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Revision of Hoplothrombium quinquescutatum Ewing, 1925 (Trombidiidae: Acarina)[1]

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Abstract

Revision is made of the larva of *Hoplothrombium quinquescutatum* Ewing, 1925, as the insufficient illustration and description of this larva needed to be brought up to date, to meet present taxonomic requirements.

The diagnosis of the genus, as well as of the species, is properly established.

Relationship between the larval taxonomy of certain groups belonging to *TROMBIDIFORMES* and to *HYDRACHNALLAE* are faced and discussed.

Résumé

La larve de *Hoplothrombium quinquescutatum* Ewing, 1925, est révisée; sa description et illustration originale étant insuffisante eu égard à la taxonomie actuelle.

Les diagnoses génériques et spécifiques sont énoncées.

Les relations, entre taxonomies larvaires de certains groupes de *TROMBIDIFORMES* et d'*HYDRACHNELLAE*, sont envisagées et discutées brièvement.

Hoplothrombium quinquescutatum Ewing, 1925, was originally poorly described and illustrated (5). It needed a revision, for observation of many larvae belonging to various trombidiforms (close to it) and of water mites, leads us today to better understanding of the true relationship among the larvae of these terrestrial and water mites, and only their larvae.

The extensive studies, carried out during the recent years, teach us that the phylogeny of mites would be based much more accurately on the external anatomy of their larvae. It is obvious that the stage emerging from the ova-embryo is the one that best reflects the common origin of various species, genera and families, in both the animal and the vegetal kingdom. In the case of obligatory parasitism of the larval stage — even on a heteroclite range of hosts —, the greater uniformity and simplicity of the larval individual reflects more clearly a common ancestry. Finally, the early post-embryonic stage, or larva, usually possesses only few elementary characters upon which one can practically depend to erect a valuable systematic. This systematic being, in addition, less artificial because based realistically on phylogeny.

[1]) This work was supported by Research Grant AI-03793 from the National Institute of Allergy and Infectious Diseases, National Institute of Health, U. S. Public Health Service.

Examples showing a clear relationship between larvae of trombidiforms and hydrachnelles are numerous, and if I have taken the opportunity to point out this relationship on the occasion of the revision of *H. quinquescutatum,* it is because of a recent description by Imamaura & Mitchell (1967) (7), of the larva of *Piersigia limophila* Protz, 1896 (9) *(EYELAIDAE : HYDRACHNELLAE).* This larva presents several characters, similar to those of *H. quinquescutatum* and also to other related genera in the *TROMBIDIIDAE* family : *Allothrombidium, Atomus, Cercothrombium, Ettmuelleria, Microtrombidium,* etc.. Other larval similarities can be established, and it is not without obvious reason that Ewing (1938) (6), classified erroneously *Limnochares simplex* as a *Hemitrombicula,* going so far as to create a new subfamily for his species. It is highy probable that *Polydiscia squamata* Methlagl, 1928 (8) is close to some *HYDRYPHANTIDAE* and in 1963, Besch (3) brought out an interesting confrontation between larval hydrachnelles and *P. squamata.* It is also probable that Dumbleton's *Nothotrombicula deinacridae,* 1947 (4) is on the verge of the complex Trombidiforms/Hydrachnelles, a species that Womersley introduced in the family *LEEUWENHOEKIIDAE* at the same time as several others : *Grossia onychia, Mackerrasiella globus, Cockingsia tenuipes* and *Audyana thompsoni,* all from Womersley, 1954 (13), all these last species being also closer to water mites than to trombiculids.

To conclude and as concern mites having a parasitic larval stage, followed by free living nymphs and adults, one has to recall that:

1 — nymphs and adults of both terrestrial and water mites are characteristically different from their larvae,
2 — nymphs and adults of terrestrial mites can hardly be correlated with the corresponding stages of water mites,
3 — larvae of terrestrial and water mites are easy to correlate,
4 — terrestrial mites show obvious evolutive convergence in their adult stage, and it is sometimes difficult to separate two species of trombiculids solely on the basis of their adult characters, whereas they are noticeably different in their larval stage,
5 — water mites show obvious evolutive divergence in their adult stages, that may lead to drastic separation of two species when one considers only the morphology of the adults, whereas the larvae show clearly their close similarity.

To sum up, it appears that evolution of terrestrial life converges, while it diverges in aquatic life.

Hoplothrombium Ewing, 1925

A. Genus Type

Hoplothrombium quinquescutatum Ewing, 1925 (2)

B. Diagnosis

Body bullet shaped with a large scutum almost entirely covering the ventral gnathosome and bearing one pair of antero-median nude setae (AM), one pair of antero-lateral setae, thick and barbed; one pair of postero-lateral barbed setae, and one pair of telostigmal[2]), nude and whip-like sensillae.

[2]) "telostigmal" = pseudostigmata far apart from each other; the antonym being "omorostigmal" = pseudostigmata close to each other.

One pair of eye lenses on an elongate plate that interlocks with the lateral sides of the scutum. A variable number of shield-like strips (scutellum), each with a pair of setae. One or more dorso-apical plates bearing setae (pygalaspis). Body setae inserted into platelets. Legs all 6-segmented (undivided femur). Leg-tarsus 3 highly modified. Leg-coxae with sword-like spines and bearing also the migrated sternal setae. Leg-tarsae 1 and 2 with dorsal solenidion and famulus; pretarsalae and long subterminala on tarsus 1, no parasubterminala; no pretarsalae on leg-tarsus 2. Leg-tibiae 1 and 2 with one solenidion and one pointed tibiala; one famulus on tibia 1, none on tibia 2. Leg-tibia 3 without tibiala (tp = 0). Leg-genu 1 with two genuala and one famulus; leg-genu 2 and 3 with a single genuala. Palpotarsus dome-like with one basal solenidion and seven short, nude setae, fT = 7N; palpotibia with three nude setae and a single apical claw; no visible seta on palpogenu; palpofemur with a short dorsal spine. Gnathobasal setae modified into 2 huge claw-like spines. Chelostyle well developed, resembling that of many trombiculids and emerging from the center of a circular collarette; strong chelobase. Galeal setae nude. SIF = 7N-N-1-2110.0001.

C. Location
U. S. A.

D. Host
Arthropods.

Hoplothrombium quinquescutatum Ewing, 1925

A. Description

1) Measurements: in micra, of the holotype and single specimen HT.894, USNH.

SCUTUM:

AA	AW	PW	SB	ASB	PSB	SD	AP	AM	AL	PL	S	SWa	SWp
72	124	160	118	106	34	140	56	50	68	55	82	146	166

		sW	sL	AS	PS	DB	DC		pa	pm	pp	Ip
SCUTELLUM:	1	170/125	42	10	38	60	50	LEGS:	269	222	235	726
	2	118	34	17	17	53	50					
	3	94	38	14	24	53	56					
PYGALASPIS:		46	35	18	18	20	85					
PARAPYGALASPIS:		22	30	—	—	—	90	(= Lateral pygosomal plates)				

N. B. = for conventions and abbreviations the reader should refer to the paper on *Atomus rhopalicus* (11).

2) Scutum: large and fairly sclerotized shield; entirely and densely punctate with some rare anterior longitudinal shrivels, and the anterior margin recurving to the ventral side so that it hides the gnathosome almost entirely and fastens it firmly. Total scutal length, SD = 140 μ, anterior width, SWa = 146 μ, separated from the posterior, SWp = 166 μ, by a constriction, SC = 138 μ. This constriction corresponds or interlocks with the two elongate platelets (76 μ) bearing the two eye lenses (ϕ = 10 μ). The pair of anterior setae is nude and long, AM = 50 μ, and called conventionally antero-median; the

antero-laterals are barbed, thick and long setae, AL = 68 μ; the postero-laterals are also barbed and thick but a little shorter, PL = 55 μ. Two slender, long and nude sensillae, S = 82 μ, are inserted each in a pseudostigma very distant from each other or "telostigmal", SB = 118 μ; these pseudostigmatic bases are equidistant (32 μ) from the AL and PL bases.

3) S c u t e l l a : the three strip-like scutella are densely punctate.

The anterior, or first scutellum, is trapezoidal, its large base being anterior, B = 170 μ, and the small base posterior, b = 127 μ, while its length is L = 42 μ. It bears one pair of thick and barbed setae, DC = 50 μ, situated near the antero-margin, AS = 10 μ, the distance to the postero-margin being PS = 38 μ, while the distance between the two setae is DB = 60 μ.

The median, or second scutellum, is an oblong strip, L = 34 μ and W = 118 μ, on which a pair of thick, barbed setae, BC = 50 μ, is inserted equidistantly from the anterior and posterior margins (AS = PS = 17 μ), the distance between the two setae being DB = 53 μ.

The posterior, or third scutellum, is an oblong strip like the median one, L = 38 μ and W = 94 μ, on which the pair of thick, barbed setae is slightly longer, DC = 56 μ, and closer to the antero-margin, AS = 14 μ, than to the postero-margin, PS = 24 μ, the distance between the two setae being, DB = 53 μ.

4) P y g o s o m e : characterized by

1) a median oval and densely punctate shield, L = 35 μ and W = 46 μ, conventionally called "Pygalaspis" (11), and bearing a pair of barbed setae, very thick and long, DC = 85 μ, inserted equidistantly from anterior and posterior margins (18 μ), distance between their bases, DB = 20 μ.

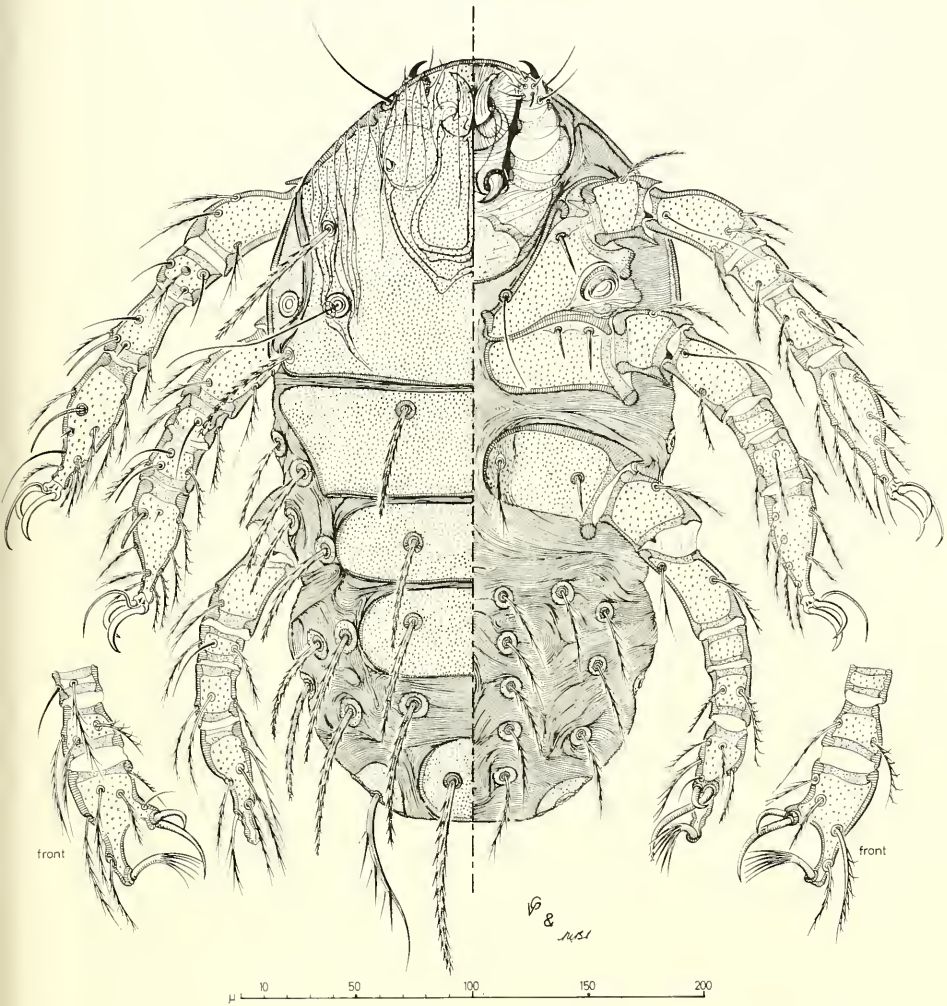
2) a pair of "parapygalaspis", or expanded trigonal platelets (rounded sides = 24 μ); each with only one outstandingly differentiated and long seta (90 μ), thick at its base with a gradually tapering tip, and bearing three pairs of long, slender branches.

5) I d i o s o m e : roughly oblong to slubbed (bullet-like).

a) Viewed in their longitudinal disposition, the dorsal setae are arranged in three rows on each side of the body (six rows in all):
1 — two dorso-central, Dc, are all the scutella and pygalaspis except for the number 4 which is inserted on an individual platelet (66 μ),
2 — two dorso-median, Dm, very similar to the Dc of the same transversal row, are all on platelets except for the "parapygalaspis" setae, as seen above,
3 — two dorso-lateral, Dl, are thick and barbed like the Dc and the Dm of the same transversal row but shorter (41, 38, 50, 54 μ).

b) Viewed in their transversal disposition; the body setae formulae are:
fD = 6.6.6.6.2 = 26 dorsal setae,
fV = 6.4.2.4.2 = 18 ventral setae, and
NVD = 26 + 18 = 44 body setae.
The ventral setae, slender with rather long barbs, are inserted in smaller platelets. The uropore opens between the two setae of the third row.

Hoplothrombium quinquescutatum Ewing, 1925



6) L e g s : are all 6-segmented and each segment is well sclerotized and punctate, The three genu are particularly short by comparison with the other leg segments.

Leg 1: total length, pa = 269 μ.

a) Coxa: L = 7 μ, W = 46 μ; densely punctate, contiguous to coxa 2, with a large urstigma opening at the apex of the lateral suture; one distal sword-like spike (18 μ) and one proximal, nude and slender seta (40 μ) that is probably a migrated sternal seta.

b) Trochanter: L = 32 μ with one ventral barbed hair.

c) Femur: fairly long, L = 54 μ, with a baso-ventral seta nude and slender, or mastifemorala, MFa = 44 μ, plus six ordinary barbed setae, 6 O.B.S.

d) Genu: relatively short, L = 20 μ, with one apical famulus, or microspur and two genualae plus 3 O.B.S.

e) Tibia: L = 35 μ; one apical famulus adjacent to a long solenidion and a long tibiala plus 6 O.B.S.
f) Tarsus: L = 58 μ; one distal nude pretarsala, PTa = 38 μ one long subterminala (36 μ), one famulus, f_1 = 5 μ, and one solenidion, S_1 = 32 μ, plus 15 O.B.S.
g) Pretarsus: L = 8 μ; with one long slender claw-like empodium flanked by 2 strong but shorter claws.

Leg 2: total length, pm = 222 μ.
a) Coxa: L = 56 μ and W = 40 μ; densely punctate with two spikes, one proximal (14 μ) and one distal (18 μ).
b) Trochanter: L = 32 μ; with one barbed hair.
c) Femur: L = 45 μ; with one central baso-ventral seta, nude and slender, or mastifemorala, MFm = 44 μ, plus 4 O.B.S.
d) Genu: very short, L = 14 μ; with one nude genuala, plus 2 O.B.S.
e) Tibia: L = 25 μ; with one distal solenidion and one proximal tibiala, plus 5 O.B.S.
f) Tarsus: L = 50 μ; no pretarsala, one solenidion, S_2 = 18 μ, and one famulus, f_2 = 5 μ, plus 14 O.B.S.
g) Pretarsus: L = 8 μ; with one long, slender and claw-like empodium flanked by two strong and shorter claws.

Leg 3: total length, pp = 235 μ.
a) Coxa: L = 62 μ and W = 44 μ; densely punctate and internal base partly covered with epiostracal pleats, bearing one distal spike (15 μ) and one basal barbed seta (a possible migrated sternal seta).
b) Trochanter: L = 40 μ; with one barbed seta.
c) Femur: L = 46 μ with a baso-ventral slender seta or mastifemorala (MFp = 46 μ, bearing 2 inconspicuous basal barbs), plus 3 O.B.S.
d) Genu: fairly short, L = 16 μ; with one genuala, plus 2 O.B.S.
e) Tibia: L = 25 μ: no tibiala, plus 5 O.B.S.
f) Tarsus: L = 56 μ and W = 29 μ; presents a double terminal apophysis:
1 — the proximal bearing one short claw, recurved over a longer sword-like claw (a small nude seta near the short claw),
2 — the apical bearing a thick brush, plus 9 O.B.S.

7) Gnathosome: chelobase pyriform, chelostyle similar to that of many trombiculids, 28 μ long, and emerging from a circular collarette. Galea with a pair of terminal, nude galeala, and a pair of huge claw-like spines on their ventral base (these spines are probably drastically modified gnathobasal setae). Gnathosome large with pleated epiostracum and dense punctation. Palpi strong but relatively short, as is its trochanter; bulbous femur with a dorsal seta modified in a short bud; no setae on the genu; palpo-tibia with a short undivided claw and three nude setae; palpal formula, fPp = N/-/NNN; palpo-tarsus with a basal short solenidion (6 μ) and 7 rather short, nude setae (homologous to the barbed setae in trombiculid mites), and fT = 7 B.

8) Synthetic Identification Formula:
SIF = 7N-N-1-2110.0001*

* for the SIF the reader should refer to the paper on *Atomus rhopalicus* (11).

B. Host and Parasitope

According to E w i n g , 1925, it was "described from a single specimen adhering to a beetle mite (?) taken from the stomach of a toad (*Bufo americanus* Holbrook)."

C. Locality and Date

The host was collected at Hudson Bay (U. S. Biol. Survey No. 585); no date, but probably in 1924, or before.

D. Type Material

H o l o t y p e in the U. S. National Museum, Washington, D. C. under Catalogue No. 893.

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