

**Notes on phoretic deutonymphs of mites (Acari)
associated with Old World Megachilidae and Anthophoridae
(Insecta Hymenoptera), mainly from Madagascar
1. Families Chaetodactylidae, Acaridae, Histiostomatidae and
Winterschmidtidae (Astigmata)**

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Summary

The authors have studied a collection of phoretic deutonymphs of mites (Acari) associated with Old World Hymenoptera of the families Megachilidae and Anthophoridae. They were collected mostly from Madagascar but also from several other countries i.e. Cameroun, Tanzania, Seychelles, India, Java and two islands of the Pacific area (New Caledonia and Moorea Island, near Tahiti). The mites belong to 7 genera and 4 families of Astigmata i.e. *Chaetodactylus* RONDANI and *Sennertia* Oudemans (Chaetodactylidae), *Horstia* OUDEMANS, *Cerophagus* OUDEMANS and *Megachilopus* FAIN (Acaridae), *Histiostoma* KRAMER (Histiostomatidae) and *Vidia* OUDEMANS (Winterschmidtidae). *Chaetodactylus ludwigi* (TROUESSART, 1904) is redescribed and reddepicted. This species has a very wide geographical distribution extending from Madagascar to the Pacific Region, including India and Java. This distribution corresponds with that of the genus *Lithurgus* BERTHOLD, 1827 (= *Lithurge* LATREILLE, 1825) which seems the only host genus. *Chaetodactylus (Achaetodactylus) leleupi* FAIN, 1974 a, was collected from *Ceratina lativentris* FRIESE, 1905, and *C. nigriceps* FRIESE, 1905, both from Kilimandjaro (Tanzania). The genus *Sennertia* is represented by 2 species collected from Madagascar i.e. *S. madagascarensis* FAIN, 1971, from *Xylocopa mirabilis* HURD & MOURE, 1963 and *S. elseni* FAIN, 1971 from *Xylocopa calens* LEPELETIER, 1841 and *Melanempis* sp. *Cerophagus heriades* n.sp. is described here from *Heriades erythrosoma* FRIESE, 1922, from Madagascar and a new tribe *Cerophagini* is proposed in the Acarinae for the genus *Cerophagus* OUDEMANS. *Horstia helenae* (OUDEMANS, 1903) and *H. tanzaniensis* FAIN, 1974, are recorded for the first time from *Xylocopa calens* LEPELETIER, 1841 and from Madagascar. *Megachilopus uellensis* FAIN, 1974 b, described from *Chalicodoma rufipes* (FABRICIUS, 1781) in

D.R. Congo is now recorded from *Chalicodoma disjunctum* (FABRICIUS, 1804) in the Seychelles and from *Xylocopa calens*, in the Cameroun. The genus *Megachilopus* FAIN, 1974, is included in the subfamily Acarinae but in a new tribe *Megachilopodini* n. tr. *Histiostoma heriades* n.sp. is described from *Heriades erythrosoma* FRIESE, 1922 (Megachilidae) from Madagascar. *Vidia* sp. is recorded from *Megachile albomarginata* SMITH, 1879 from New Caledonia.

Keywords : Deutonymphs, Acari, Acaridae, Chaetodactylidae, Histiostomatidae, Winterschmidtidae, phoretic on Megachilidae and Anthophoridae, Old World, Madagascar.

Résumé

Une collection d'acariens (Acari) représentée par les deutonymphes phorétiques (hypopes) récoltées sur des hyménoptères des familles Megachilidae et Anthophoridae est étudiée. Les hôtes porteurs de ces deutonymphes proviennent principalement de Madagascar mais aussi des pays suivants : Cameroun, Tanzanie, Seychelles, Inde, Java et deux îles du Pacifique (Nouvelle Calédonie et île Moorea près de Tahiti). Les acariens récoltés font partie de 7 genres et 4 familles : *Chaetodactylus* RONDANI et *Sennertia* OUDEMANS (Chaetodactylidae), *Horstia* OUDEMANS, *Cerophagus* OUDEMANS et *Megachilopus* FAIN (Acaridae), *Histiostoma* KRAMER (Histiostomatidae) et *Vidia* OUDEMANS (Winterschmidtidae). *Chaetodactylus* (*Ch.*) *ludwigi* (TROUËSSART, 1904) est redécrite et redessinée. Sa distribution correspond à celle de ses hôtes du genre *Lithurgus* BERTHOLD, 1827 (= *Lithurge* LATREILLE, 1825). Elle couvre une zone s'étendant entre Madagascar et les îles du Pacifique, y compris l'Inde et Java. *Chaetodactylus* (*Achaetodactylus*) *leleupi* FAIN, 1974 a, a été récolté sur *Ceratina lativentris* FRIESE, 1905 et *C. nigriceps* FRIESE, 1905, du Kilimandjaro (Tanzanie). Le genre *Sennertia* est représenté par 2 espèces récoltées à Madagascar, ce sont : *S. madagascariensis* FAIN, 1971, de *Xylocopa mirabilis* HURD & MOURE, 1963 et *S. elseni* FAIN, 1971 de *Xylocopa calens* LEPELETIER, 1841 et de *Melanempis* sp. *Cerophagus heriades* n.sp. est décrite ici de *Heriades erythrosoma* FRIESE, 1922, de Madagascar et une nouvelle tribu, *Cerophagini*, est proposée dans les Acarinae pour le genre *Cerophagus* Oudemans. *Horstia helenae* (OUDEMANS, 1903) et *H. tanzaniensis* FAIN, 1974, sont signalées pour la première fois de *Xylocopa calens* LEPELETIER, 1841 et de Madagascar. *Megachilopus uellensis* FAIN, 1974 b, décrite de la R.D. du Congo est rencontrée sur *Chalicodoma disjunctum* (FABRICIUS, 1804) dans les Seychelles et sur *Xylocopa calens* LEPELETIER, 1841 du Cameroun. Le genre *Megachilopus* FAIN, 1974, est rattaché à la sous-famille Acarinae, dans une nouvelle tribu *Megachilopodini* n. tr. *Histiostoma heriades* n.sp. est décrite de *Heriades erythrosoma* FRIESE, 1922 (Megachilidae) de Madagascar. *Vidia* sp. est signalée de *Megachile albomarginata* SMITH, 1879, de Nouvelle Calédonie.

Introduction

We are studying here a collection of phoretic deutonymphs of mites (Acari) of the families Chaetodactylidae, Acaridae, Histiostomatidae and Winterschmidtidae (Acari : Astigmata), collected by the junior author from Old

World apoid bees (PAULY, submitted). The largest part of our material originated from Madagascar. In the other countries only a few punctual investigations were performed, it was the case for the following places : Tanzania, Cameroun, Seychelles, India, Java, New Caledonia, Moorea Island (Tahiti). The apoid bees harbour an abundant fauna of mites which has given rise to a series of investigations during these last twenty years (FAIN, 1981 a and b ; BAKER *et al.*, 1987, LOMBERT *et al.*, 1987, OCONNOR, 1993 a and b, etc...).

The measurements are in micrometers (μm). All the material studied here has been deposited in the IRSNB.

Acronyms : IRSNB : Institut royal des Sciences naturelles de Belgique, Bruxelles ; MNHN : Museum national d'Histoire naturelle, Paris ; ZSM : Zoologische Staatssammlung München.

Family Chaetodactylidae

The family group name Chaetodactylidae has been used for the first time by ZACHVATKIN in 1941 (type genus *Chaetodactylus* RONDANI, 1866). According to OCONNOR (1993 b) the name Chaetodactylinae is a junior homonym of Chaetodactylini TSCHITSCHERIN, 1903 (type genus : *Chaetodactyla* TSCHITSCHERIN, 1897, Insecta : Coleoptera : Carabidae). The problem of the paternity of this family of mites should be examined and solved by the International Commission of Zoological Nomenclature.

Genus *Chaetodactylus* RONDANI, 1866

= *Trichodactylus* DUFOUR, 1839 (= homonym of *Trichodactylus* LATREILLE, 1824, Crustacea)

Chaetodactylus RONDANI, 1866 (nom. nov. pro *Trichodactylus* DUFOUR, 1839 praec.)

Trichotarsus CANESTRINI, 1888 (nom. nov. pro *Trichodactylus* DUFOUR, 1839)

The genus name *Trichodactylus* DUFOUR, 1839, has been changed into *Chaetodactylus* nom. nov. by RONDANI, 1866, because of homonymy with *Trichodactylus* LATREILLE, 1824 (Crustacea). This paper of RONDANI was completely ignored during more than 50 years by all the most prominent acarologists of this time and it is OUDEMANS in 1924, who used this name for the first time.

The biology of *Chaetodactylus osmiae* (DUFOUR), the type of the genus, has been studied by FAIN (1966), the life cycle was described by VAN ASSELT (2000) from the material obtained by FAIN.

The genus *Chaetodactylus* has been divided into 4 subgenera (FAIN, 1981a), only two of these are represented in our collection.

Chaetodactylus (Chaetodactylus) ludwigi (TROUESSART, 1904)

[Figs 1-4 ; 18-21]

Trichodactylus ludwigi TROUESSART, 1904 : 234 ; VITZTHUM, 1919 : 36.

LUDWIG discovered in the nest of *Lithurgus dentipes* SMITH, 1853 near Ponape, Eastern Caroline Isles, a colony of mites that he submitted to TROUESSART for identification. TROUESSART (1904), in his description, erroneously cited *Megachile lonalapa* as the host of this species. The correct name was provided by VITZTHUM (1919).

TROUESSART (loc. cit.) observed for the first time in this group of mites the presence of two types of deutonymphs i. e. an "encysted hypope" and a "migratile hypope". Only the first form was described and depicted.

This species has a very wide geographical distribution extending from Madagascar to the Pacific region, including India and Java. The only host genus is *Lithurgus* represented by at least 3 species, *L. atratus* SMITH, 1853, *L. scabro-*

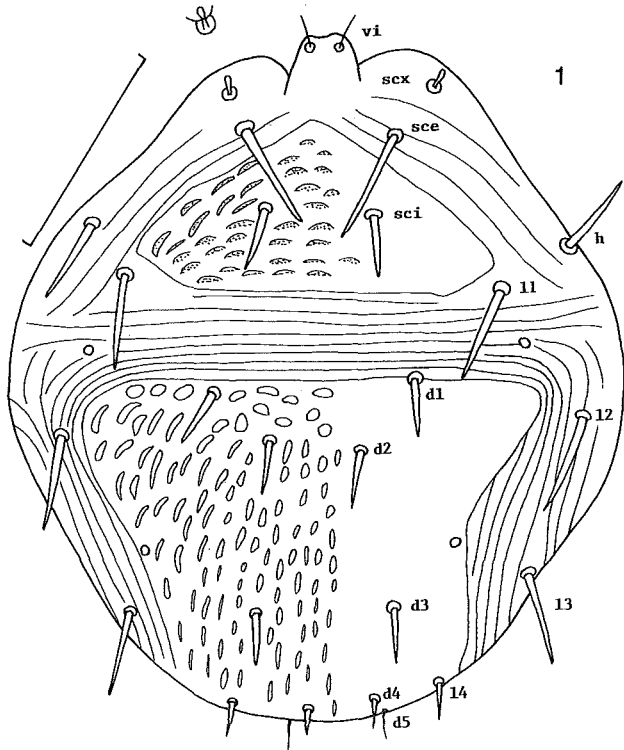


Fig. 1. *Chaetodactylus ludwigi* (TROUESSART, 1904) : Deutonymph in dorsal view. Scale line 100 μ m.

sus SMITH, 1859 and *L. pullatus* VACHAL, 1903.

The comparison of our specimens with the types of this species deposited in the MNHN and in ZSM revealed that they belong to the same species. We give here a new description and Figures of specimens collected by us in Madagascar from *Lithurgus pullatus*.

Redescription of the phoretic deutonymph of *Chaetodactylus ludwigi* :

Deutonymph (Figs 1-4 ; 18-19) : Length and width of the idiosoma in 7 specimens : 330×280 ; 310×285 ; 302×260 ; 280×343 ; 270×223 ; 265×215 ; 228×180 . The specimen 302 long has been taken as a model for the other measurements. *Dorsum* : The two median shields are punctate and bear numerous small, either elongate or crescentic pale spots arranged along regular lines which are either transverse (in middle of anterior shield) or longitudinal (middle of posterior shield) or oblique (lateral parts of the shields). Propodosomal shield 78 long and 157 wide ; hysterosomal shield 159 long and 220 maximum wide. Dorsal setae thick and spinose except *vi* and *d5* very thin and 13 and 7 long respectively. Length of setae : *sce* 49 ; *sci* 30 ; *d1* 27 ; *d2* 27 ; *d3* 24 ; *d4* 12 ; *l1* 45 ; *l2* 25 ; *l3* 30 ; *l4* 18 ; *h* 45. *Venter* : Setae *sh* 30, thick ; *l5* thin, 15 long. Epimera II 60, epimerites II (posterior apodeme of coxa II) lacking. Suctorial plate 87 wide. Diameter of anterior suckers 9, of posterior suckers 21 \times 24. The 4 conoides are arranged along a slightly concave line. Posterior border of body reinforced with a heavily sclerotized band. Coxal setae I and III very thin, 40-50 long. Palposoma consisting of 2 cylindrical lobes 10-12 long and 6 wide ending into a solenidion 11 long. Legs : Tarsi I-III 30-30-29 long, with strongly twisted claws 25-25-21 long (measured in straight line). Tarsi IV 29 long, about as long as tibia and genu IV together. *Chaetotaxy of tarsi I-IV* : Tarsi I and II with 5 setae, of which 3 foliate (*la*, *d* and *e*), the two other simple. Tarsi III with 4 setae of which 2 foliate. Tarsi IV with 5 simple setae : one apical ultralong (200) and very strong ; 1 subapical anterior 42 ; 1 subapical posterior 4 ; 2 ventral, of which 1 posterior inflated basally and 60 long, and 1 medio-ventral 18 long. Genu III with *kG* strong 36 long. *Solenidia* of tarsi I : $\omega 1$ is thicker but shorter (18) than $\omega 2$ (20) ; $\omega 3$ very thick 40 long.

Hosts and localities :

1. The typical series is deposited in the MNHN in Paris. It includes all the stages of the species. These mites had been collected by F. LUDWIG from a nest of "*Lithurge dentipes*" near Ponape, Eastern Caroline Islands.
2. Specimens originating from the same nest are deposited in the ZSM.
3. Phoretic deutonymphs of that species were collected by A.P. from the body (generally T1, propodeum and scutum) (Figs 20-21) from *Lithurgus* from the following countries : Madagascar, Manankinany, 1 bee female (25.X.1986) (25 deutonymphs), and 3 bees male (27.X.1986) (50 deutonymphs) (all *Lithurgus pullatus* Vachal). South India : 7 deutonymphs from one bee (*L. atratus*). Java at Soekaboemi : 14 deutonymphs located at the base of the wings (*L. scabrosus*). New Caledonia : from one bee



Figs 2-4. *Chaetodactylus ludwigi* (TROUESSART, 1904) : Deutonymph in ventral view (2), tarsus I in dorsal view (3) and in ventral view (4). Scale lines 100 μ m (Fig. 2), 20 μ m (Figs 3-4).

female (19 deutonymphs) (*L. scabrosus*). Moorea Is, near Tahiti : 1 bee (11 deutonymphs) (*L. scabrosus*).

Remarks :

1. There is a great variability in the size of the body of the deutonymphs infecting a bee (see above). Most, or all, of the organs (length of the legs, claws, shields, setae etc .) participate to this progressive increase in size. Moreover, the largest deutonymphs are always more sclerotized than the smaller ones. It seems probable that only the large sclerotized specimens are mature and able to transform into tritonymphs. We have observed the same variability in size in all the species of *Chaetodactylus* (as well as in other related genera) that we have examined. This observation is important in the comparison of different species only represented by their deutonymphal stage. It seems therefore imperative to use, for this comparison only mature deutonymphs.
2. VITZTHUM (1919) in his drawing of *C. ludwigi* has depicted a long epimerite II (posterior apodeme of coxa II). We have not observed such apodeme in the typical specimens nor in our material.
3. We give here some measurements of a good paratype of the TROUESSART collection : L \times W of idiosoma 315 \times 235 ; L \times W of propodosomal shield 75 \times 159, of hysterosomal shield 165 \times 230 ; ornamentation of the shields as in the specimens of Madagascar. Lengths of setae : *sce* 54 ; *sci* 31 ; *d1* 30 ; *d2* 30 ; *d3* 25 ; *d4* 12 ; *d5* 10 ; *l1* 40 ; *l2* 30 ; *l3* 32 ; *l4* 15 ; *h* 40 ; *sh* 30. Width of suctorial plate 85. Diameter of anterior suckers 9, of posterior suckers 21. Lateral conoides slightly more posterior than posterior suckers. Length of tarsal claws 22 to 26. Tarsi IV as in specimens of Madagascar. Epimerite (= posterior apodeme) of coxa II lacking.

***Chaetodactylus (Achaetodactylus) leleupi* FAIN, 1974**

[Figs 22-23]

Chaetodactylus leleupi FAIN, 1974 a : 214*Chaetodactylus (Achaetodactylus) leleupi* FAIN, 1981a : 2

This species has been described from *Ceratina ruwenzorica* COCKERELL, 1937, from Nairobi, Kenya. Our collection includes 9 and 5 deutonymphs of this species from 2 specimens of *Ceratina nigriceps* FRIESE, 1905, from Kilimandjaro, Tanzania and 8 deutonymphs from *C. lativentris* FRIESE, 1905, from Kilimandjaro, Tanzania. Location on the bee : in pouch of T1 (Figs 22-23).

Genus *Sennertia* OUDEMANS, 1905

This genus has been divided into 5 subgenera (FAIN, 1981b). Only the typical subgenus is represented in our collection.

***Sennertia (Sennertia) madagascarensis* FAIN, 1981**

This species has been described from *Xylocopa mirabilis* HURD & MOURE,

1963, a species from Madagascar (Tananarive) belonging to an endemic subgenus. New specimens of deutonymphs were collected from the same host and country but from Ranomafana (22.X.1988) and Fampanambo (1954) (24 deutonymphs). They were located on the propodeum.

***Sennertia (Sennertia) elseni* FAIN, 1971**

This species has been collected from *Xylocopa olivacea* (FABRICIUS, 1787) (= *Mesotrichia olivacea*), from Moanda, Bas Congo (ex Zaire). We collected now a series of new specimens of this species from *Xylocopa calens* LEPÉLETIER, 1841, in 3 different localities of Madagascar : Morarano-Chrome (2.II.1992) (9 deutonymphs), Foulpointe (XII.1995) (12 deutonymphs), Isalo (III.1994) (9 deutonymphs) ; and from *Melanempis* sp. [a new species unpublished ; Anthophoridae Ammobatini] in Ranomafana (4.XI.1989) (8 deutonymphs).

Family Acaridae MURRAY, 1877

Subfamily Acarinae MURRAY, 1877

Tribe Cerophagini n. tr.

Definition. Based on deutonymphs. All tarsi with modified claws. The claws of tarsi I-II are always different from those of the Chaetodactylidae, they are hooked and not twisted, their apical half is abruptly curved at 90°, the basal half is straight and slightly inflated distally. Claws III and IV either similar to the anterior claws or larger and twisted. Coxal fields II to IV either open or the fields II or III are closed, the other being open. Palposoma consisting of 2 short palps bearing a solenidion or palps lacking. Palposomal setae and solenidia *alpha* present. Dorsal plates either pitted or striated.

Type genus : *Cerophagus* OUDEMANS, 1903, type species : *Hypopus granulatus* DUJARDIN, 1849.

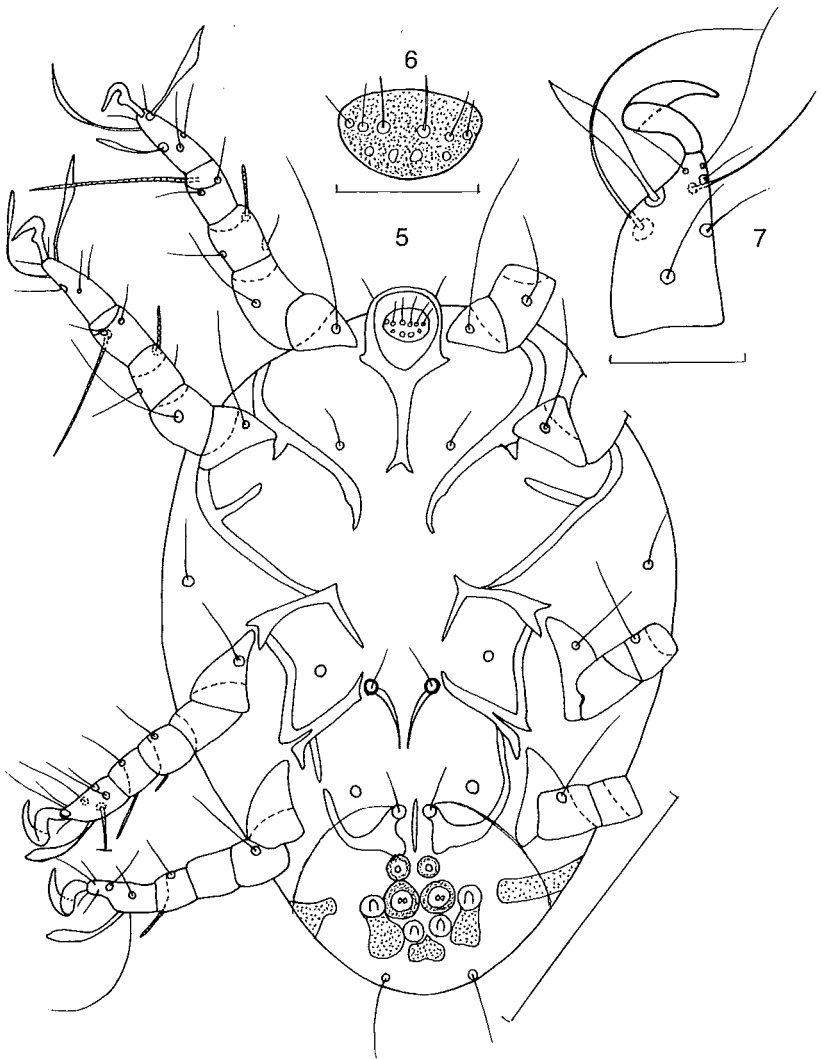
Genus *Cerophagus* OUDEMANS, 1905

***Cerophagus heriades* n. sp.**

[Figs 5-10]

This species is provisionally included in the genus *Cerophagus* until the type material of the genus *Cerophagopsis* ZACHVATKIN, 1941, could be examined. The life cycle of *Cerophagus* is known only in one species, *C. trigona* FAIN & HEARD, 1987.

Deutonymph (holotype) (Figs 5-10) : Holotype 246 long and 220 wide, this specimen is slightly compressed. Length and width in 5 paratypes : 255 × 215 ; 249 × 204 ; 245 × 183 ; 240 × 182 ; 240 × 179. *Dorsum* covered with 2 large shields. Anterior shield 78 long and 160 wide bearing numerous pale and elongate depressions oriented transversely in the middle and obliquely in the

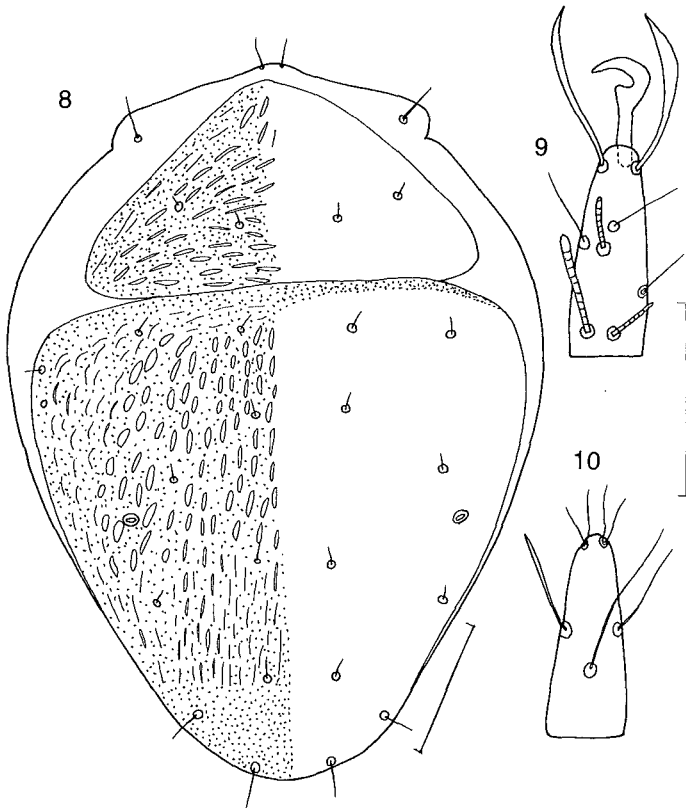


Figs 5-7. *Cerophagus heriades* n. sp. : Deutonymph in ventral view (5), palposomal plate (6), tarsus IV (7). Scale lines 100 μ m (Fig. 5) and 20 μ m (Figs 6 and 7).

lateral parts of the shield. Posterior shield 165 long and 185 wide covered in anterior two thirds with very numerous longitudinally elongate depressions generally from 5 to 15 long and 2 to 4 wide ; in the posterior third of the shield the depressions are narrower and almost linear. Setae of the shields very short and thin (5 to 10 long). Setae *vi* thin 12, setae *scx* 12. Setae *ve* are microsetae, situated off the palposomal area. *Venter* : Sternum 27 long, forked posteriorly. All the coxal fields are open. Coxae II with a long epimerite fused with epime

ra III. Epimera III and IV forked at their internal extremities. Setae *sh*, *cx I*, *ga* and *gp* are thin and very short. Setae *cx III* and *gm* are represented by small ringlets. Palposoma represented by a sclerotized elongate plate 7-9 long and 19 wide bearing the solenidia alpha and 2 pairs of palposomal setae. Suctorial plate 40 long and 60 wide. Lateral conoides at the same level as posterior suckers. Diameter of anterior suckers 8, of posterior suckers 12. Setae *l5* thin, 30 long. *Legs* : Tarsi I-IV 25-23-24-18 long. All the tarsi modified : Tarsal claws I-II hooked, not twisted. Tarsa claws III-IV larger than the anterior tarsal claws and distinctly twisted. Chaetotaxy of legs : Tarsi I with 11 setae, of which 3 are foliate, tarsi II with 10 setae of which 2 foliate, tarsi III-IV with 8 setae of which 1 foliate. Solenidia : Tarsus I with $\omega 1$ 18, $\omega 2$ 8-10, $\omega 3$ 10-12. Tibiae I to IV with solenidia *phi* 67-53-20 and 18 long respectively.

Host and locality : Holotype and 8 paratypes, all deutonymphs, from the propodeum and T1 of *Heriades erythrosoma* FRIESE, 1922 (Megachilidae), from Madagascar.



Figs 8-10. *Cerophagus heriades* n. sp. : Deutonymph in dorsal view (8), tarsus I in dorsal view (9) and in ventral view (10). Scale lines 50 μm (Fig. 8) and 25 μm (Figs 9-10).

Remarks : *Cerophagus heriades* differs clearly from *C. granulata* by the different shape of the depressed areas of the shields, they are not circular as in this species but elongate and most of them much larger. Other differences are the absence of palps and the smaller number of foliate setae on the tarsi.

Tribe Megachilopodini n. tr.

Definition : Only known from the deutonymphal stage. It is closely related to the Acarini but differs by the following characters : All legs similar in shape and size and tarsi devoid of ultra long setae. All the tarsal claws strong, equal and normal in shape and subequal in length. Dorsal shields punctate covered with numerous short striations. Coxal fields III closed, other fields open. Palposoma represented by 2 very short palps bearing long solenidia, 2 pairs of palposomal setae present. Foliate setae tarsi I-IV : 5-5-4-4.

Type genus : *Megachilopus* FAIN, 1974. Type species : *Megachilopus uellensis* FAIN, 1974.

Megachilopus uellensis FAIN, 1974

This species has been described from *Chalicodoma (Callomegachile) rufipes* (FABRICIUS, 1781) (Megachilidae), from Rep. Dem. Congo (Uellé). Only the deutonymph is known. The junior author collected now this species (9 deutonymphs) from *Megachile disjuncta* (FABRICIUS, 1804), from Seychelles (9 deutonymphs) and from *Xylocopa calens* LEPELETIER, 1841, from North Cameroun, Mindif (30.VII.1987) (8 deutonymphs).

Subfamily Horstiinae FAIN, 1984

Genus *Horstia* OUDEMANS, 1905

Horstia helenae (OUDEMANS, 1902)

This species is known from *Xylocopa tenuiscapa* WESTWOOD, 1840 (from India), from *Xylocopa dissimilis* LEPELETIER, 1841 (from Japan) and from *Xylocopa latipes* (DRURY, 1773) (from Malaysia) (FAIN, 1984). We can record it now from *Xylocopa calens* LEPELETIER, 1841, in two localities of Madagascar, i.e. Foulpointe (XII.1995 : 1 deutonymph) and Ranomafana (7.XI.1998 : 5 deutonymphs). The mites were located on T6 and T2.

Horstia tanzaniensis FAIN, 1974

This species has been described from *Ceratina excavata* COCKERELL, 1937 (typical host from Tanzania). It was also recorded from *Xylocopa* (= *Mesotrichia*) *africana* (FABRICIUS, 1781), *Megachile ovatomaculata* (PASTBELS, 1965) and *Chalicodoma devexa* (VACHAL, 1903) all from Rep. Dem. Congo (FAIN, 1974b). The junior author collected now this species from *Xylocopa calens* LEPELETIER, 1841 (female) from Morarano-Chrome, Madagascar

(2.II.1992) (12 deutonymphs). The mites were located on the lateral parts of the thorax and on T2.

Family Histiotomatidae

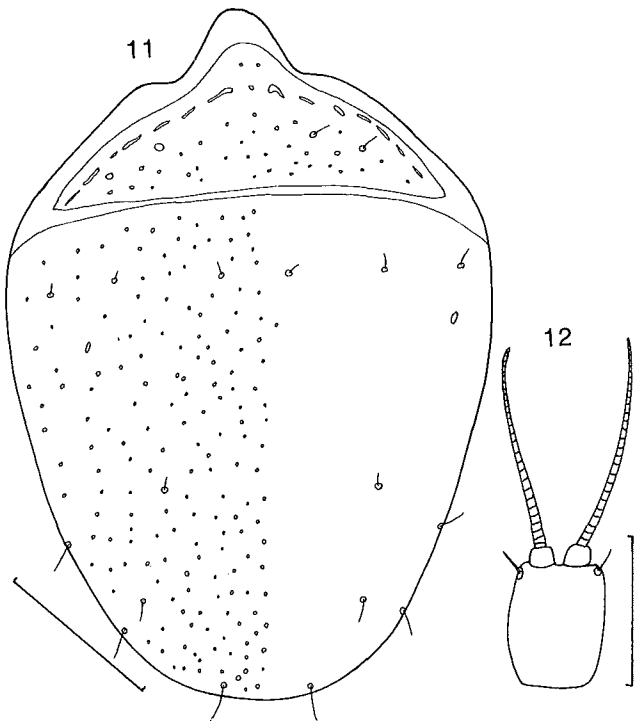
Genus *Histiostoma* KRAMER, 1876

***Histiostoma heriades* n.sp.**

[Figs 11-17]

This new species is represented by 6 deutonymphs.

Deutonymphs, Holotype (Figs 11-17) : Holotype 190 long and 141 wide (idiosoma). Length and width in 5 paratypes 212×155 ; 210×152 ; 208×154 ; 207×149 ; 200×143 . Anterior extremity with a rounded conical prologation covering the palposoma. *Dorsum* with 2 finely-punctate shields bearing numerous very small pits (0,5 to 1,2 in diameter). Chaetotaxy : most of the dorsal setae are microsetae, setae *l3*, *l4*, *l5* and *d5* slightly longer (5 to 10). Setae *sce* more posterior than *sci*. Setae *d1*, *l2*, *ve*, *vi* and *scx* not observed. *Venter* : Palposoma 18 long and 12 wide with lateral margins convex, ending



Figs 11-12. *Histiostoma heriades* n. sp. : Deutonymph in dorsal view (11), palposoma (12). Scale line 50 μm (Fig. 11) and 20 μm (Fig. 12).

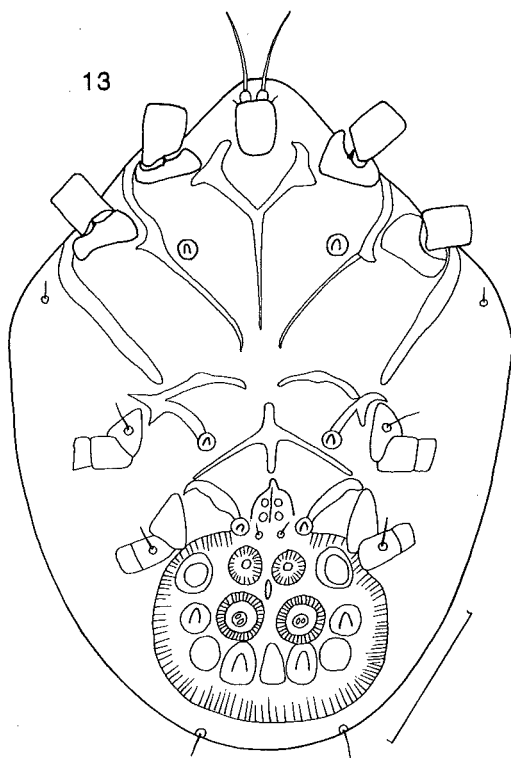
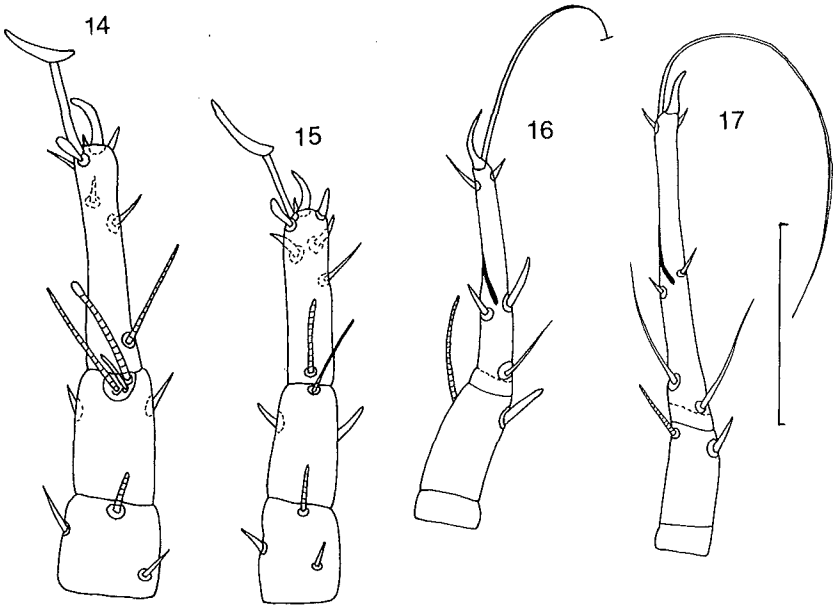


Fig. 13. *Histiostoma heriades* n. sp. : Deutonymph in ventral view. Scale line 50 μ m.

into 2 small unisegmented palps bearing a solenidion *alpha* (26). Palposomal base bearing near the apex a pair of spinelets. Sternum, epimera II and III free. Epimera IV fused in midline to a short median sclerite which does not reach the genital sclerite. *Chaetotaxy* : Coxal setae I and III modified into conoides. Setae *ga* lacking, *gm* are microsetae, *gp* are conoides. Suctorial plate very large 140 wide and 135 long, with striated margins. Diameter of anterior suckers 11, of posterior suckers 16, the latter with thick striated walls. *Legs* : Length of tarsi : 32-24-40-38. Tarsal claws 7,7 to 8,4 long. Tarsus I with a large spoon-like seta, 1 small subapical foliate seta and 5 short setae of which 2 spinelike. Tarsus II as tarsus I but with 5 spinelike setae and thicker than on tarsus I. Tarsus III with 6 setae of which one apical incomplete but at least 30 long (in paratypes). Tarsus IV with 7 setae, the apical one is 50 long. *Solenidia* : tarsus I with $\omega 3$ at the base of the segment ; tibia I with 2 subapical solenidia, the most apical is $\omega 1$, the second more basal is $\phi 1$.

Host and locality : Holotype and 5 paratypes (all deutonymphs) from T1 and propodeum of *Heriades erythrosoma* FRIESE, 1922 (Megachilidae), from Madagascar (Sainte-Marie island : Kalalao Forest).



Figs 14-17. *Histiostoma heriades* n. sp. : Deutonymph : legs (tarsus, tibia and genu) in dorsal or dorso-lateral view : I (14), II (15), III (16) and IV (17). Scale line 25 μ m.

Remarks :

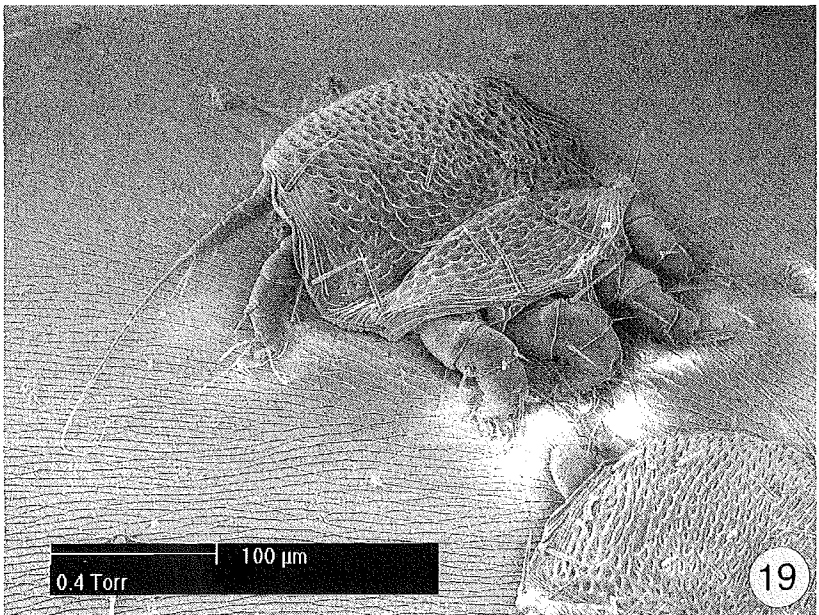
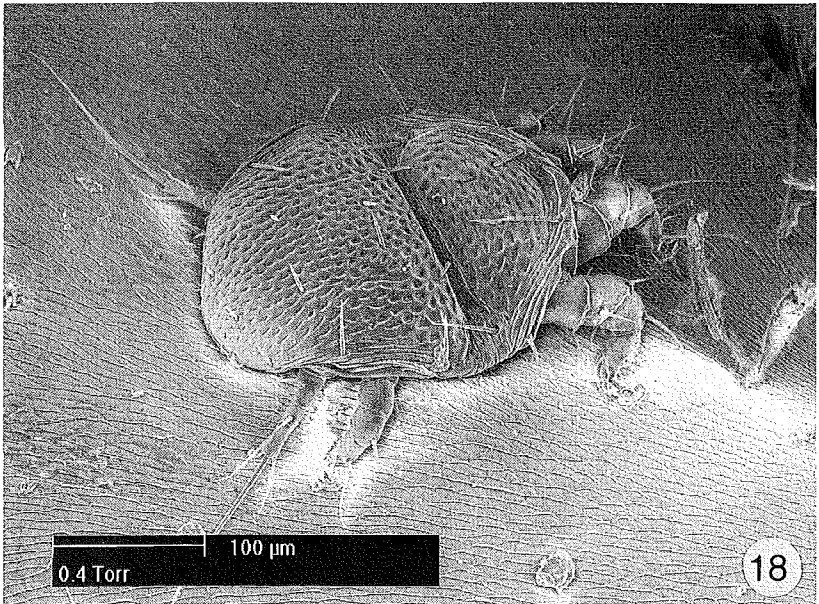
This new species is clearly distinguished from all the other species in the genus *Histiostoma* by the combination of the following characters :

1. Short pyriform shape of the body.
2. Dorsum with 2 large shields covered with numerous very small pits.
3. Most of the dorsal setae are microsetae
4. Palposoma longer than wide with lateral borders convex, ending into 2 short palpal segments.
5. Sternum, epimera II and III free ; epimera III fused in midline to a very short longitudinal median sclerite.
6. Very large suctorial plate, with large suckers.
7. Tarsi I-II relatively short. All tarsi with large claws. Legs I with relatively long solenidia.

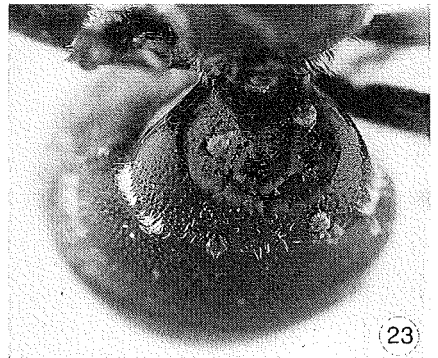
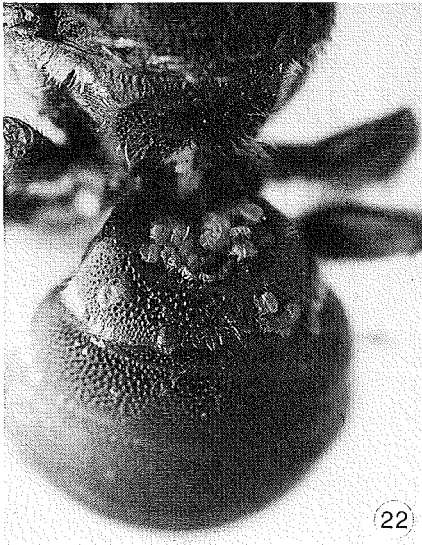
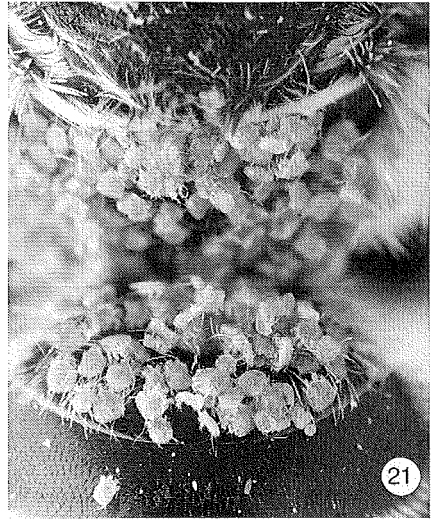
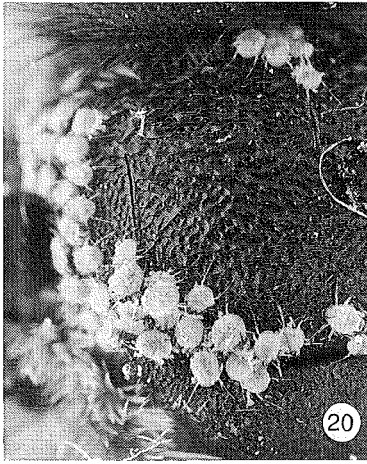
Family Winterschmidtidae

Genus *Vidia* OUDEMANS, 1905

The genus *Vidia* OUDEMANS includes at the present time about 12 species of which 7 have been described from North American Megachilidae (OCONNOR & EICKWORT, 1988). The type species (*Vidia undulata* OUDEMANS) has been redescribed and reduplicated by FAIN (1972). The typical host is *Hylaesus pilosu-*



Figs 18-19. *Chaetodactylus ludwigi* (TROUËSSART, 1904) : Deutonymphs from Madagascar (18) and New Caledonia (19) (micrographs with scanning electron microscope).



Figs 20-21. *Chaetodactylus ludwigi* (TROUËSSART, 1904) : Deutonymphs on scutum of *Lithurgus scabrosus* SMITH, female, from New Caledonia (20) and on propodeum and tergum 1 of *Lithurgus pullatus* (VACHAL), male, from Madagascar (21).

Fig 22-23. *Chaetodactylus leleupi* FAIN, 1981, in pouch of tergum 1 of *Ceratina nigriceps* FRIESE, 1905, females (22) ; view of the pouch on anterior face of tergum 1 (most acari removed) (23).

lus (PÉREZ, 1903) [= *Prosopis conformis* auct. nec (FÖRSTER, 1871)] (Colletidae : Apoidea), an European species.

Vidia sp.

The junior author collected several deutonymphs belonging to a new species

of this genus, from *Megachile albomarginata* SMITH, 1879 (Megachilidae), a species endemic to New Caledonia. Unfortunately, this material is in poor condition and we prefer to wait that new and better specimens become available before to name and describe this species.

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