Bull. Annls Soc. r. belge Ent. 124 (1988): *125-130*

Observations on **Congovidia** Fain & Elsen, 1971 and allied genera (Acari, Hemisarcoptidae)

by A. Fain[1]

Summary

The morphological characters separating the genera *Hemisarcoptes* Lignières, 1893, *Nanacarus* Oudemans, 1902 and *Congovidia* Fain & Elsen, 1971 are revised. The genus *Congovidiella* Fain & Elsen, 1971 is placed in synonymy with *Nanacarus*. A new subfamily, Sapracarinae, type genus *Sapracarus* Fain & Philips, 1978, is described in the Suidasiidae, and *Nanacarus manus* Purvis & Evans, 1982, is a junior synonym of *Sapracarus tuberculatus* Fain & Philips, 1978.

During these last years attention has been drawn to a small group of closely related genera of mites grouped in the family Hemisarcoptidae Oudemans, 1904 (=Nanacaridae Oudemans, 1923). These mites are very small and difficult to study. Some characters have not been accurately described or depicted in some previous papers and we think that it is useful to correct or complete these unadequate descriptions. Our observations are based on the reexamination of the typical material of Lignières (*Hemisarcoptes coccisugus*, adults and hypopi), of Oudemans (*Nanacarus minutus*, adults) and of our own species (*Congovidia glossinae*, hypopi; *Congovidia brasiliensis* hypopi and adults; *Congovidiella hieroglypha*, hypopi).

Genus *Hemisarcoptes* Lignières, 1893

The type species is *Hemisarcoptes coccisugus* Lignières, 1893.

The adults of this species are predacious on scale insects and their phoretic deutonymphs are carried by the coccinellid beetles which feed exclusively on scale insects. The species of this genus are of economical importance owing to the fact that they can be used for the control of the harmful scale insects. This genus is being revised by OConnor (*in litt.*).

Manuscrit accepté le 22 juin 1987

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Genus *Nanacarus* OUDEMANS, 1902

= *Congovidiella* FAIN & ELSEN, 1971, syn. nov.

The type species of *Nanacarus* is *Hypopus minutus* OUDEMANS, 1901. The type series has been reexamined and a lectotype female has been designated and depicted (FAIN, 1985).

We have identified this species from several places in Belgium : one male and 4 females were found in wheat in Antwerp (coll. J. COOREMAN, 1951) ; about 40 hypopi were collected by H. CRÈVECOEUR from *Liopus nebulosus* L., Forêt de Soignes (8.VIII.1946) ; several females were identified by us, among other mites, from unidentified insects in Liège (1965).

Recently we received from Dr H. ANDRÉ a small collection of mites found in the nest of a wild pigeon in the vicinity of Brussels. Among various other mites we found females, which correspond exactly with the lectotype of *Nanacarus minutus* (OUDEMANS), and several hypopi presenting all the characters of the genus *Congovidiella* FAIN & ELSEN, 1971, e.g. tibiae I and II bare, genua I-II with 1 seta, genu II without a solenidion, tarsus I with a well-developed solenidion $\omega 2$, tarsus III without a ventro-preapical spine. These hypopi differ however from *Congovidiella hieroglypha* FAIN & ELSEN, the type species, by the different pattern of lines on the dorsum and some other specific characters. It appears therefore that *Congovidiella* is a synonym of *Nanacarus*.

According to OCONNOR (1982a and 1982b) the species of *Nanacarus* and *Congovidia* are frequently associated with arboreal habitats including insects nests and bracket fungi. They inhabit bark, subcortical spaces and in the burrows of wood-boring insects. They show little or no specificity in phoretic hosts. Some species are found in the fruiting bodies of polypore fungi (OCONNOR, 1984 ; PIELOU & VERMA, 1968 ; MATTHEWMANN & PIELOU, 1971).

In Zaire we found hypopi of *Nanacarus* (= *Congovidiella*) attached to tsé-tsé flies. SAMSINAK & VOBRAZKOVA, 1983 described a new species of *Nanacarus* (= *Congovidiella pragensis*) found in dust samplings from streets of Praga.

The species described as *Nanacarus hungaricus* HALMAI & MAHUNKA, 1980 corresponds closely to the lectotype of *Nanacarus minutus* and is probably a synonym of this species. All the specimens (adults and hypopi) were found in the litter of rabbit cages in Hungary.

Genus *Congovidia* FAIN & ELSEN, 1971

= *Nanacaroides* VOLGIN & MIRONOV, 1979 ; OCONNOR, 1984

The type species of *Congovidia* is *C. glossinae* FAIN & ELSEN, 1971. It is based on an hypopus found on a tse-tse fly in Zaire. FAIN & CAMERIK (1977) described the life cycle of *Congovidia brasiliensis* FAIN & CAMERIK, 1977. Adults and hypopi were found in the nest of a wasp *Trypoxylon (Trypargilum) aestivale* RICHARDS (Sphegidae). This genus was first included in the Saproglyphidae but in another paper (FAIN & ROSA, 1983) it was transferred into the Meliponocoptidae owing to the similarities in the aspect of the tarsi existing between *Congovidia* and *Meliponocoptes*, the type genus of this family. By most of their others characters, however, these two genera are quite different from each other. We think now that *Congovidia* is much more related with the Hemisarcoptidae than to any other family.

The genus *Nanacaroides* VOLGIN & MIRONOV, 1979 is considered by OCONNOR (1984) as a synonym of *Congovidia*.

Genus *Espeletiacarus* FAIN, 1987

This genus based on a single hypopus (*Espeletiacarus andinus* FAIN, 1987) found in the flower of *Espeletia incana* in Colombia (alt. 3550 m). It differs from the other genera in the family by important characters, e.g. the vestigial aspect of the tarsal claws, the complete absence of palposoma, palposomal setae and solenidia, and the presence of only one long seta on the tarsus IV.

Remarks about some characters in the genera *Hemisarcoptes, Nanacarus* and *Congovidia*

Hypopi :

The most important characters in the separation of the three genera related above are the following :

1. Tarsus III bearing a ventro-preapical spine (in *Congovidia* and *Hemisarcoptes*) or without this spine (in *Nanacarus*) ;
2. Tibiae I-III with one seta (in *Congovidia* and *Hemisarcoptes*) or without setae (in *Nanacarus*).
3. Genua I-II with two setae and a solenidion (in *Hemisarcoptes* and *Congovidia*) or with only one seta on genua I-II and a solenidion only genu I (in *Nanacarus*).
4. Tarsus I with a well-developed solenidion $\omega 2$ (in *Congovidia* and *Nanacarus*) or lacking this solenidion (in *Hemisarcoptes*).
5. Palposoma formed of two short conical or cylindrical palps bearing the solenidia *alpha* (in *Congovidia* and *Hemisarcoptes*) or reduced to two chitinous rings bearing the solenidia (in *Nanacarus*).
6. Tarsus IV either free or fused with tibia, and bearing 3 thick setae, of which two long and one much shorter (in *Hemisarcoptes*), or tarsus IV fused with tibia and bearing either 2 very thin and short setae and 2 thick setae very unequal in length (in *Congovidia*) or 3 setae of which one is very thin and short and 2 are thick, long and very unequal (in *Nanacarus*).
7. In the three genera the tibiae I-II bear a small triangular apico-dorsal process. This process is more conspicuous in *Congovidia* and *Nanacarus* than in *Hemisarcoptes*. This process was not depicted in the original figure given by us for *Congovidiella hieroglypha*. HALMAI & MAHUNKA (1980) have overlooked this process in *Nanacarus*.

Females:

1 Tarsi I-IV approximately as wide as long (in *Hemisarcoptes*) or much longer than wide (in *Congovidia* and *Nanacarus*).
2 Tarsi I-IV with 3 apical spines, unequal on tarsi I-II, subequal on tarsi III-IV (in *Congovidia* and *Hemisarcoptes*), or all tarsi with a small apico-ventral spine (in *Nanacarus*). In addition, in all these genera tarsi I-II bear 5 thin setae and tarsi III-IV bear 3 thin setae.
3 All tibiae without setae (*Nanacarus*) or tibiae I-IV with 1-1-1-0 setae (in *Congovidia* and *Hemisarcoptes*).
4 Genua I-II with 1 seta (*Nanacarus*) or 2 setae (*Congovidia* and *Hemisarcoptes*).
5 Genu II with a solenidion (in *Congovidia* and *Hemisarcoptes*) or lacking a solenidion (*Nanacarus*).
6 Seta *s cx* simple in *Congovidia* and *Hemisarcoptes*, and forked in *Nanacarus*.
7 Anterior margin of trochanter I with a comb of 5-7 teeth in *Nanacarus*, with 2 or 3 teeth in *Congovidia*, or without teeth in *Hemisarcoptes*.
8 Non-pigmented eyes are present on the propodonotum in the 3 genera.

Males:

Same characters as in the females except for the number of apical spines on tarsi III and IV. In the male of *Nanacarus* there are 2 small apical spines on these tarsi whilst in the males of the two other genera there are 3 subequal spines on these tarsi.

The males of these three genera bear ventrally in front of the male organ a median rounded formation resembling a sucker. The exact signification of this organ is unknown.

Status of the genus *Sapracarus* FAIN and PHILIPS, 1978.

The type species of this genus is *Sapracarus tuberculatus* FAIN & PHILIPS, 1978. It was found in the nest of *Otus asio* in U.S.A.

We have provisionally placed this genus in the Saproglyphidae, then in the Hemisarcoptidae (FAIN, 1985). OCONNOR (1982) included it in the Suidasiidae.

Actually this genus does not agree perfectly with any of these families. The chaetotaxy of the idiosoma recalls that of the Acarinae except that there are only 4 pairs of anals. The chaetotaxy of the legs is reduced as in the Hemisarcoptidae but all the setae are thin. All tarsi end into a clawless sucker with a short stalk; there are no eyes on the propodonotum and the cuticle is verrucous. The hypopus resembles that of the Winterschmidtiidae (=Saproglyphidae) but there is no pretarsus and no claw on the legs, and the pregenital sclerite and the eyes are lacking.

We agree to include it in the Suidasiidae, mainly because the aspect of the cuticle, but in a separate subfamily, Sapracarinae.

Sapracarinae subf. nov.

Definition: Body small. Cuticle partly verrucose. Setae *vi* and *ve* present. Other dorsal setae complete. There are 4 pairs of anals (in female). Eyes absent. Vulva relatively very long. Legs: with a shortly-stalked sucker but no claw; chaetotaxy reduced, without spines; tibiae I-III with one seta, tibia IV nude. *Hypopus*: cuticle slightly verrucose dorsolaterally; tarsi I-III lacking pretarsus and claw, tarsus IV with 3 long and strong setae; epimera II-IV short and free, absence of a pregenital sclerite; eyes absent; palposoma lacking.

Type genus: *Sapracarus* FAIN and PHILIPS, 1978. The type species is *Sapracarus tuberculatus* FAIN and PHILIPS, 1978 (=*Nanacarus manus* PURVIS & EVANS, 1978, syn. nov.). The typical series of *Sapracarus tuberculatus* was found in a nest of a bird in U.S.A. We received numerous specimens of that species (females, hypopi but no males) from Dr W. CHMIELEWSKI (Poland) who found these mites in barn dust. PURVIS & EVANS (1982) recorded this species (under the name *Nanacarus manus* P. and E.) from soil cores taken from grass-covered stabilized sand dunes in Ireland.

References

FAIN, A., 1971. - Notes sur les hypopes des Saproglyphidae (Acarina: Sarcoptiformes). I. Diagnoses de taxa nouveaux. *Rev. Zool. Bot. afr.* 84: 281-284.

FAIN, A., 1985. - Notes on two genera of mites (*Viedebanttia* and *Nanacarus*) (Acari: Astigmata) described by OUDEMANS. *Zool. Meded. Rijksmus. nat. Hist. Leiden* 59, n° 23: 275-282.

FAIN, A., 1987. - Notes on the mites living in the flowers of *Espeletia* spp. (Asteraceae) in Colombia. II. *Espeletiacarus andinus* gen. n., spec. n. (Hemisarcoptidae) and *Michaelopus incanus* sp. n. (Acaridae). *Entomol. Mitt. zool. Mus. Hamburg*, 9: n°130: 37-47.

FAIN, A. and CAMERIK, A. M., 1977. - The life cycle of *Congovodia brasiliensis* sp. n. a saproglyphid mite associated with a wasp (Acarina, Astigmata). *Bull. Annls Soc. r. belge Ent.* 113: 44-51.

FAIN, A. et ELSEN, P., 1972. - Notes sur les acariens parasites ou commensaux des mouches tsé-tsés. 1. Familles Saproglyphidae et Anoetidae (Sarcoptiformes). *Acta zool. pathol. antverp.* n° 55: 71-90.

FAIN, A. and PHILIPS, J. R., 1978. - Astigmatic mites from nests of birds of prey in U.S.A. III. *Sapracarus tuberculatus* g.n., sp.n. (Acari, Saproglyphidae) *Acta zool. pathol. antverp.* n° 70: 227-231.

FAIN, A. and ROSA, A. E., 1983. - Acari Domum Meliponinarum Brasiliensium Habitantes. VI. New astigmatic mites from the nest of the bee *Partamona* sp. (Meliponidae) *Bull. Inst. r. Sci. nat. Belg.* n° 55: 1-13.

HALMAI, Z. S. & MAHUNKA, S., 1980. - *Nanacarus hungaricus* sp. n; eine neue Saproglyphidae Art aus Hungarn (Acari). *Fol. Entom. hung.* 41: 265-271.

MATTHEWMANN, W. G. and PIELOU, D. P., 1971. - Arthropods inhabiting the sporophores of *Fomes fomentarius* (Polyporaceae) in Gatineau Park, Quebec. *Can. Entom.* 103: 775-847.

OCONNOR, B. M., 1982a. - *Astigmata. In* PARKER ed.: *Synopsis and classification of living organisms*. Mac Graw Hill Co, New York: 146-169.
OCONNOR, B. M., 1982b. - Evolutionary ecology of astigmatid mites. *Ann. Rev. Entomol.* 27: 385-409.
OCONNOR, B. M., 1984. - *Acarine-Fungal relationships: The evolution of symbiotic associations*. in WHEELER, Q. & BLACKWELL, M. ed. *Fungus-Insects relationships: perspectives in ecology and evolution*. Columbia University Press, N.Y., pp. 354-381.
PIELOU, D. P. and VERMA, A. N., 1968. - The arthropod fauna associated with the birch bracket fungus, *Polyporus betulinus*, in Eastern Canada. *Can. Entom.* 100: 1179-1199.
PURVIS, G. and EVANS, G. O., 1982. - Astigmatic mites of the genera *Schwiebea* OUDMS and *Nanacarus* OUDMS from S. E. Ireland. *J. nat. Hist.* 16: 815-821.
SAMSINAK, K. and VOBRAZKOVA, E., 1983. - Mites from the city pavement. *Vest. cs. Spolec. zool.* 47: 118-121.
VOLGIN, V. I. and MIRONOV, S. V., 1979. - New species and genus of the family Saproglyphidae (Acarina, Acaroidea). In Fauna and ecology of Arachnida, Ed. Y. S. BALASHOV *Zool. Inst. Akad. Sci. SSSR.* 85: 91-98 (in Russian).

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Bull. Annls Soc. r. belge Ent. 124 (1988): *131-135*

Feeding and oviposition preference of cabbage butterfly **Pieris brassicae**

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Summary

Dual choice test indicated that *B. campestris* var. *sarson* (sarson), *B. oleracea* var. *botrytis* (cabbage) and *B. juncea* (raya) are the more preferred host plant of larvae of cabbage butterfly as compared to *B. oleracea* var. *capitata* (cauliflower). *B. campestris* var. *toria* (toria) is less preferred as compared to it. But the *B. oleracea* var. *capitata* was most preferred for oviposition followed by *B. oleracea* var. *botrytis*, *B. juncea*, *B. campestris* var. *toria* and *B. campestris* var. *sarson*. The larvae completed their development after passing through 5 instars. As compared to *B. campestris* var. *sarson* larval development was faster on *B. juncea*, *B. oleracea* var. *botrytis*, *B. oleracea* var. *capitata* and *B. campestris* var. *toria*. Maximum adults emerged on *B. oleracea* var. *botrytis* followed by *B. juncea*, *B. oleracea* var. *capitata*, *B. campestris* var. *sarson* and *B. campestris* var. *toria*. Highest growth index was recorded on *B. oleracea* var. *botrytis* followed by *B. oleracea* var. *capitata*, *B. juncea*, *B. campestris* var. *sarson* and *B. campestris* var. *toria*. A new method was developed to draw conclusion regarding susceptibility of host plants from different experiments.

Cabbage butterfly, *Pieris brassicae* is an important pest of cole crops in many countries of North Africa, Europe and Asia. In India it has been recorded as major pest of cruciferous crops from an altitude of 100 to 1800 m. (SACHAN and GANGWAR, 1980; BAKHETIA and BRAR, 1982). Defoliation of 8.97-10.41, 10.75-13.76, 13.80-16.89 and 7.79-9.63 percent of leaf area in early cabbage, late cabbage, early cauliflower and late cauliflower respectively have been found to cause economic damage (STRAKA, 1979) and direct correlation between number of larvae and yield loss was observed (TER-SIMONYAN and MIKHEEVA, 1981). The outbreak of the pest depends upon the availability of preferred host and favourable temperature and humidity. Preferred hosts of the same or different species play important role in population build up of the pest and the outbreak can be checked by giving due emphasis to less preferred plant types in agro-ecosystem. A few attempts have been made to search the resistant plant types of cabbage (CHANDRA and LAL, 1976; VERMA *et al.*, 1981). In the present investigation feeding, growth and development, and oviposition preference of cabbage butterfly have been studied on cole crops and a new method has been developed to draw conclusion from different experiments.

Accepted for publication: 30/7/87

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