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Previous volumes (2010-2017): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under
the reference ID 1500-024 through the « Investissements d’avenir » programme
(Labex Agro: ANR-10-LABX-0001-01)

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BIOLOGICAL STUDIES AND DESCRIPTION OF STAGES OF TWO SPECIES:

**Papillacarus aciculatus** Kunz and **Lohmannia egypticus** Elbadry and Nasr (Oribatei-Lohmanniidae) in Egypt

By

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**Introduction**

Several genera of family Lohmannidae were described by Grandjean (1950), Kunst (1959), Wallwork (1962) and Balogh (1972). However, the latter in the same year reviewed all the genera belonging to this family. In Egypt Elbadry and Nasr (1976) described the two new species *Papillacarus vitis* and *Lohmannia egypticus*.

It is very difficult to rear oribatid mites under laboratory conditions; out of 6,000 species only 85 species can be reared (Shereef, 1971). It is impossible to investigate the suitable diet for each species. Some species were successfully reared applying algae: *Galumna longipluma* and *G. elimatus* Sengbusch (1954), lichens: *Ceratozetes cisalpinus*, *Scheloribates laevigatus* and *Oppia neerlandica* Woodring and Cook (1962), mushrooms: *Galumna confusa* and *G. parva* Woodring (1965), fungi: *Epidamaeus kamaensis*, *Belba meridionalis*, *B. rossica*, *Metabelba rara*, *Porobelba spinosa*, *Oppia nova*, *O. concolor*, *Eremobelba geographica* and *Palaecarbus kamenskii* Shereef (1971).

Certain mites: *Phthiracarus* sp. and *Carabodes coriaceus* did not apply any of the mentioned diet.

The present studies deal the duration of the life cycle of *Papillacarus aciculatus* and *Lohmannia egypticus*. These species were reared on rotten wood, dry leaves and decaying roots.

**Methods**

Solitary individuals were reared in glass rings (1 x 1 x 0.5 mm), containing a mixture of plaster of Paris/charcoal and the decaying plant remains. The stock cultures were mentioned in glass vessel (5 x 5 x 2 cm) containing the above mixture. Rings were kept in dessicator with water, at 25°C. The applied technique was described by the author 1970 and 1972.

_Acarologia, t. XVIII, fasc. 2, 1976._
RESULTS AND DISCUSSION

A. — Description of the developmental stages of *Papillacarus aciculatus*.

**Egg**:
Whitish, oval, smooth, size $0.181 \times 0.101$ mm, Fig. I.

**Larva**:
Length $0.278$; width $0.175$ mm. Body whitish, prodorsum triangular, the prodorsal setae are equal in length, bi-serrated. Sensilli pectinate with 16 branches at one side and with few number of minute setae at the another. Prodorsum is separated from notogaster by the suture dorsosejugalis.

Notogaster with 10 pairs of setae. Setae $C_3$, $d_p$ and $h_1$ are longer than others. All setae are ciliated.

Ventrally, the length of adanal plate is $0.048$ mm, with two pairs of setae. Coxisternal formula : 3-1-2.

**Nymph I**:
Length $0.318$, width $0.190$ mm. Body pale-yellow, somewhat sclerotized, prodorsal setae increase in length. Sensilli with 16-17 branches.

Notogaster with 14 pairs, it covers with dense minute setules. Neotrichial setae present.

Ventrally, the genital plate with a pair of simple setae, the length of the genital plate is $0.032$ mm. Adanal plate with 4 pairs of setae, the length of the adanal plate $0.080$ mm. Coxisternal formula 3-1-2-1. Setae $P_s_1$, $P_s_2$, $P_s_3$ distinctly ciliated.

**Nymph II**:
Length $0.484$, width $0.287$ mm. Body integument is more sclerotized, lamella distinct, prodorsal setae increase in length, sensilli with 16-17 branches.

Notogaster with 18 pairs of ciliated setae. Genital plate divided by transverse suture into two parts, the upper with two long pairs and a small pair of setae, the lower with a long and two small pairs of setae; the length of genital plate $0.052$ mm. Adanal plate with 4 pairs of ciliated setae, the anal plate with two pairs of ciliated setae, the length of the anal plate is $0.100$ mm. Neotrichial coxisternal setae present; 7-4-2-3.

**Nymph III**:
Length $0.530$, width $0.296$ mm. Similar nymph II, prodorsal setae increase in length. Notogaster with neotrichial setae. Ventrally, the genital plate is divided with transversal suture into two parts; the small upper part with three long and two small pairs of setae, the lower part with two long and three small pairs of setae. The length of genital plate $0.068$ mm. Adanal and anal setae increase in length. The pre-anal plate can be seen as instar shaped. Genito-anal region surrounded by two bands of area porosae. Coxisternal formula 9-4-2-3.
Fig. 1. — The developmental stages of *Papillacarus aciculatus*.

1 — egg; 2 — larva; 3 — protonymph; 4 — deutonymph; 5 — tritonymph and 6 — adult stage.
Adult:

Length 0.588, width 0.376 mm. Body brown, sclerotized, prodorsal setae long, bi-serrated sensilli with 19 branches, lamella elongated. Prodorsum covered with dense minute setules and tubercles.

Notogaster elliptical, with ciliated neotrichial setae.

Ventrally; the genital and anal plates similar as tritonymph, pre-anal plate star-shaped. The length of the genital plate 0.080 mm, anal plate length 0.136 mm. Coxisternal neotrichial setae are present. Coxisternal formula 9-4-2-3; marginal setae of coxisternal region considerably are longer and ciliated than anterior one.

B — Description of developmental stages of *Lohmannia egypticus*.

Egg:

Oval, whitish, ornamented. Size 0.249 × 0.181 mm, Fig. 3.

Larva:

Length 0.400, width 0.260 mm. Body whitish, prodorsum round, covered with dense tubercles, the prodorsal setae are lanceolate except the posterior expseudostigmatic setae which have fan-shaped, sensilli pectinate with 7 branches.
FIG. 3. — The developmental stages of *Lohmannia egypticus*.

1 — egg; 2 — larva; 3 — protonymph; 4 — deutonymph; and 5 — adult. A. — lanceolate seta; B. — exp. seta.
Notogaster with 10 pairs of narrow lanceolate setae. Setae C₃ and h₁ are more longer and wider than others. Notogaster with 4 transverse bands of porosae.

Ventrally, the adanal plate with 3 pairs of smooth setae, Coxisternal formula 2-₁-2; Coxisternal setae mostly broad leaf-shaped, with dense fine serrated marginally.

**Nymph I:**

Length 0.660, width 0.332 mm. Body pale yellow, rostral setae are slightly longer than lamellar. Sensilli with 9 branches. Notogaster with 13 pairs of lanceolate setae, and with 5 transverse bands of porosae. Notogastral setae increase in length.

Ventrally, the genital plate with a pair of leaf-like setae, the length of the genital plate 0.048 mm. Adanal plate with 4 pairs of setae. Setae Ps₁, Ps₂ and Ps₃ are long and lanceolate shaped. Pores (ip) and (ih) can be seen. Coxisternal formula 3-₁-2-₁.

**Nymph II:**

Length 0.808, width 0.440 mm. Body is more sclerotized. Prodorsal setae are more wider and longer.

Ventrally, genital plate divided unequally by transverse suture into a large rectangular part which bears two pairs of simple setae and a pair of leaf-like setae; and a small triangular part with a pair of leaf-like setae. The length of the genital plate 0.056 mm. Adanal plate and anal plates are separated by a longitudinal suture, four pairs of adanal lanceolate setae and two pairs of anal bi-serrated setae. The length of the anal plate 0.228 mm. Pores (ip) and (ih) elongated. Coxisternal formula 3-₁-3-₃.

**Nymph III:**

Length 0.892, width 0.464 mm. Body orange, more sclerotized. Prodorsal setae increase in length. Notogaster with 13 pairs of more long and wide of lanceolate setae.

Ventrally, the large of rectangular part of genital plate with two pairs of leaf-like setae and 3 pairs of ciliated setae; the small triangular part with two pairs of leaf-like setae and a pair of simple setae. The length of the genital plate is 0.080 mm. The anal and adanal setae increase in length, the length of the anal plate 0.260 mm. Coxisternal formula 3-₁-₃-₃.

**Adult:**

Length 1.020, width 0.508 mm. Body sclerotized, elongate, brown in colour. Prodorsum triangular covered with minute tubercles, prodorsal setae are lanceolate, tapering to an elongated point, hardly visible ciliae. Rostral setae are longer and wider than lamellar.

Notogastre elliptical, with 13 pairs of lanceolate setae, C₉, d₉, f₉, h₁, h₉, and h₉ are longer than others. Ventrally, genital plate divided by transversal suture into upper small part which bears 2 external pairs of leaf-like setae and 3 inner pairs of uniserrated setae; and large part which bears 2 external pairs of leaf-like setae and 3 inner pairs of uniserrated setae. The length of genital plate 0.176 mm. The genito-anal region is surrounded by two oblique bands of area porosea. The length of anal plate 0.268 mm. No coxisternal neotrichia, coxisternal formula 3-₁-₃-₃; Legs carry also broad leaf-like setae (Fig. 4).
Fig. 4. — The genital and anal plates of developmental stages of *Papillacarus egypticus*.

1 — larva; 2 — protonymph; 3 — deutonymph; 4 — tritonymph and 5 — adult. Legs of adult stage.
C — Life-cycles of *Papillacarus aciculatus* and *Lohmannia egypticus*.

The life cycle of both species is illustrated in table I. It is clear that the life cycle of *L. egypticus* is 1 1/2 times longer than that of *P. aciculatus*. Both species reproduced parthenogenetically. A female of *P. aciculatus* deposited 14 eggs, while *L. egypticus* deposited only 10 in two months after emergence. The preoviposition period in the former species was 24 days, while in the latter was 15. Eggs of both species were deposited in every where: on faeces, on rotten wood, in splits of roots and sometimes on substrate. It was observed that adult stages did not apply fungal mycelia or spores, while larvae and nymphs unwillingly applied this diet. When isolated larvae and nymphs were kept with fungi, they died. Immatures and adult individuals tend to burrow holes in plant roots and their existence can be distinguished by the faecal pellets found on roots around these holes.

The adult individuals of both species can be observed in soil samples collected in winter, while immatures can be observed in addition to adult in the spring, summer and autumn.

The longevity of the adult stages of two species is about two years.

The obtained results enable us to make the following interesting conclusion: species which were reared on fungi had shorter life cycle than those reared on dry leaves and potato. For instance the duration of the life cycle of species when reared on dry leaves and potato are longer: *Nothrus silvestris* — 188 days, *Hypochthonius rufulus* — 117 days, *Camisia spinifer* — 259 days and *Achipteria coleoptara* — 104 days (SITNIKOVA, 1962), the life cycle of *Pergalumna omniphagous* and *Ceratozetes jeweli* reared on mushrooms and moss were 42 and 53 days respectively (ROCKETT and WOODRING, 1966), the life cycle of *Oppia nova, O. concolor* and *Granuloppia sp.* when reared on fungi — 20, 27, 31 days respectively (SHEREEF, 1970, 1972).

**TABLE I.** — Average duration in days of the different developmental stages of *Papillacarus aciculatus* and *Lohmannia egypticus* at 25°C (eggs hatched in May 1975).

<table>
<thead>
<tr>
<th>Species</th>
<th>Egg</th>
<th>Larva</th>
<th>Proton.</th>
<th>Deuton.</th>
<th>Triton.</th>
<th>Life cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Papillacarus aciculatus</em></td>
<td>12</td>
<td>11</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>13 7 71</td>
</tr>
<tr>
<td><em>Lohmannia egypticus</em></td>
<td>18</td>
<td>16</td>
<td>3</td>
<td>13</td>
<td>10</td>
<td>24 6 101</td>
</tr>
</tbody>
</table>

M. moving stage, Q. quiescent stage.

**Acknowledgement**

The author wishes to express thanks to Dr. BÁLOGH and Dr. MAHUNKA, Hungary-Budapest and also Dr. SITNIKOVA, Zoological museum, Leningrad USSR for mite identification.

**Summary**

The life cycle of two oribatid species of Lohmanniidae when reared on dry leaves and decaying roots was studied. The morphological characters of developmental stages were described.
RÉSUMÉ

Le développement postembryonnaire de deux Oribates de la famille des Lohmanniidae a été étudié. Ils ont été élevés sur des feuilles sèches et des racines pourries. Les caractères morphologiques des stases sont décrits.

REFERENCES CITED


Woodring (J. P.) and Cook (E. F.), 1962. — The biology of Ceratozetes cisalpinus Berlee, Scheloribates laevigatus Koch. and Oppia neerlandica Oudemans (Oribatei) with a description of all stages. — Acarologia 4 : 101-137.


Paru en Novembre 1976.