

Histiostoma unidentatum n.sp. (Acari, Astigmata) associated with a fly *Drosophila bipectinata* originating from Thailand

by A. FAIN, F. ATHIAS-BINCHE & Y. CARTON

Summary

Histiostoma unidentatum n.sp. (Acari, Histiostomatidae) is described from adult and deutonymphal stages. Adults were found in a laboratory culture of *Drosophila bipectinata* imported from Thailand and the hypopi were collected from the adult flies. Hypopi of the same species were also found from *Drosophila melanogaster* from Australia.

Key words: Systematics, Acari, Life cycle, *Drosophila* spp.

Résumé

Histiostoma unidentatum n.sp. (Acari, Histiostomatidae) est décrit d'après les adultes et la deutonymphe phorétique (hypope). Les adultes furent trouvés dans un élevage de *Drosophila bipectinata* importé de Thaïlande, et les hypopes étaient attachés aux mouches adultes. Des hypopes de cette même espèce furent également trouvés sur *Drosophila melanogaster* d'Australie.

Mots clé: Systematique, Acari, Cycle évolutif, *Drosophila* spp.

Introduction

The mites described herein were found in a laboratory culture of *Drosophila bipectinata*, imported from Thailand and used for researches in population genetics in the CNRS Laboratory of Evolutionary Biology and Genetics, Gif sur Yvette, France. The adult mites were found free in the food of the flies and the hypopi were collected from the adult flies.

Remarks:

the SEM view was made by F.A.-B., using the SEM of the Centre de Microscopie Electronique, Université de Perpignan. Specimen treated following the method described by Athias-Binche and Habersaat (1988).

All measurements are in micrometers.

Abbreviations: IRSNB = Institut royal des Sciences naturelles de Belgique; MNHN = Museum national d'Histoire Naturelles, Paris.

FAMILY HISTIOSTOMATIDAE BERLESE, 1897

Genus *Histiostoma* KRAMER, 1876

Histiostoma unidentatum n.sp.

Female Holotype (figs 1-9):

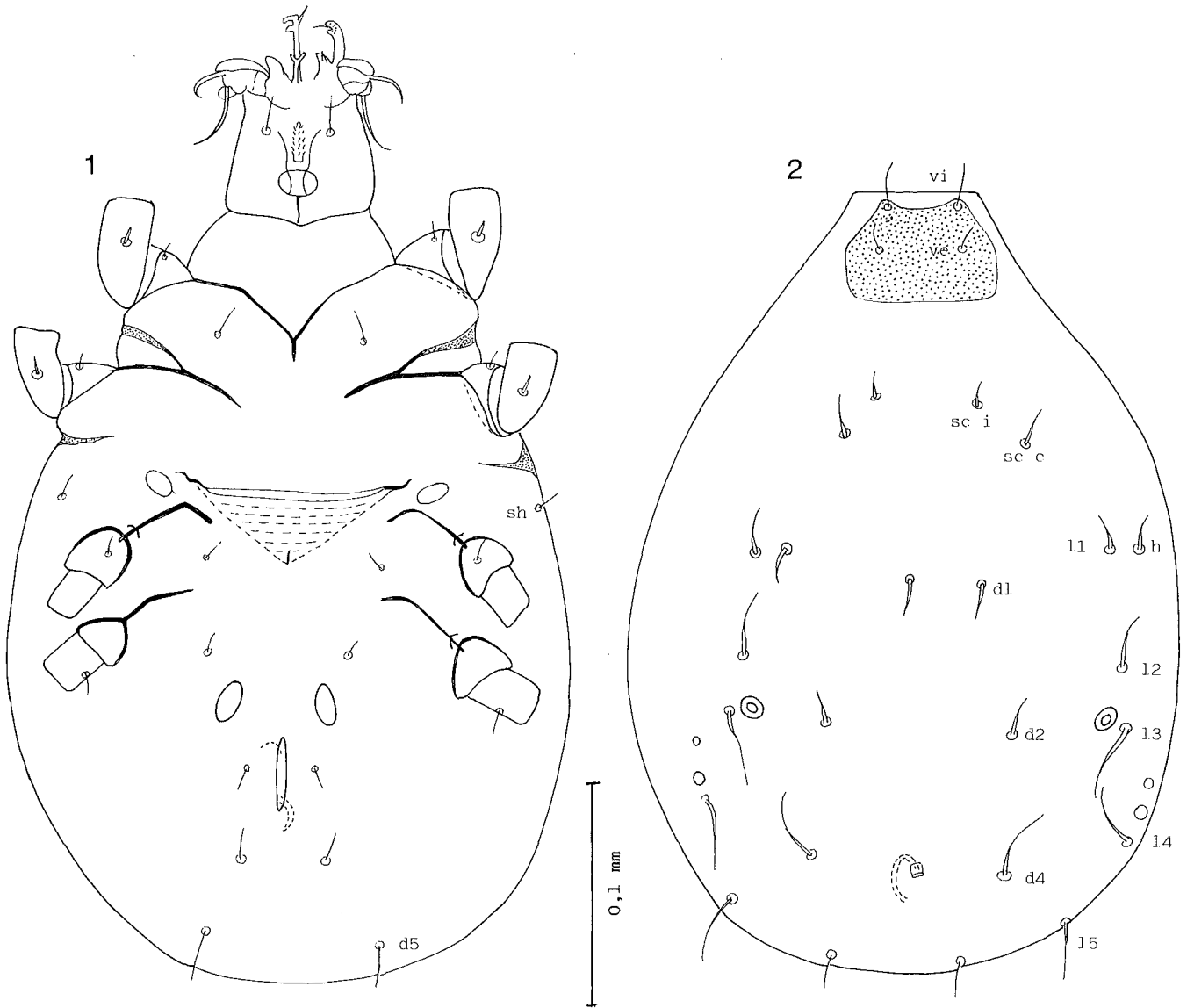
Length and width of idiosoma in holotype: 345 x 225. Dorsum: Cuticle soft except a small punctate and poorly sclerotized area in the anterior part of dorsum. This scutum bears 2 pairs of short setae (*vi* and *ve*). Setae *sc i* and *sc e* 15 and 25 long respectively. Setae *d1* to *d5* thin, 18 to 30 long, some (*d1* to *d3*) with inflated bases. Setae *l1* to *l5* 18 to 33 long, the *l3* set very close to the orifice of the oil glands. The orifice of the bursa copulatrix opens on the posterior margin of a very small square (5 x 5) and punctate platelet. This plate is situated at 45 from the posterior extremity. Bursa relatively wide, describing 3 loops before to join the spermatheca, the latter very poorly sclerotized (fig. 9). Venter: epimera I fused into a short sternum. Vulva very wide. Anterior rings oval situated in front of epimera III (15 wide and 8 long). Posterior rings oval, situated in front and slightly outside of the anus, they are 20 long and 11-12 wide. Gnathosoma: Palps with large transparent membranes, the posterior flagellum much longer (30) than the anterior flagellum (18 to 20). Fixed digit of chelicera with a more or less spatulate extremity and bearing only one large and rounded preapical tooth and a short apico-internal seta. Legs relatively long and slender. Tarsi I and II with a rather long tenent hair. Solenidia of leg I: tarsus with $\omega 3$ apical and $\omega 1$ basal; $\omega 2$ very thin and close to $\omega 1$; ϕ of tibiae I and II short.

Male (fig. 10):

One paratype is 330 long and 180 wide. Dorsum as in the female, except that there is no copulatory pore. Venter: sternum much longer than in female. Anterior ring subcircular (9 x 7,5). Posterior rings more or less polygonal (diameter 12) situated at the level of the sexual organ but far from it.

Hypopus (figs 11-15):

Length and width of 10 paratypes: maximum 177 x 130, minimum 160 x 121; average 168,3 x 127,3. Body in



Figs 1-2 — *Histiostoma unidentatum* n.sp. Female in ventral view (1) and in dorsal view (2).

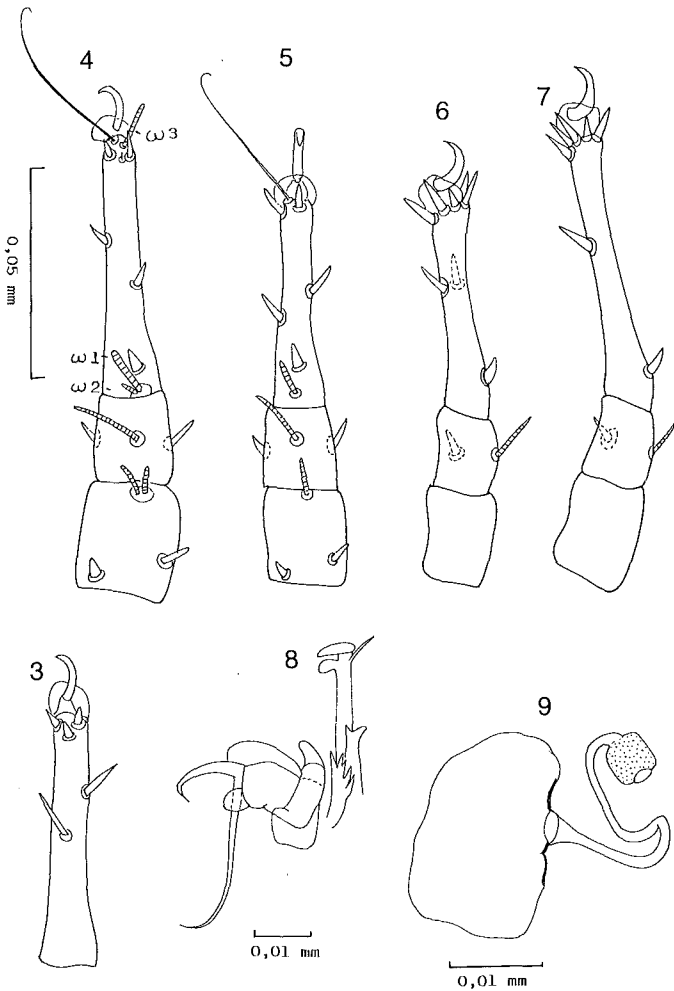
broad oval. Anterior margin with a rounded projection in midline. Dorsum finely punctate, with a few number of small rounded or irregular depressions in anterior half of the body. All dorsal setae very thin and frequently incomplete. Lengths of these setae: *sc i* 30, *sc e* 8-9, *d 1* to *d 3* 25 to 30; *11*, *12* and *h* about 20 long; *d 4*, *d 5* and *14* very short (4-5 long). Setae *cx I*, *cx III* and *gp* modified into large conoids (= soft buffers). Sternum long but not reaching the transverse sclerite joining the epimera III. Suctorial plate large with fine striations along its posterior and lateral margins. Anterior suckers slightly smaller than posterior suckers. Lateral conoids at the same level as posterior suckers. Palposoma 13 long and 6,5 wide, ending in two long (36) solenidia. Legs: Apical part of tarsus I with 4 setae of which 2 ventral small and 2 dorsal much longer, one spoonlike, the other foliate, mem-

branous. Solenidia of leg I: tarsus with $\omega 3$ basal; tibia with $\phi 1$ relatively long, a thin and long piliform famulus (*e*) and ϕ slightly longer than $\omega 1$, these 3 setae being set very close to each other near the apex of tibia. Genu with one solenidion σ .

Host and locality:

Holotype female from a laboratory culture of *Drosophila bipectinata* imported from Thailand in October 1990 (Y. Carton rec.)

Paratypes: 4 females and 6 males with the same data as for the holotype; 17 hypopi attached to the flies. The material was reared by F.A.-B. from October 1990 to February 1991, in Banyuls. The hypopus production followed the ageing of the rearing medium. The hypopi attached phoretically to the adults of *D. bipectinata*.



About 50 hypopi collected from *Drosophila melanogaster* from a laboratory culture in Brisbane, Australia, also belong to *H. unidentatum*. These mites had been collected by B.H. Kay in November 1967 and sent to A.F. It appears therefore that this species is probably confined to the genus *Drosophila*.

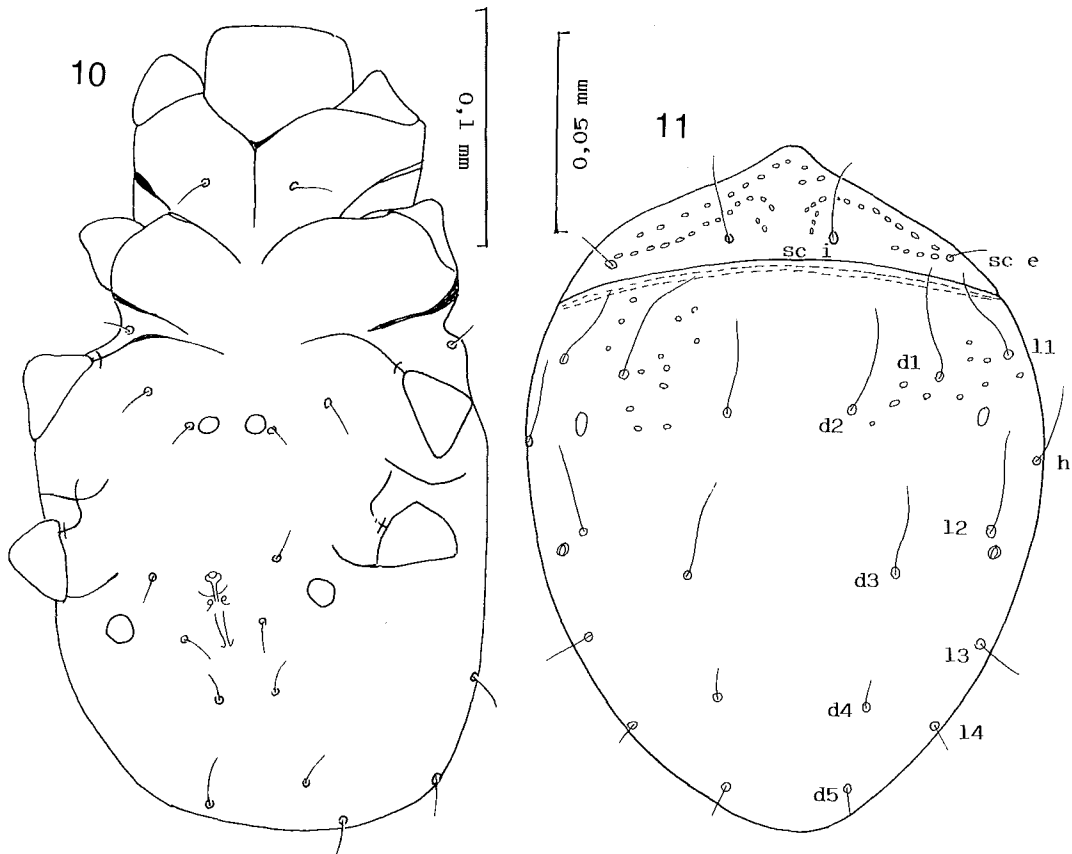
Holotype and 3 female paratypes, 5 males and 15 hypopi, paratypes, are deposited in IRSNB. One female, one male and 2 hypopi all paratypes are in the MNHN, Paris. Four hypopi in the collection of F.A-B.

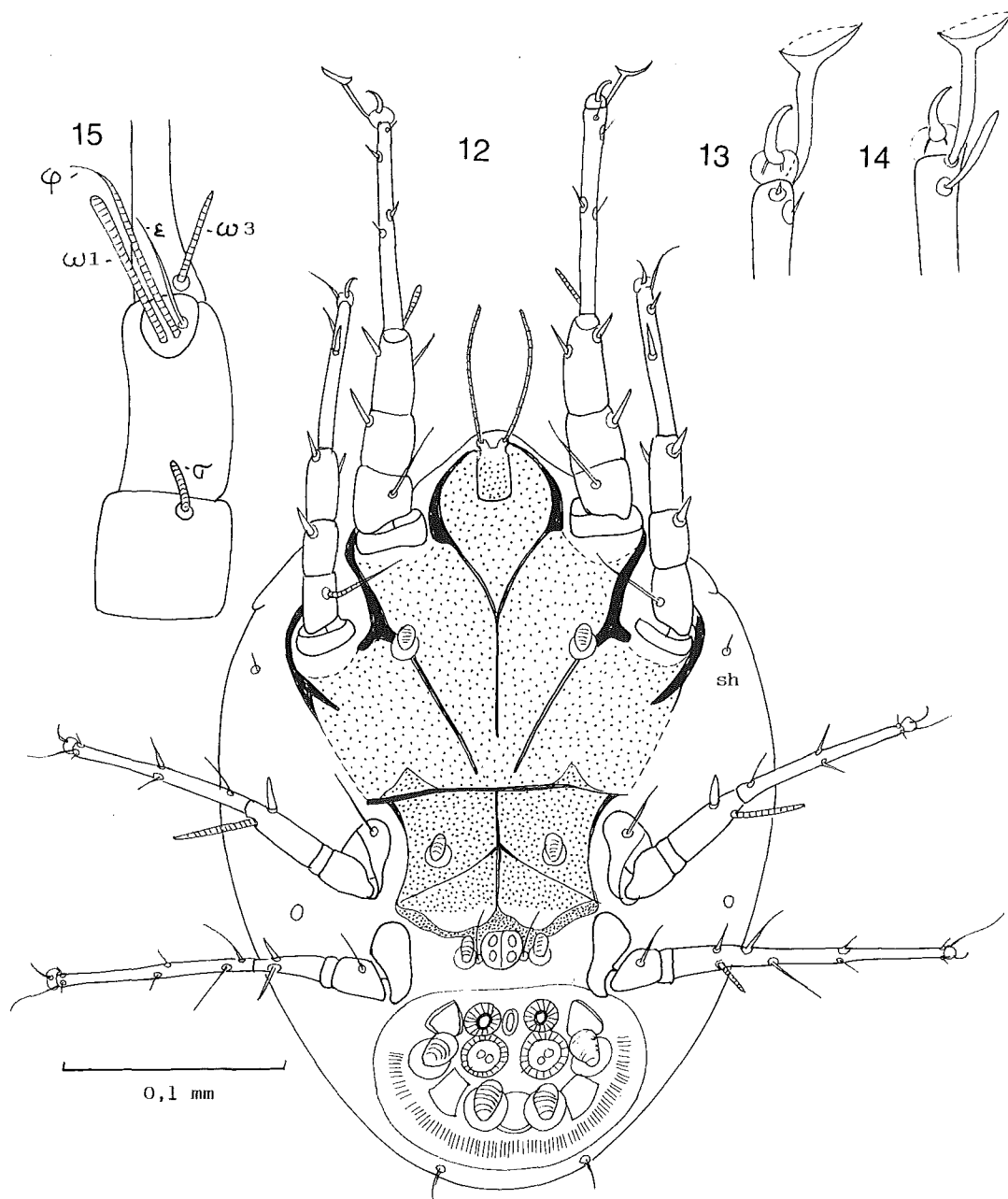
Remarks

This new species in the most close to *Histiostoma himalayae* (Vitzthum, 1923), described from the hypopus stage from *Polygraphus minor* Stebbing (Ipidae) in the Himalaya.

Figs 3-9 - *Histiostoma unidentatum* n.sp. Female: tarsus I in ventral view (3); tarsus, tibia and genu I (4) and II (5) in ventral view; tarsus, tibia and genu III (6) and IV (7) in dorsolateral view; palp and fixed digit of chelicera (8); bursa copulatrix, spermatheca and external punctate platelet (9).

Figs 10-11 - *Histiostoma unidentatum* n.sp. Male in ventral view (10); hypopus in dorsal view (11).





Figs 12-15 – *Histiotostoma unidentatum* n.sp. Hypopus in ventral view (12); apical region of tarsus I in ventral view (13) and in dorsal view (14); base of tarsus I, tibia and genu I in dorsal view (15).

Our hypopi differ from the latter by the following characters:

1. Body size broader (160 to 177 in length and 121 to 133 in width, whilst in the species of Vitzthum these measurements are 123 to 151 in length and 87 to 120 in width).
2. Setae *sc i* about 2,5 times longer than *sc e*. These setae are equal in length in *H. himalayae*. Setae *l3* distinctly shorter than in this species.
3. Presence of small irregular depressions in the anterior half of the dorsum (absent in *H. himalayae*).

4. Suctorial plate: posterior conoids (= setae modified into elastic buffers, see Fain, 1973) similar to lateral conoids (much larger than the latter in *H. himalayae*); lateral conoids situated at the same level as the posterior suckers (they are in front of these suckers in *H. himalayae*).

5. Conoids of coxae I and III much larger than in *H. himalayae*.

6. Solenidion ϕ of tibia I about one third the length of tarsus I. In *H. himalayae* this solenidion is longer than the tarsus I.

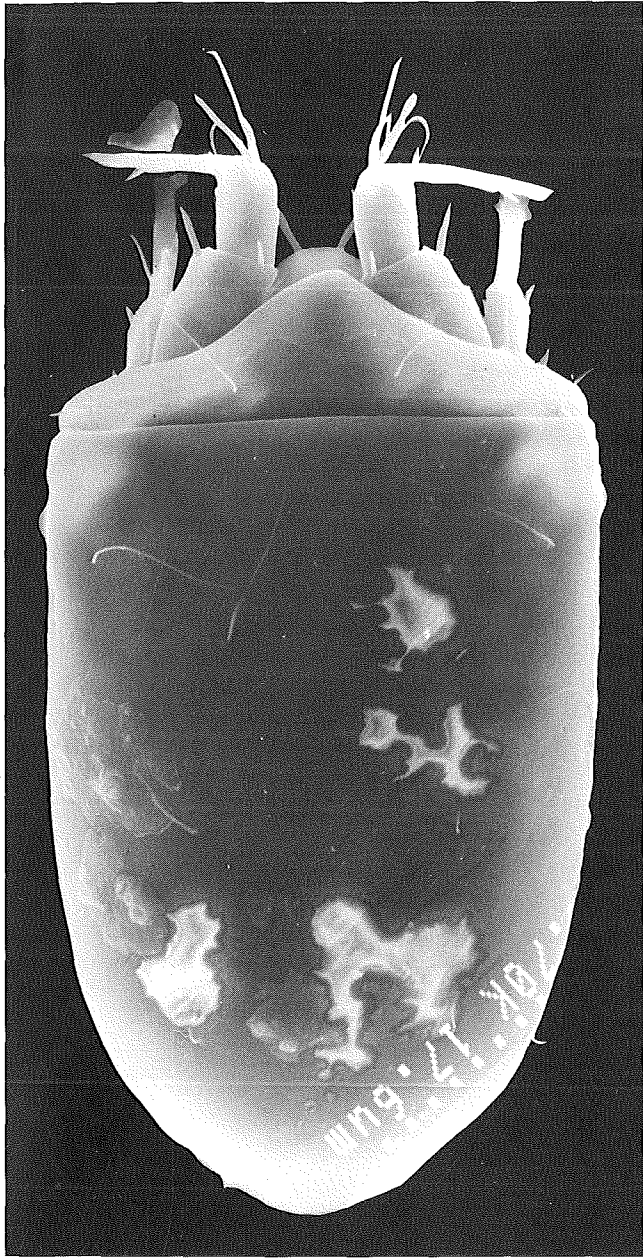


Fig. 16 – *Histiostoma unidentatum* n.sp. Hypopus, dorsal surface (Scanning microphotograph).

Hughes and Jackson (1958) redescribed the hypopus of *H. himalayae* from specimens collected in association with *Polygraphus minor* in various places of Virginia, USA. In addition they described the adult stages of this species. Actually the hypopus that they depicted differs significantly from the original drawings of Vitzthum and we surmise that they do not belong to the same species. They resemble more our specimens but differ, however, from the latter by the following characters: 1. presence of two bosses on anterior part of propodonotum; 2. setae *d4* long (very short in our species); 3. solenidion ϕ shorter than $\omega 1$ (in our species ϕ is longer than $\omega 1$); 4. posterior and lateral margin of suctorial plate note striated (striated in our species); 5. anterior seta of tibia III is a short and thin seta (it is a thick spine in our species). The adults of *H. unidentatum* differ from those of *H. himalayae* (sensu Hughes & Jackson) by the shape of the fixed digit of chelicerae, which present a single rounded preapical tooth (there are several teeth on this digit in *H. himalayae*). Apparently Hughes and Jackson have not examined the typical material (hypopi) of Vitzthum. Plesiotypes of *H. himalayae* are supposed to be in the IRSNB, but we have not found them in the collection of this Institution.

Notes on some other astigmatic mites from laboratory cultures of Drosophila spp.

In the course of our survey, *Hormosianoetus laboratorium* (Hughes, 1950) was observed associated with *Drosophila willstoni* from Guadeloupe, French West Indies and *D. subobscura* from Agadir, Morocco (Y.C. coll.). This species was observed by F.A.-B. in various laboratory cultures of *Drosophila* spp. from Gif Sur Yvette. It is recorded as very common in *Drosophila* cultures (Perron, 1954; Ashburner & Wright, 1978).

Tyrophagus putrescentiae, a mite commonly found in stored food products and also frequent in house dust, infested a culture of *D. subobscura* from The Netherlands, together with *H. laboratorium*.

The hypopi of *H. unidentatum* and *H. laboratorium* were very numerous. They attached mostly to the legs of the adult flies, the wings may be colonized in case of high phoretic infestation (more than 100 mites par fly). The flies appeared to be greatly disturbed and exhibited an active self-cleaning behaviour.

References

- ASHBURNER, M. & WRIGHT, T.R.F., 1978. *Drosophila*. Vol 2A. Academic Press.
- ATHIAS-BINCHE, F. & HABERSAAT, U., 1988. An ecological study of *Janetiella pyriformis* (Berlese, 1920), a phoretic Uropodina from decomposing organic matter. Mitt. Schweiz. ent. Gesellsch. Bull. Soc. entom. Suisse, 61: 377-390.
- FAIN, A., 1973. Notes sur les hypopes des Saprogllyphidae (Acarina: Sarcoptiformes). III. Le genre *Crabrovidia* Zachvatkin, 1941. Bull. Ann. Soc. R. Belge Ent., 109: 153-189.
- HUGHES, R.D. & JACKSON, C.G., 1958. A Review of the Family Anoetidae (Acari). Virg. J. Sci., 9 (n°1): 1-198.
- PERRON, R., 1951. Untersuchung über Bau, Entwicklung und Physiologie der Milbe *Histiostoma laboratorium* Hughes. Acta Zool. Stockholm, 35: 71-176.
- SCHUECHER, R., 1958. Systematik und Ökologie der deutschen Anoetiden, in «Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina». Stammer, Leipzig, 1957 Teil II: 233-384.
- VITZTHUM, H. GRAF, 1923. Acarologische Beobachtungen, 7 Reihe. Arch. Naturgesch., 89: 97-181.

A. FAIN
Institut royal des Sciences naturelles
de Belgique,
29 rue Vautier, B-1040 Bruxelles

F. ATHIAS-BINCHE
Laboratoire Arago,
Université Pierre et Marie Curie,
UA CNRS 117,
F-66650 Banyuls, France

Y. CARTON
Laboratoire de Biologie
et de Génétique Evolutive,
CNRS bat. 13
F-911198 Gif-sur-Yvette, France