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A NEW SPECIES OF HISTIOGASTER BELONGING TO THE FAMILY ACARIDAE, EWING & NESBITT 1942 (ACARINA)

BY

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The material was sent to me by Dr Robert DAVIS of the Department of Entomology, University of Georgia, Athens, Georgia, U.S.A. He has successfully reared the hypopi which he took from pine reproduction weevils Pachylobius picsivorus (Germ.) collected in North Carolina. A paper on the biology of this mite, by Robert DAVIS and Preston R. HUNTER, will shortly be published under the title "Biological Studies of a Histiogaster mite associated with weevils (Acarina, Acaridae)."

**Histiogaster anops** sp. n.

The following characters serve to distinguish this mite from all other described species attributed to the genus Histiogaster:

I. In the male the anterior margin of the anal suckers each bears a short simple seta. In all other species in which the male has a four-lobed opisthosomal shield this seta is cone-shaped or spatulate.

II. The hypopus is devoid of corneae.

Hitherto, the presence of a pair of corneae on the dorso-anterior margin of the rostrum of the hypopus has been used as a generic character by many taxonomists. The discovery of *H. anops* precludes its use in the future.

No one has yet been able to find a morphological character which can be used to separate the females.

**Male** (Figs. 1, 2 & 3).

The body is oval in shape with the posterior margin produced into a horizontal opisthosomal shield which, in the living mite, projects outwards and downwards. The cuticle of both dorsal and ventral surfaces of the shield is strongly

thickened. On the ventral surface this thickened region terminates evenly along a line where the shield joins the opisthosoma, whilst on the dorsal surface it is sculptured and extends further forwards irregularly, its anterior margin reaching approximately level with the fourth dorsal setae. The terminal margin of the shield is developed into four distinct semi-circular lobes; each lobe bears a thin transparent fan-like flange.

The propodosoma bears a dorsal shield which is extremely difficult to detect, extending from the base of the vertical internal setae to just in front of the suture separating the propodosoma and hysterosoma.

The setae of the idiosoma are smooth, their tips end in very fine whip-like threads which are difficult to see without phase contrast equipment. The vertical internals (v.i.) arise close together projecting forward and diverging a little above the base of the chelicerae, extending over the anterior margin of the propodosoma for about half their length. Grandjean's organs arise laterally and at about the same level as the v.i.'s; they are strong, curved down and towards the base of the chelicerae, forking at the apex.

The bases of the external scapular setae (sc.e.) form a transverse line on a level with coxae II. They extend forward over the opisthosoma almost as far as the tips of the v.i. setae. Internal scapulars are absent. Only one pair of humerals (h.e.) is present. The dorsal setae are represented by \( d_3 \) and \( d_4 \); \( d_1 \) and \( d_2 \) being absent. Lateral setae are also absent. The external sacrals (sa.e.) are about the same length as the third dorsals (\( d_3 \)); internal sacrals are a little longer and equal in length to the fourth dorsals (\( d_4 \)). Just forward and to the side of the openings to the latero-abdominal glands is a pair of chitinous circles, about half the diameter of a setal base; their position is close to, but not synonymous with, the expected position of the absent lateral setae. A second pair of circles are close to the expected position of the absent posterior lateral setae, whilst a third pair is situated external to the fourth dorsal setae. They may be the openings of dermal glands.

The ventral surface (fig. 2) bears two pairs of coxal setae, three pairs of genital setae and the ventral humerals. The genital aperture, situated between coxae IV, is large. The lateral arms of the penis support are slender and widely extended with the ends turning inwards slightly. The posterior margin of the basal element of the penis is strongly curved at the extremities filling the space between the arms of the support. The penis curves downwards, with a short upturned tip.

The anal opening is short, bordered behind by a pair of strongly scleritised suckers with evenly rounded posterior and oblique anterior margins (fig. 3). The central disc is divided into seven or eight segments. The antero-lateral border of the sucker bears a short simple seta tapering to a fine point. A pair of chitinous circles lie external to the suckers. The postanal setae are represented by a single pair of simple thin microsetae, probably \( p_{a_2} \).

Epimeres are heavily cuticularised, those of leg I meeting to form a short sternum. Epimerite II is long and thin, running almost parallel to epimere II.
**Histogaster anops** sp. n.

Fig. 1, dorsal view of male (paratype mounted on same slide as type): *vi*, internal vertical setae; *sce*, external scapular setae; *he*, external humerals; *d₃* and *d₄*, dorsals; *sai* and *saе*, internal and external sacrals. Fig. 2, ventral view of male (holotype); *pa₂*, post anal setae. Fig. 3, male, ventral view of anal region, (paratype).
The gnathosoma is quite slender, the chelicerae are of the chelate pattern, the shears are long and strongly toothed.

The legs are of medium length; their chaetotaxy is described below.

**Female** (Figs. 4 & 8).

The female is larger than the male, the body is more oval being less rounded posteriorly and the idiosoma is not produced into an opisthosomal shield. The arrangement of the setae on the dorsal surface is the same, the three pairs of chitinous rings are also present.

Ventrally, the epimeres and epimerites are the same as in the male as are the genital, humeral and coxal setae. The genital opening is a narrow inverted V

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**Histiogaster anops** sp. n.

Fig. 4, ventral view of female: 1 to 5, anal setae; *p.a*₁ and *p.a*₂, post anal setae; *sa.i*, internal sacrals.
lying between coxae II and IV. The usual two pairs of “suckers” are present. The wall of the oviduct is ridged. The bursa copulatrix opens by a small aperture on the dorsal posterior end of the idiosoma. The anus is nearer the posterior end of the body. It is flanked by two rows of three anal setae (1, 4 and 5) equal in length and with bases equi-distant from each other, with another two setae (2 & 3) external to the rows and twice as long. A pair of chitinous rings lie outside and in line with setae 2. In addition to the pair of posterior microsetae (pa₂) of the male, the female bears a pair of macrosetae (pa₁).

The chaetotaxy of the legs is the same as in the male; but tarsus IV is not modified nor thickened.

_Hypopus_ (Figs. 5, 6, 10, 12 & 13).

The dorsal anterior margin of the propodosoma is devoid of the pair of corneae found on all the other hypopi of _Histio gaster_ known to science.

_Histiogaster anops_ sp. n.

Fig. 5, hypopus, dorsal view: v.i, and v.e, internal and external vertical setae; sc.i, and sc.e, internal and external scapulars; h.i, h.e, and h.v, internal, external and ventral humerals; d₁ to d₄, dorsals; l₁ and l₂, laterals; sa.e, external sacrals; p.a, post analis. Fig. 6, ventral view of the hypopus.

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The dorsal surface of the idiosoma is slightly convex and faintly reticulate. Two pairs of setae arise from the front margin of the propodosoma; setae v.i. are fairly long, extending well forward; v.e. are short and blunt. The bases of the four scapular setae form the four corners of a trapezoid across the middle of the opisthosoma; sc.i. are shorter than sc.e. On the hysterosoma h.i. are slightly behind h.e. Four pairs of dorsal setae, each a little longer than the preceding pair, form a row down the centre, and are flanked by two pairs of lateral and one pair of external sacral setae. A pair of chitinous rings, similar in structure and position to a pair on the dorsum of the adult, occur external to setae d1.

The ventral surface (Fig. 6) is slightly concave. Anteriorly it bears a small rostrum terminating in two papillae from which project two long bristles; two pairs of much shorter bristles project from the lateral margins of the rostrum. Epimeres I unite to form a short sternum, but epimeres two to four end freely in the mid-line. The internal edge of the acetabulum of leg III extends backwards until it almost reaches epimere IV.

The sucker plate is bounded posteriorly by a fairly wide colourless rim which does not reach the posterior margin of the opisthosoma. Two large suckers are arranged centrally, bordered posteriorly by four smaller suckers and anteriorly by a slightly larger pair. Four lozenge-shaped heavily etched areas occur around the edge of the plate; one between each of the anterior pairs of suckers and one on each lateral border between the anterior and posterior suckers. These four areas occupy the position of the four supplementary suckers found in other genera of the family Acaridae. A pair of chitinous rings occur on the opisthosoma just external to the lateral rim of the sucker plate.

The chaetotaxy of the legs is described below.

Other pre-adult stages.

The two nymphal stages resemble the adult female. In the larva however, one pair of posterior setae (d4) is absent from the opisthosoma (Fig. 7). The larva also bears a pair of 'Bruststiele' on coxal fields I.

Chaetotaxy of the legs of all stages.

The method of labelling is the same as that used by Grandjean (1939). The synonymy of this nomenclature has been published by Hughes A. M. (1948). The chaetotaxy of all the stages, except the hypopus, is very similar to that of Forcellinia wasmanni which Grandjean used as an example of a member of the Acaridae, bearing all the possible setae and solenidia.

Leg I of the male is the same as that of the female (Fig. 8). On the distal end of the tarsus setae d, ra, and f, are expanded at their tips and curve towards the claw. Seta e, is in the form of a short strong spine external to d, which is dorsal in position. Setae la and wa, are medium length spines. Solenidion w3 is well developed and arises close to the base of f. The median portion of the tar-
Histioqaster anops sp. n.

Fig. 7, larva, dorsal view: $d_3$, dorsal setae; $sa.i$, and $sa.e$, internal and external sacrals; $p.a_1$, post anal. Fig. 8, female, internal lateral view of right leg I: $\omega_1$, $\omega_2$, $\varphi$, $\sigma$ and $\sigma'$ solenidia; $e$, famulus; $d$, $e$, $f$, $la$, $ra$, $wa$, $gT$, $hT$, $cG$, $mG$, $vF$, and $pR$, setae; $ba$, $s$, $u$, and $p$, spines. Fig. 9, dorsal view tarsus I of tritonymph: $\omega_1$, $\omega_2$, $\omega_3$, solenidia; $e$, famulus; $d$, $e$, $f$, $la$, $ra$, $wa$, setae; $ba$, spine.

Sus is constricted slightly and devoid of setae. On the dorsal basal third of the segment solenidion $\omega_1$ is club-shaped and famulus $e$ is a slender cone; immediately distal to $\omega_1$ is the stout conical spine $ba$. Solenidion $\omega_2$, external to $ba$, is a short rod slightly expanded at the tip. On the remaining segments of the leg.
solenidion \( \phi \) of the tibia is long and whip-like; on genu I solenidion \( \sigma' \) is about three times as long as \( \sigma'' \). The setae of all segments are without pectinations.

The chaetotaxy of the remaining legs of the adults follows the progressive simplification that \textit{Grandjean} (1939) showed is characteristic of the Acaridiae. Tarsus IV of the male is modified to aid in copulation. Setae \( d \), and \( e \), are replaced by large suckers and solenidion \( \phi \) IV is much reduced in length, but not in thickness, to a very short truncate protruberance.

The tritonymph is exactly the same as that of the adult female except that the position of solenidion \( \omega_3 \) is different. Here, it arises dorsally and immediately behind \( d \), and \( e \), but in the adult it has moved forward and lateral to a position near \( f \) (Figs. 8 & 9). I have noticed this change in position on another species of \textit{Histiogaster}.

Legs I, II and III of the larva and protonymph are the same as the corresponding legs of the adult, except where solenidia have yet to arise and the absence of a seta on all trochanters. Leg IV of the protonymph shows the simplified chaetotaxy described by \textit{Grandjean} (1939); setae \( e, f \), and ventral spine \( s \), being absent.

![Diagram](image)

\textit{Histiogaster anops} sp. n.

\textbf{Fig. 10 to 13}, tarsus tibia and genu of hypopus leg I, II, III and IV, respectively: \( \omega_1, \omega_2, \phi, \) and \( \sigma' \), solenidia; \( e, \) famulus; \( d, e, f, ba, la, ra, wa, r, w, gT, hT, kT, mG, \) and \( nG, \) setae; \( s, q + v, \) and \( p + u, \) spines.

Adapted as it is to a special mode of life, the chaetotaxy of the legs of the hypopus is different from that of the other stages. The differences, with few exceptions, involve a change in shape of setae rather than the expression or suppression of setae and solenidia. The most noticeable differences are:

i. Solenidion \( \phi \) arises on tibia IV; setae \( e, f \), and spine \( s \), arise on tarsus IV, and a seta (\( \phi R \) or \( sR \)) appears for the first time on trochanters I, II, and III.

ii. Solenidion \( \sigma' \) of genu I and \( \sigma \) of genu III are suppressed but both reappear in the tritonymphal stage.
iii. Seta e, is a trumpet-like organ on tarsus I and II, and leaf-like on tarsus III and IV. (Figs. 10 to 13).

iv. The ventral spines p + q and r + v respectively are fused, lengthened and expanded at their tips. Spine s has lengthened and expanded on tarsus III and IV only.

v. Seta ba, is no longer cone-shaped but fairly long and slender as it is in the adults and other non-hypopial stages of many of the more primitive members of the family.

In his excellent work on the chaetotaxy of the legs of the Acaridiae Grandjean (1939) studied members from thirteen genera, examining all stages except the hypopus. He compiled six rules to which there were no exceptions. Five of the rules are concerned with the setal pattern and, according to my observations, they can be extended to cover the hypopial form of H. anops. The sixth rule is quoted below:

"la déficience d'un solénidion à une stase quelconque entraîne la déficience du même solénidion à toutes les autres stases"

This sixth rule cannot be extended to include the hypopus of H. anops since one solenidion from genu I and one from genu III are supressed in the hypopus stage and reappear in the following tritonymphal stage.

Type:


Mounted in Hoyer's.

Deposited in Department of Acarology, U.S. National Museum, Washington, U.S.A. (A paratype male is mounted on the same slide as the type. The type is mounted ventral side uppermost and faces the paratype which is mounted dorsal side uppermost).

Paratypes:

The following paratypes, with the same data, are also deposited in the U.S. National Museum : one male on same slide as type ; three females ; one tritonymph ; five hypopi ; four protonymphs, and three larvae. (On nine slides including type slide).

The following paratypes, also with the same data, are deposited in the Arachnida Department of the British Museum (Natural History) : one male ; four females ; two hypopi ; eight protonymphs ; one larva. (On seven slides).

The following paratypes, with the same data, are in the possession of the author : three males ; three females ; one tritonymph ; eight hypopi ; five protonymphs, and three larvae. (On eight slides).

The author also possesses four slides of paratypes which the collector cultured
in the laboratory at Athens, Georgia. They are: one tritonymph labelled — Athens, Georgia 7.6.60. Exp. O.; one protonymph, with the same data; one female with the same data but labelled Exp. 22, and one tritonymph labelled Exp. 32.

Eight slides (five with the same data as the type, and three labelled Athens, Georgia 7.6.60. Exp. O.) have been returned to the collector, Robert Davis. They comprise: four males; two females; three hypopi; one protonymph, and two larvae.

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REFERENCES
