incision between cornu deep and wide; upper part of pharyngeal sclerite less pigmented; ventral cornu about half the dorsal cornu, the latter with a short longitudinal window; window of ventral cornu not differentiated; anterodorsal process of pharyngeal sclerite pointed and hook-like.

Third stage larva : White, muscidiform, amphipneustic; length 14 to 17 mm., and diameter 4 to 4.5 mm.; each segment entirely covered with poorly pigmented spines; tubercles on the last segment fleshy; inner dorsal tubercles longer than the middle ones, both pairs horn-shaped; outer dorsal tubercles pointed, longer than the other two pairs, about two times the middle ones; inner ventral tubercles shorter than the middle ones; the distance between the inner ones less than that between the inner and outer ventral tubercles; outer and middle and ventral tubercles equal, the former longer than the inner ones and more pointed; anal tubercles long, pointed, surrounded by short spines.

Anterior spiracles : Anterior spiracles broad with 11 to 12 branches; openings of spiracles arranged in a single row.

Posterior spiracles : Posterior spiracles D-shaped, large, higher than wide and situated in a deep cavity; peristome thin and open with well developed projections between slits; slits long and slender; button absent; inner arc long, straight, with a loop-shaped tail which does not touch the inner slits; ventral arc well developed and pointed; posterior spiracles separated by a distance of about one-eighth the width of one spiracle.

Cephalopharyngeal skeleton : Labial sclerite strongly developed and heavily pigmented; basal piece of mouth-hook three-cornered; hook part well developed longer than the basal part, pointed and

curved backwards; posterodorsal process short and almost blunt; hypostomal sclerite roughly triangular, more narrowed anteriorly; parastomal sclerite short and slender; upper and lower margins of pharyngeal sclerite poorly pigmented, with long black striations; window of dorsal cornu narrow; ventral cornu with a short weakly developed ventral window, its length about half that of dorsal cornu; the length of labial sclerite about one-fourth that of pharyngeal sclerite.

Puparium : Length 8 to 11 mm., and diameter 3 to 3.5 mm.; cylindrical in shape with tapering more on the anterior end than the posterior end; colour light brown; anterior spiracles with short stalks; posterior spiracles situated in a deep cavity; spine bands on segments prominent; no transverse striations are found between the segments.