# TYDEINAE (ACARI : TYDEIDAE) FROM BELGIUM
# II. THE GENERA *TYDEUS, IDIOLORRYIA*, AND *METALORRYIA*

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TYDEINAE, BELGIUM, TYDEUS, IDIOLORRYIA, METALORRYIA

SUMMARY : After a first paper devoted to the genus *Homeotydeus*, the description of Belgian Tydeinae collected on bark is continued. Two new species are described : *Tydeus stefani* and *Idiolorryia marci*. *T. stefani* is compared to a closely related species, *T. bedfordiensis*. *Metalorryia armaghensis*, of which only tritonymph was known, is also redescribed. Specific character in Tydeinae are discussed and keys to species are provided for the genera *Idiolorrya* and *Metalorryia*.

TYDEINAE, BELGIQUE TYDEUS, IDIOLORRYIA, METALORRYIA

RÉSUMÉ : Suite à un premier article consacré au genre *Homeotydeus*, la description des Tydeinae récoltés sur écorce en Belgique est poursuivie. Deux nouvelles espèces sont décrites : *Tydeus stefani* et *Idiolorrya marci*. *T. stefani* est comparé à une espèce fort proche, *T. bedfordiensis*. *Metalorryia armaghensis* connue seulement par sa tritonymphe est également redécrite. Les caractères spécifiques chez les Tydeinae sont discutés et des clés d'identification sont fournies pour les espèces appartenant aux genres *Idiolorryia* et *Metalorryia*.

## INTRODUCTION

In the course of my study on corticolous microarthropods (ANDRÉ, 1985), numerous tydeid species were collected (ANDRÉ, 1986). Most of them are new, and some have already been described (ANDRÉ, 1980, 1984). This paper continues the descriptions of corticolous Tydeinae. All the species described herein would have been classified in the genus *Lorryia* according to BAKER's (1965) revision.

## THE GENUS *TYDEUS*

Five species belonging to the genus *Tydeus* were recorded on bark (ANDRÉ, 1986). *Tydeus bedfordiensis* (Evans) was found to be quite abundant (353 individuals). However, the most abundant *Tydeus* was an undescribed species (523 individuals). This new species, *Tydeus stefani* [1], must be described in parallel with *T. bedfordiensis* as they are very similar and were even confused at the beginning of my study. Both species meet the following generic description :

■ *Prodorsum* : recurved, two eyes. *Opisthosoma* : dorsal chaetotaxy : 10 (*l2* and *h1* missing) ; poroidotaxy : 3 ; genital organotaxy : Ad (0.4-6-4), T (4-4), D (2-2), P (0-1) ; epimeral formulae : Ad, T & D (3-1-4-2), P (3-1-3-0), L (3-1-2) ; coxal organ. *Legs* : chaetotaxy : I (8-4-3-3-1) II (6-2-2-3-0) III (5-2-1-2-1) IV (5-2-1-1-0) in the adult, trito- and deutonymphs ; protonymph with no *trI*, sometimes

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1. This species is named for my elder son, Stéphan.

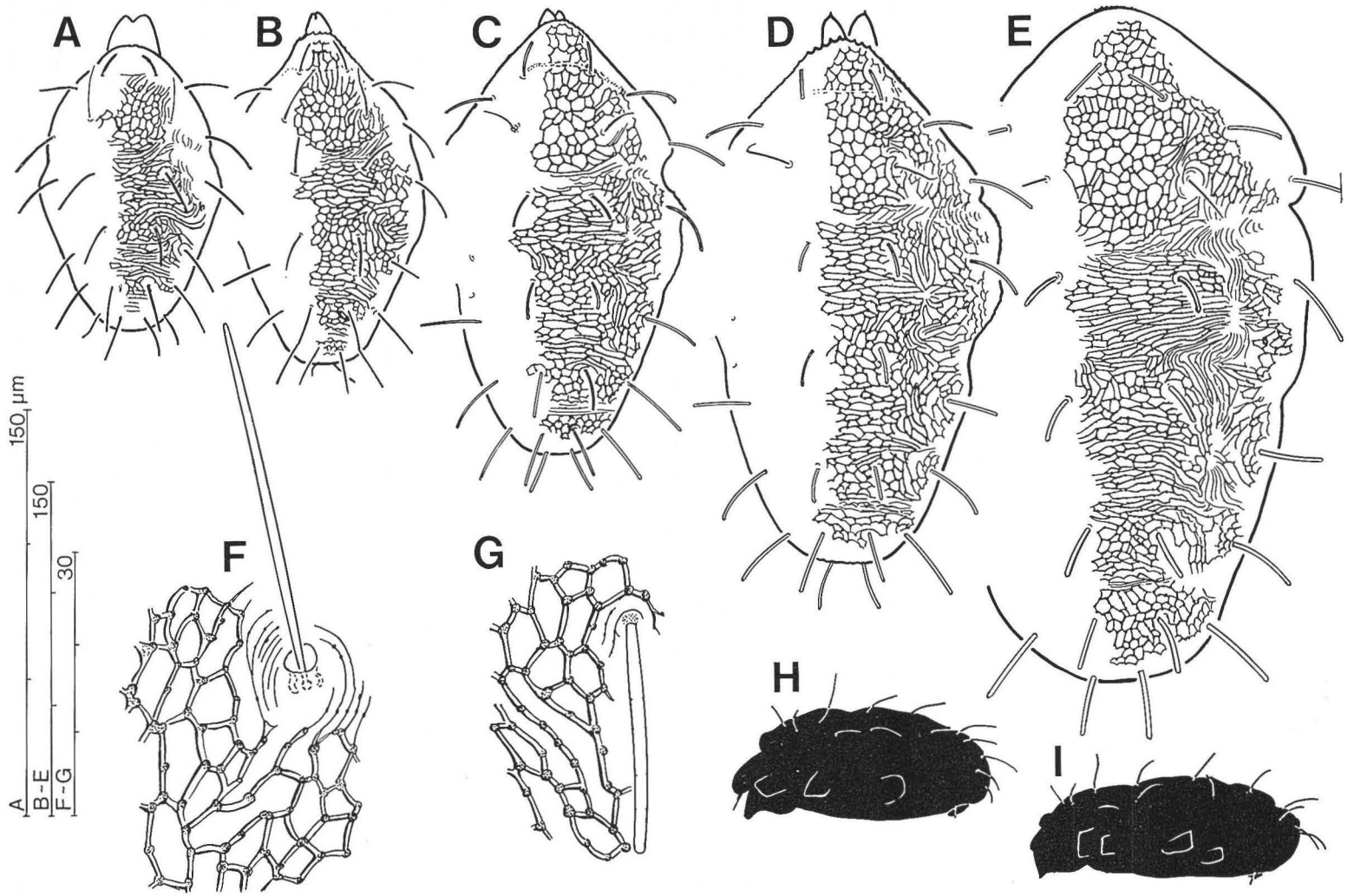


FIG. 1 : *Tydeus bedfordiensis* (Evans).

Dorsal view of the larva (A), proto- (B), deuto- (C), tritonymphs (D) and adult (E) ; detail of the sensillus (F) and dorsal seta *d2* (G) ; lateral outline ot the larva (H) and tritonymph (I). Note that the scale relating to the dorsal view of the larva (A) differs from the others (B to E).

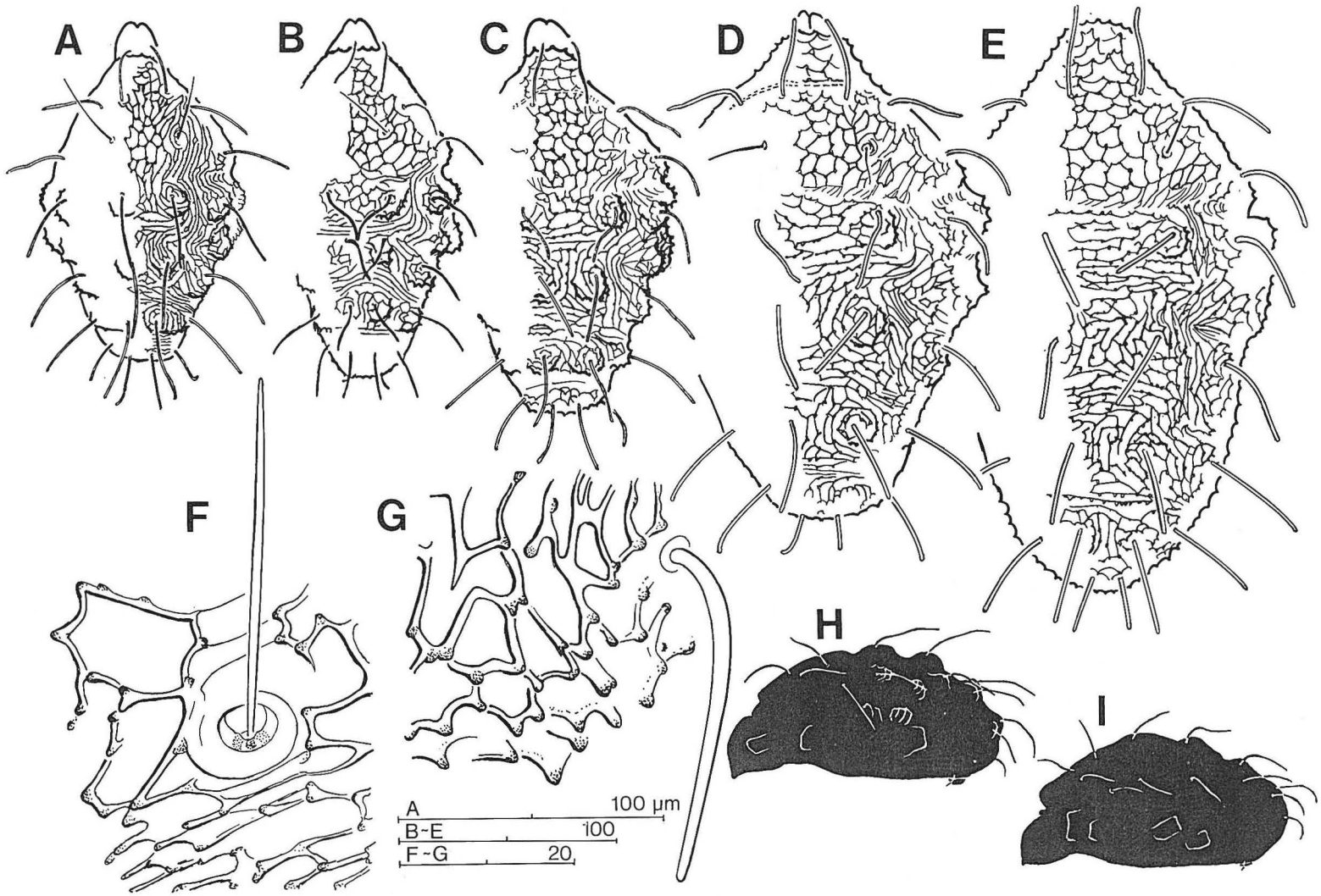


FIG. 2 : *Tydeus stefani* n. sp.

Dorsal views of the larva (A), proto- (B), deuto- (C), tritonymphs (D) and adult (E), detail of the sensillus (F) and seta *d2* (G) ; lateral outline of the larva (H) and tritonymph (I). Same scales as in Fig. 1.

with no *trIII*, and with only five tarsal setae on the fourth leg; larva : I (8-4-3-3-0) II (6-2-2-3-0), III (5-2-1-2-0); eupathidia on tarsus I : (*p*), (*tc* N1) and, possibly, *ft"*; simple anabasis with (*tc*) vestigial in the larva; solenidiotaxy : 2; femur IV undivided. *Palp* : (6-2-2) + ω with a double eupathidium at the tip of the tarsus.

*T. bedfordiensis* and *T. stefani* are compared in Figs. 1 and 2, where all active stases are illustrated. The new species exhibits a reticulate pattern slightly different from that of *T. bedfordiensis*. In the former, the reticulation is areolate [2] (i.e. composed of irregular cells) while, in the latter, it is more alveolate, i.e. composed of regular and angular cells. Second, cells forming the reticulate pattern in *T. stefani* are larger than those observed in *T. bedfordiensis*. Third, the reticulate pattern varies through ontogeny, but differently in the two species. In *T. stefani* larvae, the reticulate pattern is found only on the prodorsum and around the opisthosomatic dorsal setae at the tip of humps clearly visible in lateral view (Fig. 2 H); these humps tend to disappear through ontogeny (Fig. 2 I) while the reticulate pattern progressively extends all over the dorsal surface of the opisthosoma. The dorsal relief is much less pronounced in *T. bedfordiensis* (compare Fig. 2 H to Fig. 1 H) and the reticulate pattern is less precisely localized in the larva. Lastly, lobes and microtubercules scattered along striae are much more pronounced in *T. stefani* than in *T. bedfordiensis*.

The shape of dorsal setae also differs in *T. bedfordiensis* and *T. stefani*. In the former, the dorsal setae are more or less straight or just a bit curved. In the latter, dorsal setae are evidently curved down to the dorsal surface (Figs. 2 H, I) and even S-shaped; quite often, mostly in immatures, setae of pairs (*d1*) and (*d2*) even overlap due to their S-shape (Fig. 2 B).

Lastly, the length of the two species measured from the posterior tip of the opisthosoma to the anterior border of the prodorsum (i.e. gnathosoma *not* included) is different [3]. On the basis of a two-tailed test, the hypothesis $H_0$ that both species have the same length is rejected at a 0.05 level of significance in the protonymph and adult and at 0.01 level in the deuto- and tritonymphs (table I).

TABLE I : comparison of the total length (gnathosoma *not* included) in *T. bedfordiensis* and *T. stefani*.

| | T. bedfordiensis | | | T. stefani | | | t-value |
|---|---|---|---|---|---|---|---|
| | m.l. | s.e. | n | m.l. | s.e. | n | |
| larva | 107.00 | — | 1 | 114.00 | 1.00 | 2 | — |
| protonymph | 147.00 | 3.32 | 5 | 129.00 | 11.31 | 2 | 2,73* |
| deutonymph | 195.40 | 5.64 | 5 | 167.20 | 8.90 | 5 | 4.15** |
| tritonymph | 243.86 | 9.89 | 7 | 219.00 | 11.20 | 7 | 4.08** |
| female | 276.57 | 10.66 | 7 | 258.57 | 11.98 | 7 | 2.77* |

m.l. = mean length; s.e. = standard error;
n = number of measures; dimensions in µm.

* : significantly different at level 0.05
** : significantly different at level 0.01.

As for the chaetotaxy, the two species are quite similar and *ft"* becomes eupathidial in the deutonymph in both species.

The habitat of the two species is somewhat different. *T. bedfordiensis* was collected in different types of corticolous lichens whereas *T. stefani* was found to be restricted to crustose epiphytes (for further details, see ANDRÉ, 1986).

■ *Material examined* : all active stases of *T. bedfordiensis* and *T. stefani* have been found. *T. bedfordiensis* specimens were compared to the holotype. *T. stefani* types are deposited in the Institut royal des Sciences naturelles, Bruxelles, Belgium.

## THE GENUS *IDIOLORRYIA*

When it was described in 1980, the genus *Idiolorryia* was monotypic although an undescribed species found in Belgium was mentioned. This new species, called *I. marci* [4] is described after the generic description.

2. Whatever the group studied, terminology of surface sculpturing is somewhat confusing; HARRIS' (1979) terminology is followed here.

3. The length is measured in a concavity slide filled with lactic acid and *not* in a permanent slide, a technique which usually biases the measurement.

4. This species is named for my younger son, Marc.

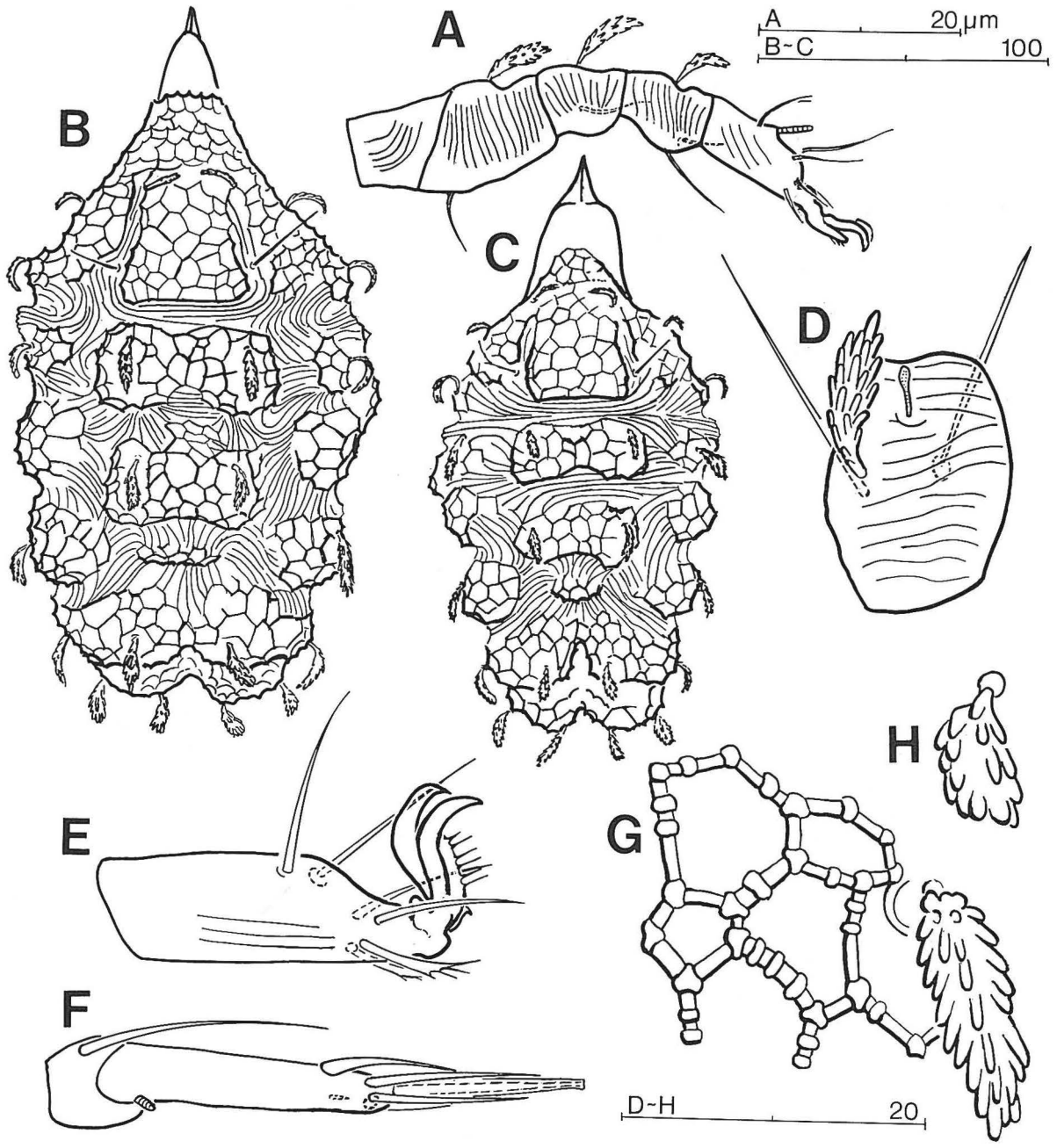


FIG. 3 A-G : *Idiolorryia marci* n. sp.

Leg I in antiaxial view (A) ; dorsal views of the adult (B) and tritonymph (C) ; dorsal view of tibia I (D) ; antiaxial view of tarsus II (E) ; palp, tarsus and tibia (F) ; detail of dorsal seta *d2* (G).

FIG. 3 H : *Idiolorryia macquillani* (Baker)

Dorsal seta *d2* (H) (same orientation and magnification as G).

■ *Prodorsum* : recurved. *Opisthosoma* : dorsal chaetotaxy : *9* (*12, h1* and *h2* missing), poroidotaxy : 3 ; genital organotaxy : Ad (0.?-6-4), T (2-4) [5], P (0-1) ; epimeral formulae : Ad & T (3-1-4-2), P (3-1-3-0), L (3-1-2) ; coxal organ. *Legs* : chaetotaxy : I (8-4-2-3-0) II (6-1 or 2-1-3-0) III (5-1-1-2-1) IV (5-1-1-1-0) in the adult and tritonymph, protonymph with only five tarsal setae on the fourth leg ; larva with no *trI* and no leg IV ; eupathidia on tarsus I : (*p*), (*tc* N1) and *ft"* in the adult ; double anabasis ; solenidiotaxy : 1 ; femur IV entire. *Palp* : (6-1-2) + ω with a double eupathidium at the end of the tarsus. *Other features* : gnathosoma elongate with movable chelae very long and straight, palpal tarsus long and slender as are the setae it bears ; reticulate pattern.

The new species illustrated in fig. 3 is similar to *I. macquillani* (Baker, 1968). In particular, the reticulate pattern is virtually identical. However the new species differs from *I. macquillani* in two details. *I. marci* has only one seta on tibia II instead of two as in *I. macquillani.* In addition, the ornamented dorsal setae located on the opisthosoma and on some leg segments are more slender and longer in the latter species than in the former.

*Habitat : I. marci* was found only in Ruette, most often in thalli of *Ramalina farinacea* growing on ash. Some specimens also were collected in *Parmelia sulcata* and *P. acetabulum* on the same tree.

*Material examined* : Adults, trito- and protonymphs and one larva of *I. marci ; I. macquillani* : ♀ holotype + one tritonymph ; type-material of *I. marci* is deposited in the Institut royal des Sciences naturelles, Bruxelles, Belgium.

*Key* : the species of *Idiolorryia* are easily distinguished by the following character :

— Tibia II with only one seta *I. marci* n. sp.
— Tibia II with two setae ..... *I. macquillani* (Baker, 1968)

## The genus *Metalorryia*

When it was described in 1980, this genus was also monotypic. The type species of the genus, *M. armaghensis* (Baker, 1968), has been collected on bark in Ruette and Saint-Mard (in both sites A and B). Most specimens (128 out of 143) were found in crustose epiphytes, especially in algae growing on hornbeams in Ruette. As the original species description was based only on one tritonymph, some additional features are illustrated in fig. 4.

Since the description of *Metalorryia* in 1980, another species, *Lorryia magdalenae* Gerson, 1968, has been studied and must also be classified in that genus. Both species meet the generic description published in 1980 and exhibit a similar reticulate pattern. They are however distinguished by the following character :

— Opisthosomatic dorsal setae clublike and slightly serrate (Fig. 4 F) ..... *M. armaghensis* (Baker, 1968)
— Opisthosomatic dorsal setae clublike and smooth (Fig. 4 G).. *M. magdalenae* (Gerson, 1968)

*Material studied : M. armaghensis* (Baker, 1968) : holotype plus specimens of Belgium (all stases) ; *M. magdalenae* (Gerson, 1968) : holotype.

## Specific characters in Tydeinae

Except in a very few cases (as in *Idiolorryia* for instance), each tydeid genus is characterized at the adult stase by a special set of organotactic formulae [6] and, conversely, each formula defines only one genus. There is thus a one-to-one correspondence between tydeid genera and the set of organotactic formulae. The problem arises of highlighting good specific characters.

In regard to the setae, only variations in length, shape, ornementation, state (eupathidial vs normal) and position are recognized within a particular genus and, accordingly, allow the recognition of species. For instance, *ft"* of tarsus I is eupathidial in the adults of three *Homeotydeus* species but is not in the two other species included in the genus (André, 1984). The shape of the opisthosomatic dorsal setae is usually used to discriminate different

5. In the 2 *I. marci* tritonymphs available, formula (2-4) was observed three times, while formula (4-4) was seen only once.
6. Most often, formulae concern chaetotaxy, solenidiotaxy and poroidotaxy (André, 1980).

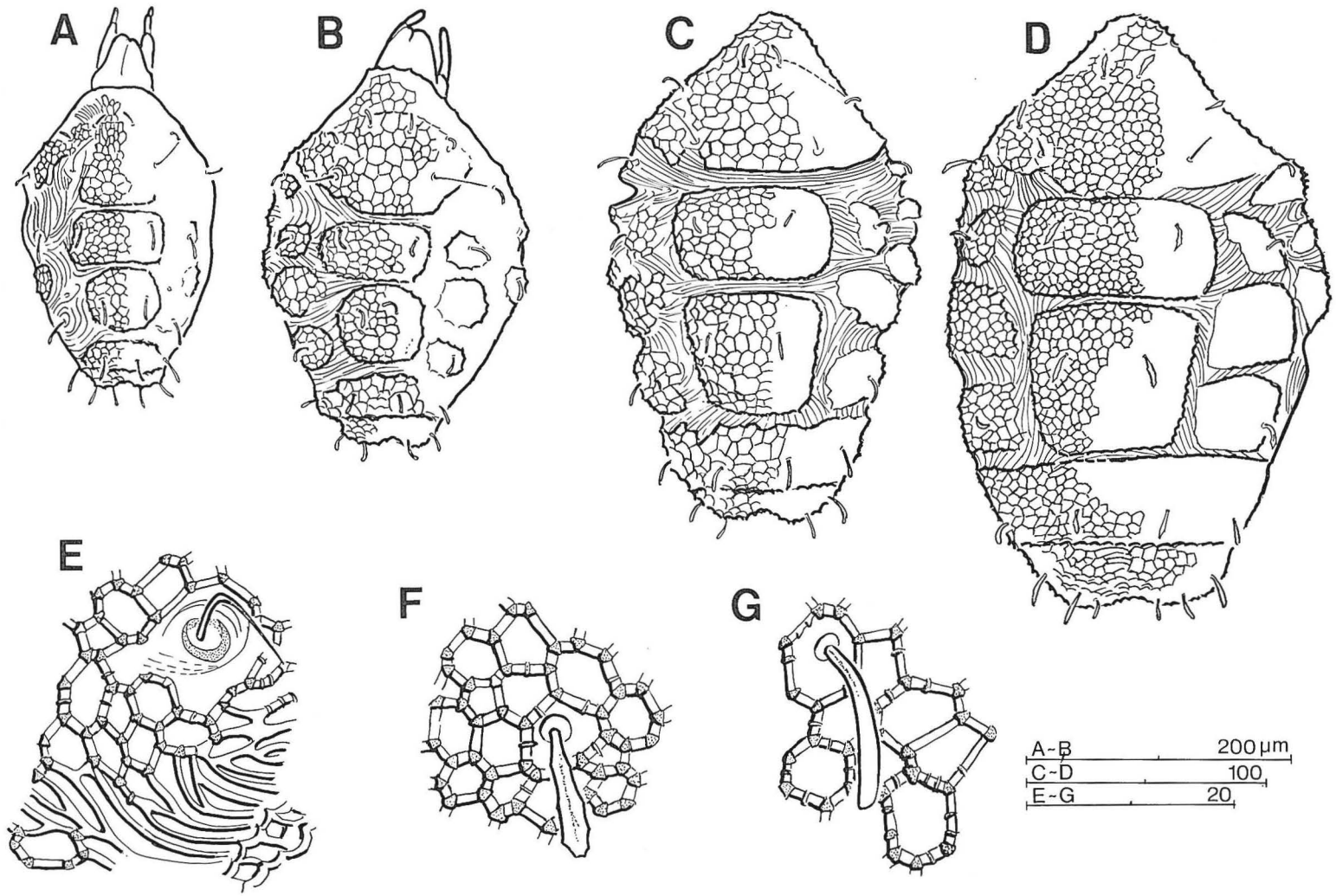


FIG. 4 A-F : *Metalorryia armaghensis* (Baker).
Dorsal views of the larva (A), proto- (B), tritonymphs (C) and adult (D), detail of the sensillus (E) and seta *d2* (F).
FIG. 4 G : *Metalorryia magdalenae* (Gerson).
Dorsal seta *d2* (same orientation and magnification as F).

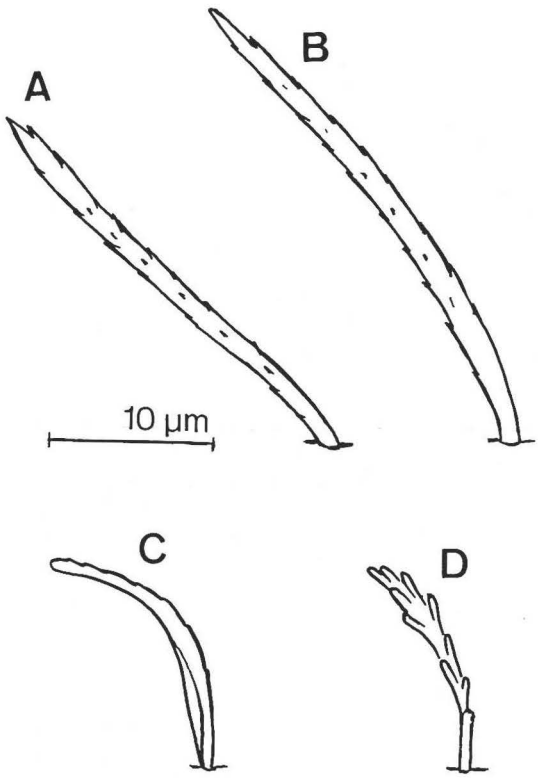


FIG. 5 : Dorsal seta of femur I (antiaxial view) of *Tydeus formosa* Cooreman) (A), *Tydeus stefani* n. sp. (B), *Metalorryia magdalenae* (Gerson) (C) and *Idiolorryia marci* n. sp. (D).

species ; this could be extended to dorsal setae found on different leg segments as shown in fig. 5. Although they are not setae, solenidia also vary in shape and are distinguishing characters for species separation.

The striation pattern is a traditional character used for species separation. According to BAKER's (1965) pioneer work, two major dorsal striation pattern are recognized in Tydeinae : the " Tydeus " type where striae are transverse between dorsal setae (*d2*) and the " Paralorryia " type where striae are longitudinal between setae (*d2*). The striation pattern transforms into a reticulate pattern in some genera and/or species. This pattern is useful in recognizing species. Indeed, reticulations are not necessarily distributed all over the idiosoma and may be restricted to some area (prodorsum, posterior tip of the opisthosoma, around dorsal setae, etc.) depending on the species. Cells forming the reticulate pattern may vary in shape, size or density. However, such variations are sometimes subtle and difficult to depict and, thus require careful and detailed drawings (compare Fig. 1 to Fig. 2). In addition, the reticulate pattern may vary through ontogeny (cf. Figs 1 and 2, cf. also ANDRÉ, 1984). In this context, scanning microscopy, though a fairly exotic technique, might be useful to reproduce accurately the reticulate pattern as suggested by the scanning micrograph of *Lorryia crustata* published by ALBERTI *et al.* (1981) [7].

The ventral face of Tydeinae also exhibits a striation pattern which, so far, has been neglected by most taxonomists. However, BAKER (1970) has used the ventral striation pattern in his revision of the genus *Tydeus*. Another character, also found in ventral face of Tydeinae and neglected by most taxonomists, is the coxal organ. It may vary in shape and turns out to be a useful character as shown by KARG (1973, 1975).

Lastly, the length of the idiosoma, or of any other part of the body, may support the discrimination between species as indicated in table I. However, it must be emphasized that measurements made on specimens mounted in permanent slides are not always reliable. Indeed, such specimens are often more or less flattened, if not twisted, or not mounted in the right orientation, i.e. with the idiosomatic axis parallel to the horizontal plane.

Some other characters indicated in the literature are not reliable at all. For instance, some species have been distinguished depending on whether the gnathosoma is visible from above or not. This character is not consistent at all as the gnathosoma is movable. Indeed, it may be stretched forwards and visible from above, or it may be turned down ventrally and obscured in dorsal aspect. In addition, the relative position of the gnathosoma may vary depending on whether the specimen is more or less flattened in the permanent slide.

Another debatable character is the presence of a third claw, the so-called empodial claw, which has

7. Medium phase contrast photographs of the dorsal reticulate pattern were used by SUMMERS & CHAUDHRI (1965) as a tool for species separation in Cryptognathidae. Unfortunately, dorsal relief is much more marked in Tydeidae (see Fig. 2 H) than in Cryptognathidae and it seems that only SEM is able to give enough depth of focus.

been used as a specific character in some keys. At first sight, the empodial claw should be present in most if not all Tydeinae. A problem arises because in some species it is very small and difficult to see. The presence or absence of an empodial claw is thus a delicate question.

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