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DESCRIPTION OF THE IMMATURE AND ADULT STAGES
OF AMBLYSEIUS COLIMENSIS N. SP.
(ACARI : PHYTOSEIIDAE) FROM MEXICO

BY ORLANDO R. APONTE * & J. A. McMURTRY **

ABSTRACT: Studies of the general morphology and ontogeny of body setation and
porotaxy were conducted on Amblyseius colimensis n. sp. Stages are taxonomically
described and figured.

TAXONOMY AND DEVELOPMENT STAGE BY STAGE

DESCRIPTION

Description of species in the family Phytoseiidae
are based on adult females and infrequently on
both sexes. Immature stages are not considered as
tools for the classification within the family and
only a few descriptions of them have been made
(CHANT, 1957, 1958, WESTERBÖER, & BERNHARD,
1963, SCHUSTER, 1966, VAN DER MERWE, 1968,

CHANT (1958) studied the homology of setae on
the dorsal shield of the different stages of mites of
the family Phytoseiidae. ARUTUNYAN (1972) dis­
cussed the ontogenetic development of shields and
setae in the family Phytoseiidae. ROWELL et al.
(1978) discussed the setal homologies and setal
patterns on the dorsal shield and developed a more
complete system of chaetotactic nomenclature for

INTRODUCTION

the family based on similarities between Ascidae
and Phytoseiidae. ROWELL and CHANT (1979) pre­
sented evidence of homologous setal relationship
between the immature and adult stages, based on
chaetotaxy of the legs, and ventral and dorsal
shields. YOSHIDA-SHAUL and CHANT (1983) showed
the ontogenetic development of setae in two species
groups in the genus Typhlodromus Scheuten.

METHODS

The description of Amblyseius colimensis n. sp. is
based on 25 females (including 3 specimens from
the original shipment) and 10 females taken from
the laboratory culture. Descriptions of immature

stages are based on 10 individuals, except the male deutonymph which is based on 6 individuals. All the measurements are given in micrometers.

The nomenclature used for the chaetotaxy of the dorsal surface and ventral shields of the opisthosoma is based on the system of Lindquist and Evans (1965) and modified by Athias-Henriot (1975b) and Rowell et al. (1978). Nomenclature of the appendage chaetotaxy is based on the system of Evans (1963, 1965, 1969, 1972). Other terminologies were used as follows: Schuster and Smith (1960) for the structures of the spermatheca; De Leon (1961) for the structures of the spermadactyl; De Leon (1966) for the peritremal and stigmal structures; Athias-Henriot (1969a, 1969b, 1970, 1975a, 1975b, 1977) for the organotaxy of the dorsal shield; Nesbitt (1951) and Van der Hamm (1964, 1966) for the ventral region of the prosoma; Van der Hamm (1964) and Evans and Loots (1975) for the nomenclature of the mouthparts.

**Structure of the Gnathosoma**

**Gnathosomal capsule.** The gnathosoma or capitulum resembles the general type for Gamasida. The gnathosoma is lightly sclerotized in the adult stage and in live specimens appears as a prognathus cone-shaped structure. The anterior margin of the epistome (Fig. 1, eps) is smooth and rounded. The 3-segmented chelicerae are bounded dorsally and laterally by the cheliceral sheaths (Figs. 1, 5, 8, chs), sliding over the subcheliceral plate (Fig. 3, scp).

As with other mites, the lateral walls of the gnathosoma are formed by expansion of the coxal palpi; ventrally the palpal coxae form the subcapitulum (Fig. 2) which is about as wide as long and bears the medial deutosternal groove (deu). This groove bears excrescences in the larva (Fig. 7, ex), and transverse lines with denticles in the later stages. The tritosternum (Figs. 2, 6, 7, tri) normally
Figs. 5-8. *Amblyseius colimensis* n. sp.

Male. 5. — Hypostome, dorsal region. 6. — Subcapitulum, hypostome.

Larva. 7. — Subcapitulum. 8. — Hypostome, lateral aspect.
rests in the deutosternal groove. Its base originates on the idiosoma and it bifurcates into 2 laciniae. The function of the tritosternum in certain Gamasida is described by WERNZ and KRANTZ (1976).

The subcapitulum of the larva bears 2 pairs of hypostomal setae (Fig. 7, $h_1$, $h_2$); and the later stages have 3 pairs of hypostomal setae (Figs. 2, 6, $h_1$, $h_2$, $h_3$) and 1 pair of coxal or subcapitular setae (cs). The adult also shows scars, which probably represent points of internal muscle insertions (Fig. 2, sca), and 1 pair of longitudinal cuticular pore-like structures (cp) behind the capitular setae. The hypostome is formed by the anterior extension of the subcapitulum (coxal endites) and the lateroventral extension of the pharyngeal walls (EVANS & LOOTS, 1975, KRANTZ, 1978). The corniculi or external malae (Figs. 2, 4, 5, 6, 7, 8, co) arise from the anterior portion of the hypostome and possess a furrow (Figs. 4, 5, fu) dorsally, which widens posteriorly. A bilobed structure, the minor internal mala and the internal mala (Fig. 6, mim, im) arises from the lateral bases of the corniculi. The salivary stylus (siphunculus of VAN DER HAM MEN, 1964) (Figs. 3, 5, 6, 7, 8, ss) are located lateral to the corniculi. These structures are tapered and internally bear a secretory duct (Figs. 3, 6, sd). Dorsally and laterally the corniculi and internal malae form the preoral groove (Figs. 4, 8, pg) (EVANS & LOOTS, 1975) and behind this is the oral opening (oo) which laterodorsally is surrounded by the following organs: an arrowhead shaped structure, the supralabrum (Figs. 3, 5, sla), which is located anteriorly at the end of the subcheliceral plate; a tapering structure with the ridges folded upward, the labrum (la) (Figs. 3, 5, 6, 8) just below the supralabrum; a pair of processes, the paralabra (pla), laterally and partially under the labrum.

The epipharynx and the pharynx (Fig. 4, ep, pha), which have a large fissure (df) along their dorsal surface, are located behind the oral opening. The pharyngeal muscle surrounds the pharynx to form a cylindrical structure (mu).

Cheliceria. The chelicerae (Figs. 9, 10, 11, 12, 13) in immature and adult stages bear the pilus dentilis (pd) on the fixed digit (fdi), the terminal hook on both digits, ventral excrescences (ex) behind the movable digit (mdi), and several teeth which increase in number during ontogeny. Larva (Fig. 9): length of the fixed digit 17 (15-18), with 6 teeth; movable digit with 2 teeth. Protonymph (Fig. 10): length of the fixed digit 20 (19-22), with 6-7 teeth; movable digit with 2 teeth. Deutonymph (Fig. 11). Female: length of the fixed digit 27 (26-28); Male: length of the fixed digit 21 (21-22); both sexes: fixed digit with 7-8 teeth; movable digit with 3 teeth. Adult. Female (Fig. 12, a, b, c): length of the fixed digit 37 (35-38), with 9 teeth; movable digit with 3 teeth, and 2 lyrifissures (ly).
present on the antiaxial region. Male (Fig. 13, a, b) with spermadactyl which bears the following structures: base (ba), connective membrane (cm), foot (ft), heel (h), lateral process (lp), shank (sh), and toe (t). Length of the fixed digit 25 (24-26), with 6-9 teeth; movable digit with 1 tooth.

**Description of stages**

**Larva**

**Dorsum** (Fig. 17). Two weakly sclerotized shields are present, with 1 pair of setal nubs (SN) on the membrane. Podonotal shield (PS) smooth over entire surface, distance from the base of j1 to the base of j6 129 (123-136); distance between the bases of setae s4 108 (106-111); with 9 pairs of setae (j1, j2, j3, j4, j5, j6, z2, z4, z5, s4). Opisthonotal shield (OS) with 3 pairs of setae (Z3, Z5, S5). Setal measurements: j1 31 (30-34), j2 12 (11-12), j3 8 (8-9), j4 29 (27-34), z2 10 (9-11), z4 13 (12-15), z5 8 (8-9), Z3 150 (143-151), Z5 7 (7-8), s4 66 (63-68), S5 7 (6-7).

**Venter** (Fig. 18). Shields absent or weakly sclerotized; sternogenital region with 3 pairs of setae (S1, S2, S3); ventrianal region with anal shield (AN) bearing the anal setae (a1, a2, a3), 4 pairs of preanal setae (JV1, JV2, JV3, ZV3), and 2 pairs of cuticular pores (p). Stigmata and peritremes absent.

**Legs.** Chaetotaxy as shown in Table 3. Dorsal field (Jackson, 1974) bears a set of 9 short pegs or spur-
Figs. 14-16. *Amblyseius colimensis* n. sp. palp

14. — Larva. 15. — Protonymph. 16. — Adult. Tr = trochanter; Fe = femur; Ge = genu; Ti = tibia; Ta = tarsus.
like setae. Coxa I has 1 gland (Fig. 18, cxg) (Fain, 1966, Swirski et al., 1973) with a single glandular opening.

**Protonymph**

**Dorsum** (Fig. 19). Podonotal and opisthontal shields widely separated by interscutal membrane, which bears 5 pairs of setae ($J_5$, $Z_1$, $S_2$, $r_3$, $R_1$). Dorsal surface: length (distance from $j_1$ to $J_5$) 212 (201-223); width (distance between bases of $s_4$ 108 (105-111). Podonotal shield with 9 pairs of setae ($j_1$, $j_3$, $j_4$, $j_5$, $j_6$, $z_2$, $z_3$, $z_4$, $s_4$). Opisthontal shield with 5 pairs of setae ($J_5$, $Z_1$, $Z_2$, $S_4$, $S_3$). Setal measurements: $j_1$ 22 (19-24), $j_3$ 31 (28-34), $j_4$ (13-15), $j_5$ 8 (8-9), $j_6$ 18 (17-22), $J_5$ 14 (13-15), $J_1$ 7 (6-7), $z_2$ 10 (9-11), $z_4$ 13 (12-15), $z_5$ 8 (8-9), $Z_1$ 12 (12-14), $Z_2$ barbed, 147 (143-151), $Z_3$ barbed, 38 (35-42), $s_4$ 66.
Figs. 19-20. *Amblyseius colimensis* n. sp. idiosoma. Protonymph.


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(63-68), $S_2$ 11 (10-12), $S_4$ 6 (5-6), $S_6$ 6 (6-7), $r_3$ 18 17-19), $R_1$ 7 (6-7).

VENTER (Fig. 20). Shields weakly sclerotized. Sternogenital shield ($SG$) bears 3 pairs of setae ($S_1$, $S_2$, $S_3$), and 2 pairs of sensillae ($S_5$, $S_6$). Ventrianal region with anal shield bearing three anal setae ($a_1$, $a_2$, $a_3$), and setose process ($sd$) at posterior end of anal shield, with 4 pairs of preanal setae ($JV_1$, $JV_2$, $JV_3$, $ZV_2$), and 4 pairs of cuticular pores ($p$) (anterior to $JV_1$, lateral to $JV_2$, posterior to $JV_2$, medial to $JV_3$).

Stigmal opening ($sti$) and secondary pore ($sp$) located ventro-laterally between coxae III and IV; peritreme extends from the stigma to the level of anterior margin of coxa III, and bears small tubercular processes along its length.

LEGS. Chaetotaxy as shown in Table 3. Dorsal field with 11 short pegs or spur-like setae. Coxa I (Fig. 20) with 2 glands with 1 and 2 glandular openings, respectively. Macroseta ($pd$) basitarsus IV : 71 (68-74).

DEUTONYMPH

DORSUM (Fig. 21). Interscutal membrane with 2 pairs of setae ($r_3$, $R_1$). Podonotal and opisthontal shields partially fused. Length (from bases of setae $j_1$ to $j_N$) : female 246 (246-262), male 232 (231-236) ; width between bases of $s_4$ : female 123 (120-126), male 113 (108-116). Podonotal shield with 9 pair of
setae \(j_1, j_2, j_3, j_4, j_5, z_2, z_3, s_3, s_4\). Opisthontonal shield width 8 pairs of setae \(J_1, J_2, Z_1, Z_2, Z_5, S_1, S_2, S_5\). 

Setal measurements. Female: \(j_1, 27 (25-29), j_2, 46 (45-49), j_3, 14 (13-15), j_4, 8 (8-9), j_5, 16 (14-19), J_1, 15 (14-17), J_2, 9 (9-10), j_3, 24 (23-26), z_3, 36 (32-40), z_4, 8 (8-9), Z_1, 15 (13-17), Z_2, 103 (99-108), s_4, 63 (62-65), S_1, 17 (15-19), S_2, 9 (8-9), S_3, 8 (9-8), r_5, 21 (20-22), R_1, 11 (10-12). Male: \(j_1, 24 (23-25), j_2, 43 (40-45), j_3, 14 (14-15), j_4, 9 (9-10), j_5, 17 (16-19), J_1, 14 (12-15), J_2, 9 (9-10), z_3, 20 (19-22), z_4, 33 (30-35), z_5, 8 (8-9), Z_1, 14 (13-15), Z_2, 61 (55-63), Z_3, 78 (74-80), s_5, 54 (51-55), S_1, 17 (15-19), S_2, 9 (8-9), S_3, 9 (8-9), r_5, 19 (19-20), R_1, 12 (10-13).\)

**VENTER** (Fig. 22). Shields weakly sclerotized. Sternogenital shield bears 5 pairs of setae \(S_1, 2, S_3, MT, g\), and 3 pairs of sensillae \(S_s_1, S_s_2, ms\). Sexual dimorphism is evident in the ventrial region. Female: with 6 pairs of preanal setae \(J V_1, J V_2, J V_3, Z V_1, Z V_2, Z V_3\). Male: with 4 pairs of preanal setae \(J V_1, J V_2, Z V_3, Z V_3\). Both sexes with 3 anal setae \(a_1, a_2, a_3\), and 1 pair of postanal setae \(J V_3\). The membraneous area lateral of the preanal setae has 4 cuticular pores; an additional pair of prominent pores are situated mediad to setae \(J V_3\). Setose processes present at posterior end of anal shield.

Peritremes \(pe\) extended anteriorly to level of
setae $j_t$, with the tubercular processes, stigmal opening and secondary pore located ventrolaterally between coxae III and IV.

**LEGS.** The legs of both sexes show the same chaetotaxy as the adults (Table 3). Coxa I (Fig. 22) with 3 glands ($cxg$), 2 of which have 2 glandular openings and the third with 4 glandular openings. Macroseta ($pd$) on basitarsus IV: female 74 (71-79), Male 68 (65-69).

**ADULT**

**DORSUM** (Figs. 23, 27). Podonotal and opisthonomal shields fused, forming a complete dorsal shield, which is smooth over the entire surface. Female (Fig. 23): length (between bases of $j_1$ and $j_5$) 344 (324-360), width of the dorsal shield at the constricted point ($R_t$ level) 218 (209-222). Dorsal shield with 17 pairs of setae: $j_1$ 29 (26-31), $j_5$ 50 (46-52), $j_6$ 7 (6-7), $j_8$ 6 (5-7), $j_8$ 7 (6-8), $j_9$ 7 (6-7), $j_{10}$ 10 (9-11), $z_2$ 12 (9-14), $z_9$ 27 (23-32), $z_5$ 5 (5-7), $Z_7$ 7 (6-8), $Z_4$ barbed, 85 (82-90), $Z_5$ barbed, 188 (182-193), $s_4$ 69 (65-74), $S_1$ 12 (10-13), $S_2$ 8 (8-9), $S_3$ 8 (8-9), $r_1$ on membrane, 18 (17-20), $R_1$ on membrane, 10 (9-12).

Male (Fig. 27): length (between bases of $j_1$ and $j_5$) 274 (259-293), width of dorsal shield at level of $R_1$ 196 (188-199). Dorsal shield with 19 pairs of setae: $j_1$ 25 (22-28), $j_5$ 45 (42-49), $j_6$ 7 (6-8), $j_8$ 6 (5-7), $j_8$ 8 (6-9), $z_7$ 7 (6-9), $j_9$ 9 (9-10), $z_1$ 17 (15-20), $z_4$ 30 (25-34), $z_5$ 6 (5-6), $Z_7$ 7 (7-8), $Z_4$ barbed, 64 (60-65), $Z_3$ barbed, 117 (116-120), $s_4$ 56 (52-59), $S_1$ 14 (12-15), $S_2$ 9 (8-10), $S_3$ 9 (8-9), $r_3$ 18 (17-20), $R_1$ 10 (9-11).

**VENTER** (Figs. 24, 25, 28). Ventral shields well defined. Female (Figs. 24, 25): sternal shield ($ST$) with 3 pairs of sternal setae ($S_1$, $S_2$, $S_3$), and 2 pairs

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FIG. 27. *Amblyseius colimensis* n. sp. Male. Dorsum.
Figs. 28-29. *Amblyseius colimensis* n. sp. Male. 28. — Venter. 29. — Fused dorsal and peritremal shield.

of sensillae (*S*₄₁, *S*₄₂) near bases of *S*₁ and *S*₃; length at the medial section 64 (62-66). Sternal shield with anterior lateral projection reaching the anterior region of coxa II and with a pore-like structure at the end of each of these projections; posterior margin of the shield with lateral truncated lobes. Metasternal setae (*MT*) on platelet (*MS*) with sensillae (*ms*). Length of genital shield (*G*) at the medial region, not including genital flap (*gf*), 84 (79-89); maximum width 77 (69-86); genital flap semicircular with scalloped margin and lateral arms reaching coxae IV; a pair of pores present on the surrounding membrane posterolaterally to genital setae (*g*), and a thin, tranverse platelet (*pl*₁) behind genital shield. Ventrianal shield (Fig. 25, *VA*) rounded at the anterior corners, length at the medial region 112 (103-119), width at level of seta *ZV₂* 84 (77-90), with 3 pairs of preanal setae (*JV*ᵢ, *JV*₂, *JV*₃).
JV2, ZV2), and 1 pair of pores mediad and slightly posterior to JV3; 3 anal setae (a1, a2, a3) and setose processes present; surrounding membrane with 4 pairs of setae (JV4, JV5, ZV1, ZV3), and 6 pairs of pores; 2 pairs of metapodal platelets (mp) with pebbled surface, 1 pair of small platelets (pl) behind ZV1.

Endopodal and parapodal shields present. Spermatheca (Fig. 26) pyriform when vesicle (Ve) expanded; cervix (ce) and atrium (ar) forming an angular tube, cervix length 12 (11-13), major duct (ma) and minor duct (mi) well defined.

Peritremal shield (Fig. 23, ps) extensions fused anteriorly with dorsal shield at the level of id1 sensillae. Stigma (sti), secondary pore (sp), and peritreme (pe) on peritremal shield, which also bears 3 pairs of sensillae (id5, id7, id8) and 1 pair of cuticular openings (gd4). Peritreme extending to level of j1 seta.

Male (Fig. 28). Ventral shields well sclerotized. Sternogenital shield (SG) length at the medial section 116 (114-120) with 5 pairs of setae (S1, S2, S3, MT, g), and 3 pairs of sensillae (Ss1, Ss2, ms). Genital opening at anterior margin of sternogenital shield, with internal chitinous organ (go) and genital flap (gf) which are protruded during mating. Ventrianal shield (VA) with a few striations, length at the medial section 117 (108-122), maximum width 147 (145-150), with 4 pairs of preanal setae (JV1, JV2, ZV2, ZV3) (some specimens also have 1
or 2 \( JV_4 \) setae), and 5 pairs of cuticular pores; surrounding membrane with 1 pair of setae (\( JV_3 \)) and 3 pairs of cuticular pores.

Peritremal shield (Fig. 29, ps) fused with dorsal shield at level \( r_1 \) setae. Stigma (\( sti \)), secondary pore (sp) and peritreme on peritremal shield, which also bears 3 pairs of sensillae (\( id_s, id_r, id_b \)). Peritreme extending to level of \( id_l \) sensillae.

**LEGS.** The legs have the same chaetotaxy in both sexes (Table 3). All legs with 1 dorsal tibiotarsal (\( jt_1 \)), 2 lateral trochanterofemoral (\( jt_2 \)), and ventral coxotrochanteral joints (\( jt_3 \)) (Fig. 30). Coxa I with 2 prominent glands (\( cxg \)) with 2 and 4 openings, respectively. Pretarsus (Fig. 31) with 2 claws and pad-like empodium. Dorsal field (Fig. 32) with 11 short pegs or spur-like setae. Leg IV (Fig. 33) with dorsal coxotrochanteral joint (\( jt_4 \)) as well as 2 lateral trochanteral and 1 ventral coxotrochanteral joints. Macroseta (pd) on basitarsus IV: female 73 (69-82), male 57 (56-60). Macrosetae also present on genu and tibia IV and genua of legs I, II, III in both sexes.

**ONTGENETIC DEVELOPMENT OF ORGANOTAXY OF DORSUM AND APPENDAGES**

Setae, sensillae and glandular openings are considered in the ontogeny of the organotaxy of the dorsum, while only the setal ontogeny is considered in relation to the appendages.

**IDIOSOMA**

Setae. Arutunyan (1972) stated that for some Amblyseius, the number and arrangement of setae in the dorsal region is the same in the protonymph and deutonymph stages, and changes occur during the molt to protonymph. Definitive dorsal setation in *Amblyseius colimensis* n. sp. is present in the protonymph stage and complete idiosomal chaetotaxy is definitive in the deutonymph stage, as also shown for other phytoseiid mites (Chant 1958, Arutunyan 1972, Swirski et al. 1973, Rowell et al. 1978, 1979). The chaetotaxy for each stage is shown in Table 1. During the molt to protonymph \( r_3, R_1, Z_2, S_1 \) and \( S_2 \) are added. No changes occur in the body venter except that \( JV_5 \) is posteriorly displaced. During the molt to deutonymph, the chaetotaxy of the dorsal surface remains the same. On the ventral surface, metasternal setae (\( MT \)) and genital (g) setae are added in the sternogenital region; seta \( ZV_3 \) is added in the male and \( ZV_1, ZV_3 \) and \( JV_4 \) are added in the female. Seta \( JV_5 \) is completely displaced posteriorly. During the molt to adult, no setae are added. However, exceptions

### Table 1: Ontogenetic development of the idiosomal chaetotaxy in *Amblyseius colimensis* n. sp. (Acarina: Phytoseiidae).

#### DORSUM

<table>
<thead>
<tr>
<th>Stage</th>
<th>Central</th>
<th>Medio lateral</th>
<th>Lateral</th>
<th>Marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larva</td>
<td>( j_1, j_1, h, h, b )</td>
<td>( z_2, z_3, Z_2, Z_3 )</td>
<td>( s_4 )</td>
<td>( S_1 )</td>
</tr>
<tr>
<td>Protonymph</td>
<td>( j_1, j_1, h, h, j_1, j_1 )</td>
<td>( z_2, z_3, Z_2, Z_3 )</td>
<td>( s_4 )</td>
<td>( S_1, S_2, S_3 )</td>
</tr>
<tr>
<td>Deutonymph</td>
<td>( j_1, j_1, h, h, j_1, j_1 )</td>
<td>( z_2, z_3, Z_2, Z_3 )</td>
<td>( s_4 )</td>
<td>( S_1, S_2, S_3 )</td>
</tr>
</tbody>
</table>

#### VENTER

<table>
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<tr>
<th>Sterrogenital</th>
<th>Medio lateral</th>
<th>Anal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larva</td>
<td>( S, S, S )</td>
<td>( JV, JV, JV )</td>
</tr>
<tr>
<td>Protonymph</td>
<td>( S, S, S )</td>
<td>( JV, JV, JV )</td>
</tr>
<tr>
<td>Deutonymph</td>
<td>( S, S, S, MT_g )</td>
<td>( JV, JV, JV )</td>
</tr>
</tbody>
</table>

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Figs. 31-32. *Amblyseius colimensis* n. sp. Female. Leg I. 31. — Pretarsus. en = empodium; cl = claw; bs = base. 32. — Dorsal field.
may occur in some males where 1 or 2 JV₄ setae may be added.

**Sensillae** (Figs. 17, 19, 21, 23, 27, and Table 2).

- **Larva.** This stage shows 7 pairs of sensillae. Protonymph. This stage shows the beginning of sclerotization of the interscutal membrane between shields. The sensillae id₁, id₁, and id₁ are added; podonotal shield with the same sensillae as larva; id₉ and id₉ incorporated in the opisthonotal shield; id₉ also added to this shield. Deutonymph. The shields are partially formed and fused. The sensillae id₁ is added to the membrane; podonotal shield adds id₁. Sensillae id₁, id₁, and id₁ incorporated on the opisthonotal shield from the membrane. This shield also adds id₉, id₉, and id₉. Adult. The dorsal shield is completely developed. All the sensillae are located on it; the dorsum adds id₉, and id₉. Peritremal shield bears id₉, id₁, and id₁.

**Glandular openings** (Figs. 17, 19, 21, 23, 27 and Table 2). The full complement of glandular openings appears in the deutonymph stage. Larva. The podonotal shield bears gd₂. Protonymph. This

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**Table 2.** Sensillae and glandular openings of the dorsum in *Amblyseius colimensis* n. sp.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Surrounding membrane</th>
<th>Podonotal shield</th>
<th>Opisthonotal shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larva</td>
<td>id₁, id₉</td>
<td>idₙ₁, idₙ₂, idₙ₃</td>
<td>idₙ₄, idₙ₅, idₙ₆</td>
</tr>
<tr>
<td>Protonymph</td>
<td>id₁, id₁, id₉, id₉, id₉, id₉</td>
<td>idₙ₁, idₙ₂, idₙ₃</td>
<td>idₙ₄, idₙ₅, idₙ₆, idₙ₇</td>
</tr>
<tr>
<td>Deutonymph</td>
<td>id₁, id₁, id₉, id₉, id₉, id₉, gd₂, gd₃, gd₄</td>
<td>idₙ₁, idₙ₂, idₙ₃, idₙ₄, idₙ₅, idₙ₆, idₙ₇, idₙ₈</td>
<td>idₙ₉, gd₉, gd₁₀</td>
</tr>
</tbody>
</table>

---
stage adds \( gd_6 \) to the surrounding membrane, no changes occur on the podonotal and opisthonotal shields. Deutonymph. The membrane adds \( gd_3 \); podonotal shield bears \( gd_1, gd_3 \) and \( gd_4 \); opisthonotal shield bears \( gd_4 \) and \( gd_5 \). Adult. All the glandular openings are located on the dorsal shield, except \( gd_3 \) which appears in the female on the peritremal shield.

APPENDAGES

As in the idiosoma, palp and leg chaetotaxy reaches its full complement in the deutonymph stage (Table 3). Only a few setae are added during the ontogenetic development of the palps. In the legs, the major addition of setae occur in the molt from protonymph to deutonymph.

REMARKS. *Amblyseius colimensis* n. sp. was present in a consignment of citrus leaf pieces, containing parasitized woolly whitefly *Aleurocanthus floccosus* (Maskell) from Manzanillo, Colima State, Mexico. The material was shipped by B. DEBACH and M. ROSE¹ to the quarantine facility of the University of California, Riverside. From those mites, an insectary culture was established and studies were conducted on their progeny.

The adult females of *Amblyseius colimensis* n. sp. resemble *Amblyseius divisus* De Leon, 1961; *Amblyseius simiatus* De Leon, 1961; *Amblyseius potentillae* (Garman, 1958), and *Amblyseius andersoni* (Chant, 1957). *A. colimensis* can be distinguished from *A. divisus* by the shape of the spermatheca, lengths of the dorsal setae \( Z_4 \) and \( Z_5 \), and the length and width of the dorsal shield; from *A. simiatus* by differences in lengths of the setae \( f_3, s_4, s_5, Z_4 \) and \( Z_5 \), and the constriction in the middle region of the ventrianal shield in *A. simiatus*; from *A. andersoni* by the shape of the spermatheca and differences in lengths of setae \( j_3, s_4, 4_4 \) and \( Z_5 \); and from *A. potentillae* by differences in shape of the spermatheca; no differences were considered on the dorsal setae between the two species because the measurements were not given in the original description of *A. potentillae*.

**TYPE SERIES.** Holotype: ♀ original sample. Allo- type: ♂ from laboratory culture. Paratypes: 2 ♀♀ from original sample. 22 ♀♀ and 9 ♂♂ from laboratory culture. The holotype and allotype are deposited in the U.S. National Museum of Natural History.

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**Table 3 :** Ontogenetic development of the appendage chaetotaxy in *Amblyseius colimensis* n. sp. (Acarina : Phytoseiidae).

<table>
<thead>
<tr>
<th>Stage</th>
<th>Appendages</th>
<th>Coxa</th>
<th>Trochanter</th>
<th>Femur</th>
<th>Genu</th>
<th>Tibia</th>
<th>Tarsus</th>
</tr>
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<tbody>
<tr>
<td>Larva</td>
<td>Pulp</td>
<td>0</td>
<td>0</td>
<td>1-1-1-1</td>
<td>1-1-1-1-1</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Leg I</td>
<td>0/2</td>
<td>1-0/1-0/1-1</td>
<td>0</td>
<td>2-2/1-2/1-2</td>
<td>1-2/1-2/1-2</td>
<td>1-2/1-2/1-1</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>1/2</td>
<td>1-0/1-0/1-1</td>
<td>0</td>
<td>1-2/1-2-1</td>
<td>1-2-1</td>
<td>1-1/1-2/1-1</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0/2</td>
<td>1-1-1-0/1-0</td>
<td>0/1</td>
<td>1-2-1-1</td>
<td>1-2-1-1</td>
<td>1-1-2/1-1</td>
</tr>
<tr>
<td>Protonymph</td>
<td>Pulp</td>
<td>4</td>
<td>0/1</td>
<td>1-1-1-1</td>
<td>1-1-1-1</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td></td>
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<td>1-0/1-0/1-1</td>
<td>0</td>
<td>2-2-1-2</td>
<td>1-2/1-2/1-2</td>
<td>1-2/1-2/1-1</td>
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<td>1-2-1</td>
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<td>1-1-0/1-0/0</td>
<td>0/1</td>
<td>1-2-1-1</td>
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<tr>
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<td>IV</td>
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<td>1-2-1-0</td>
<td>1-2-1-0</td>
<td>1-1-2/1-1</td>
</tr>
<tr>
<td>Deutonymph</td>
<td>Pulp</td>
<td>4</td>
<td>0-0/1-0/1-0</td>
<td>1-1-1-1</td>
<td>2-1-1-1-1</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>and Adult</td>
<td>Leg I</td>
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<td>1-0/1-0/1-1</td>
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<td>2-2-1/2</td>
<td>2-2/1-2-1</td>
<td>2-2/1-2-1</td>
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<tr>
<td></td>
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<td>1-2-1-1</td>
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<td>0/1</td>
<td>1-2-1-1</td>
<td>1-2-1-1</td>
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<tr>
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<td>1-2-1-1</td>
<td>1-2-1-1</td>
<td>1-1-1-1</td>
</tr>
</tbody>
</table>

¹. University of California, Riverside, U.S.A.
History (Washington, D.C.); 14 paratypes are deposited in the Florida State Collection of Arthropods (FSCA), Gainesville, Florida. Nineteen paratypes (14 ♀♀ and 5 ♂♂) and the immature stages are deposited in the Division of Biological Control, Department of Entomology, University of California, Riverside, CA.

REFERENCES


