THE ORIBATID FAMILY PHTHIRACARIDAE. IV. THE LEG CHAETOTAXY OF *PHTHIRACARUS ANONYMUM* GRANDJEAN

BY

L. VAN DER HAMMEN

(Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands)

Phthiracarus anonymum has been dealt with by GRANDJEAN in several papers. Apart from a specific description (1934), data have been published by him on : notogaster (1950) ; ventral region (1933 *a*) ; numbers of anal, notogastral, genital, and aggenital setae (1949) ; comparative chaetotaxy of the genu (1942) ; solenidiotaxy (1946, 1964), development (1933), and prelarva (1940). A complete description of the leg chaetotaxy of the species is, however, still wanting. According to unpublished observations by GRANDJEAN, the number of setae is considerably reduced, so that a comparison with *P. laevigatus* and *nitens* appeared interesting.

On my request Prof. GRANDJEAN kindly placed a number of topotypic specimens at my disposal. The data of this material are : Mongaillard, Coulounieix (Dordogne), France, July 1939 ; rotten wood from a cellar. — 12 adults. The present paper is entirely based on these specimens. Because detailed descriptions of the idiosoma already exist, our study nearly exclusively deals with the legs. At the end some remarks are given on the importance of a number of characters for a future subdivision of the genus *Phthiracarus*.

A few words must be added here on the way of studying leg chaetotaxy in the Phthiracaroidea. Legs should always be separated from the idiosoma, and orientated in such a way that the plane of pseudosymmetry is exactly horizontal. This is a difficult manipulation in *Phthiracarus* because of the following reasons : (1) the solenidions φI and especially $\sigma_2 I$ are relatively very long and directed slightly laterally so that at least $\sigma_2 I$ must be cut off ; (2) several tarsal setae are not placed in distinct pseudosymmetric pairs ; (3) probably owing to the ptychoid condition, the position of the setae deviates from the normal one ; (4) the number of setae is reduced. In *P. anonymum* difficulties have increased because the subunguinal seta (*s*), which as a rule is in the plane of pseudosymmetry, is lacking in legs II-IV. I may remark that the notation used here is based on

the preceding studies of the legs in *P. laevigatus* and *nitens* ; without these studies a satisfactory notation for *anonymum* would have been impossible.

Description of the legs (figs. 1, 2)

There are slight differences in shape and measurements between legs I-IV. Leg I is distinctly longer and more robust than the other legs. The total length of the legs (from femur to tarsus) decreases from I to IV. Femur I is distinctly longer than II-IV ; genu I and II are slightly longer than III and IV ; tibia I is slightly longer than II, which in its turn is distinctly longer than III and IV ; tarsus IV is smaller than the other tarsi. The trochanteres III and IV are distinctly longer than I and II.

The formulae of the legs are the following.

Setae : I (1 — 3 — 2 — 5 — 15 — 1) ; II (1 — 3 — 2 — 3 — 11 — 1) ; III (2 — 2 — 1 — 2 — 10 — 1) ; IV (2 — 1 — 0 — 2 — 8 — 1).

Solenidions : I (2 — 1 — 3) ; II (1 — 1 — 2) ; III (1 — 1 — 0) ; IV (0 — 1 — 0).

Tarsus I bears 5 eupathidia, viz., (*it*), (*p*), and *s*. Just as in the large *Phthiracarus* species, the other setae can be distinguished into those with curled terminal parts (*tc*, *p*, *u*, *a″*) and those in which the terminal part is straight, although in *anonymum* the differences between the two types are less striking than in *laevigatus* and *nitens*. In this way (*ft*) and (*pv*) are easily recognizable. In the absence of ontogenetic evidence, this character appears to be a practical aid in the homologization of the setae.

There remain, however, difficulties with the curled setae. The number of these setae appears to be reduced : *s* is only present in tarsus I ; *a″* is only present in tarsus I and II ; *a′* is not present.

The setae are not placed in distinct pseudosymmetric pairs. Especially the unguinal setae (*u*) raise difficulties : it appears that the setae of one pair are often slightly differently shaped. As a rule *u′* is more strongly curved and slightly thicker at the base (sometimes resembling a eupathid), although *u′* and *u″* can also be completely similar. The antelateral seta *a″ I* is difficult to observe because it is rather thin and small (smaller than *a″ II*).

Tarsi I-III have the complete pairs of fastigial (*ft*) and primiventral (*pv*) setae ; tarsus IV lacks, however, *ft′* and *pv′*.

Among six specimens I found the following vertitions. In one case *a″ I* was apparently absent from both legs ; in another case only from the left leg. In one specimen the primiventral seta *pv″ I* was absent at the left.

Some of the solenidions are relatively very long, especially the solenidion σ_2 of genu I, and the solenidion φ of tibia I.

It is striking that the leg chaetotaxy of *P. anonymum* is still more reduced than in *P. laevigatus* and *nitens*. The differences concern the following numbers (the

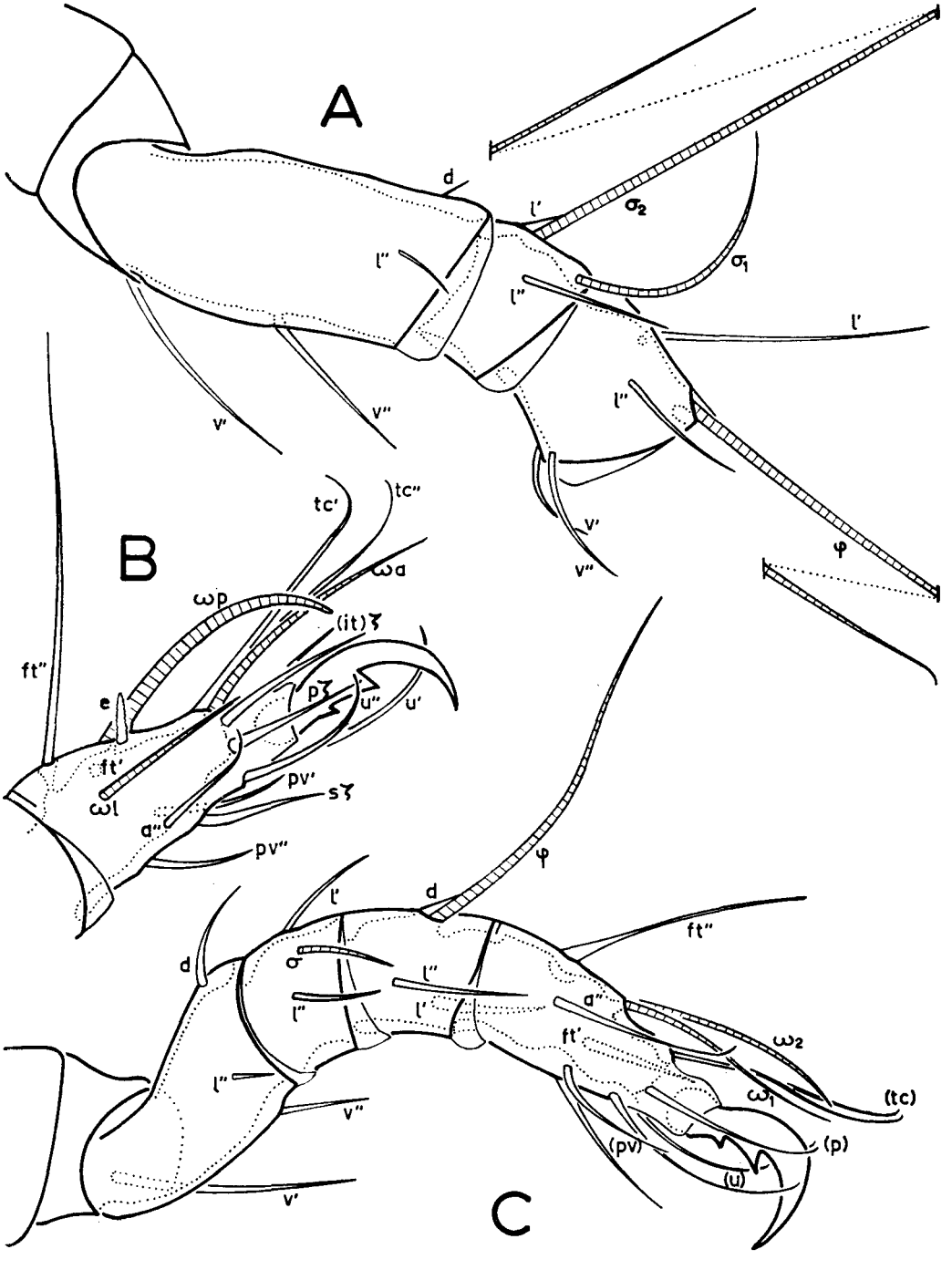

FIG. 1. — *Phthiracarus anonymum* GRANDJEAN, lateral (antiaxial) views of right legs I and II ; A, trochanter, femur, and genu of leg I ; B, tarsus of leg I ; C, leg II ; A-C, × 945.

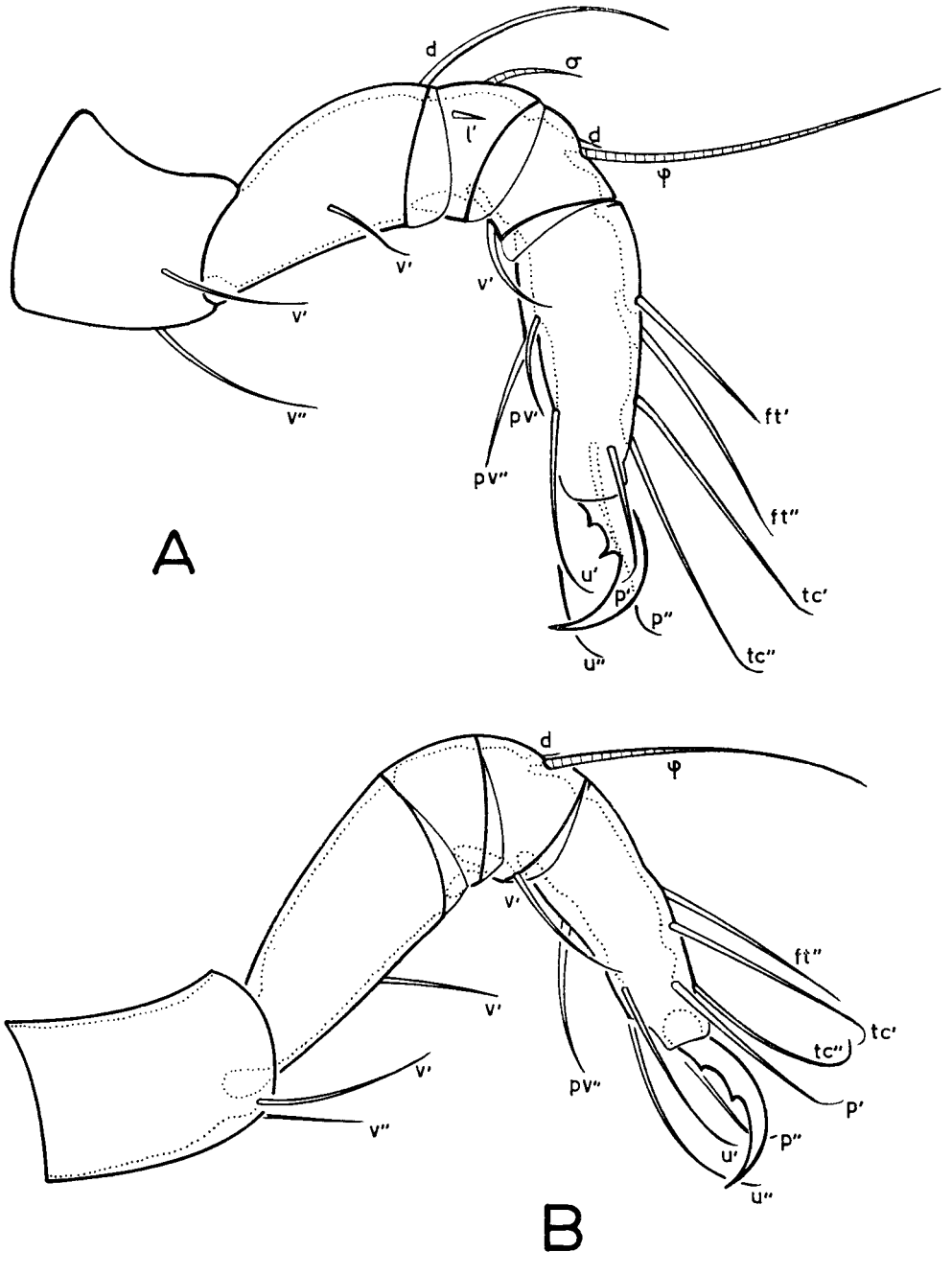

FIG. 2. — *Phthiracarus anonymum* GRANDJEAN, lateral (antiaxial) views of left legs III and IV ; A, leg III ; B, leg IV ; A-B × 945.

numbers for *laevigatus* and *nitens* in brackets) : femur I 3 (4) ; tarsus I 15 (16) ; tarsus II 11 (12) ; genu IV 0 (1) ; tarsus IV 8 (10).

Only leg III has the same number of setae in the three species. Nevertheless, the notation is apparently different. *P. laevigatus* and *nitens* have preserved *s*, *P. anonymum* the primiventral seta *pv''*. In the case of leg IV it appears that *anonymum* has preserved *ft'*, a seta lacking in the two large species.

Characters important for a subdivision of the genus *Phthiracarus*

It is evident that leg chaetotaxy provides important diagnostic characters that probably can be used in a subdivision of the genus *Phthiracarus*. Up to now (cf. van der Hammen, 1963, 1964) the following characters appeared to be useful for such a subdivision : (a) the number of lyrifissures ; (b) the number of vestiges of notogastral setae, and the position of the vestige of f_1 ; (c) the presence or absence of an anterior genital apophysis ; (d) the condition of the adanal setae ad_1 and ad_2 (well-developed or vestigial) ; (e) the chaetotaxy of the legs.

The type of the genus *Phthiracarus* (*P. contractilis*) is undoubtedly closely related to *P. laevigatus* and *nitens*. A subgenus *Phthiracarus* s. str. would consequently be characterized by the following diagnosis : (a) the notogaster of the adult presents four pairs of lyrifissures ; (b) f_1 and f_2 are vestiges, f_1 being situated behind h_1 ; (c) an anterior genital apophysis is distinctly present ; (d) ad_1 and ad_2 are vestiges (or normally developed in vertitions) ; (e) the leg chaetotaxy is as given in previous papers (van der Hammen, 1963, 1964).

P. anonymum is characterized by the following : (a) the notogaster of the adult presents two pairs of lyrifissures ; (b) f_1 and f_2 are vestiges, f_1 being situated in front of h_1 ; (c) a genital apophysis is not present ; (d) ad_1 and ad_2 are normally developed ; (e) the legs present a reduced number of setae in comparison with *Phthiracarus* s. str.

Because the above-mentioned characters are as a rule not dealt with in the existing descriptions, a subdivision of the genus must be postponed till after the redescription of other species.

REFERENCES

Grandjean (F.), 1933. — Étude sur le développement des Oribates. *Bull. Soc. Zool. France*, vol. 58, pp. 30-61, figs. 1-28.

—, 1933 *a*. — Structure de la région ventrale chez quelques Ptyctima (Oribates). *Bull. Mus. Nat. Hist. Nat.* (2), vol. 4, pp. 309-315, figs. 1-4.

—, 1934. — Phthiracarus anonymum n. sp. *Rev. Franç. Ent.*, vol. 1, pp. 51-58, figs. 1-4.

—, 1940. — Observations sur les Oribates (15e série). *Bull. Mus. Nat. Hist. Nat.* (2), vol. 12, pp. 332-339, figs. 1-2.

—, 1942. — La chaetotaxie comparée des pattes chez les Oribates (2e série). *Bull. Soc. Zool. France*, vol. 67, pp. 40-53, figs. 1-2.

—, 1946. — Les poils et les organes sensitifs portés par les pattes et le palpe chez les Oribates. Troisième partie. *Bull. Soc. Zool. France*, vol. 71, pp. 10-29.

—, 1949. — Formules anales, gastronotiques, génitales et aggénitales du développement numérique des poils chez les Oribates. *Bull. Soc. Zool. France*, vol. 74, pp. 201-225.

—, 1950. — Observations sur les Oribates (20e série). *Bull. Mus. Nat. Hist. Nat.* (2), vol. 22, pp. 73-80, figs. 1-2.

—, 1964. — La solenidiotaxie des Oribates. *Acarologia*, vol. 6, pp. 529-556.

HAMMEN (L. VAN DER), 1963. — The Oribatid family Phthiracaridae. II. Redescription of Phthiracarus laevigatus (C. L. Koch). *Acarologia*, vol. 5, pp. 704-715, figs. 1-6.

—, 1964. — The Oribatid family Phthiracaridae. III. Redescription of Phthiracarus nitens (Nicolet). *Acarologia*, vol. 6, pp. 400-411, figs. 1-6.