Bicirronema caledoniense n. gen., n. sp. and *Amphidirhabditis longipapillata* n. gen., n. sp. (Secernentia : Rhabditida), two remarkable soil-nematodes from New Caledonia

István Andrássy

Zoosystematical and Ecological Institute, Eötvös Loránd University, Puskin-u. 3, Budapest, Hungary.

SUMMARY

Two new soil-inhabiting nematode genera and species are described from New Caledonia. *Bicirronema* n. gen. belongs to the family Chambersiellidae and is related to the genera *Chambersiella* and *Geraldius*. It differs, however, so much from these latters that Bicirronematinae n. subfam. is proposed to establish for it. *Amphidirhaditis* n. gen. belongs to the family Rhabditidae but it is also unique within the family differing on subfamily level (Amphidirhabditinae n. subfam.) from the other genera. The type and only species of each new genus, *Bicirronema caledoniense* n. sp. and *Amphidirhabditis longipapillata* n. sp., are also described.

RÉSUMÉ

Bicirronema caledoniense *n. gen., n. sp. et* Amphidirhabditis longipapillata *n. gen., n. sp. (Secernentia : Rhabditida), deux nématodes du sol remarquables de Nouvelle-Calédonie*

Deux nématodes du sol provenant de Nouvelle-Calédonie et représentant chacun un nouveau genre de Rhabditida sont décrits et figurés. *Bicirronema* n. gen. appartient aux Chambersiellidae et est proche des genres *Chambersiella* et *Geraldius ;* il en diffère cependant par des caractères si particuliers (cirres labiales au nombre de deux seulement, absence de soies labiales, lèvres nettement séparées les unes des autres, etc.) qu'il est proposé la création d'une nouvelle sous-famille (Bicirronematinae n. subfam.) comprenant uniquement *Bicirronema* n. gen. Un réarrangement des six genres et des trois sous-familles composant les Chambersiellidae est également présenté.

Amphidirhabditis n. gen. appartient aux Rhabditidae mais présente lui aussi des caractères le différenciant très nettement des autres genres : structure particulière de la cavité buccale, amphides très développées, bursa de forme spéciale, etc. Aussi une nouvelle sous-famille (Amphidirhabditinae n. subfam.) est-elle proposée pour y classer uniquement ce genre. Une liste des huit sous-familles composant la famille des Rhabditidae est donnée.

Les espèces types, et uniques, de chacun des nouveaux genres sont également décrites (*Bicirronema caledoniense* n. sp. et *Amphidirhabditis longipapillata*, n. sp.).

There is no doubt that the nematode fauna of the Archipelago of the Southern Pacific comprises numerous curiosities in taxonomic sense, still it has been hardly investigated hitherto. That novelties of generic level, too, can be found in that interesting area that was demonstrated by one of my recent papers (Andrássy, 1973). I have described in it three new genera *(Papuaphelenchus, Thalassogenus, Adenolaimus)* from New Guinea, one of them being probably even a marine residual. Recently, two further genera were discovered in the material collected by Dr. J. Balogh on his expedition in New Caledonia, which not only proved to be new for science but represent each a new subfamily, too.

The descriptions of the new genera, their type species and the new subfamilies are as follows.

Bicirronema n. gen.

Chambersiellidae, Bicirronematinae n. subfam. Cuticle annulated with simple lateral fields. Cephalic region composed of six lips separated by deep furrows each from the others and of two median cirri. Stoma divided in two parts : a wider anterior chamber (promesostom) and a narrowing posterior funnel (meta-+ telostom). Cheilostom not cuticularized ; metastom with small denticle-like projections. Oesophagus strongly developed, corpus long and cylindrical, isthmus short, terminal bulb valvulated. Excretory pore and nerve ring at level of the œsophagus corpus. Intestine with a definite prerectal portion. Vulva posterior, gonad one, prodelphic but extending back. *Receptaculum seminis* and post-vulval uterine sac present. Spicules weakly cuticularized, not fused distally, gubernaculum simple. Genital region of male carrying paired pre- and postanal papillae but no bursa. Tails of both sexes similar, short, conoid, ending in arrow-like tip. Phasmids distinct.

TYPE SPECIES : *Bicirronema caledoniense* n. sp.

Although *Bicirronema* has a quite alone-standing cephalic region and a number of other special characteristics — structure of mouth cavity, nerve ring surrounding the oesophagus corpus, presence of a prerectum, peculiar tail terminus — it seems to be related to the members of the family Chambersiellidae. The presence of cirri and a spacious stoma, the shape of oesophagus, spicules and phasmids, as well as the structure of the female genital apparatus are all characteristics which give reason for placing our new genus in the family Chambersiellidae. Among the representatives of this family there are two genera, *Chambersiella* Cobb, 1920 and *Geraldius* Sanwal, 1971 which are also characterized by labial cirri. They are closely related and have a number of common morphological features : six cephalic cirri, six bristle-like labial papillae, heavily sclerotized, mandible-like cheilorhabdions, posterior amphids, hooked tail terminus, etc. On the basis of their common characteristics I proposed (1976) to unite them in the subfamily Chambersiellinae and to separate them from the Macrolaiminae, the other group of genera within the family.

The new genus can be separated from both genera of the subfamily Chambersiellinae by the following characteristics : cirri only two, labial bristles absent, lips deeply segregated, mouth cavity of other type, amphids indistinct, nerve ring and excretory pore more forward, prerectum present, male genital papillae less in number and tail other shaped. On the basis of these differences it seems to be advisable to separate *Bicirronema* n. gen. on subfamily level from *Chambersiella* and *Geraldius*.

The new subfamily, Bicirronematinae n. subfam. has the characters of its type genus and can be separated by the above mentioned features from the related subfamily, Chambersiellinae Thorne, 1937.

The family Chambersiellidae would consist thus of the following subfamilies and genera :

Fam. Chambersiellidae Thorne, 1937
- Subfam. Chambersiellinae Thorne, 1937
  - *Chambersiella* Cobb, 1920
  - *Geraldius* Sanwal, 1971
- Subfam. Bicirronematinae n. subfam.
  - *Bicirronema* n. gen.
- Subfam. Macrolaiminae Sanwal, 1971
  - *Diastolaimus* Rahm, 1928
    - Syn. *Santafea* Massey, 1963
  - *Macrolaimellus* Andrássy, 1966
  - *Macrolaimus* Maupas, 1900
    - Syn. *Seleneella* Rahm, 1932

Bicirronema caledoniense n. sp. (Fig. 1, A-K)

DIMENSIONS

Holotype, female : L=0.86 mm ; a=25 ; b=2.6 ; c=30 ; V=70%.

Allotype, male : L=0.76 mm ; a=23 ; b=2.6 ; c=23.

Females (n=4) : L=0.76-0.88 mm ; a=22-26 ; b=2.6-2.8 ; c=22-33 ; V=70-72%.

Males (n=5) : L=0.67-0.78 mm ; a=23-28 ; b=2.6-2.8 ; c=21-24.

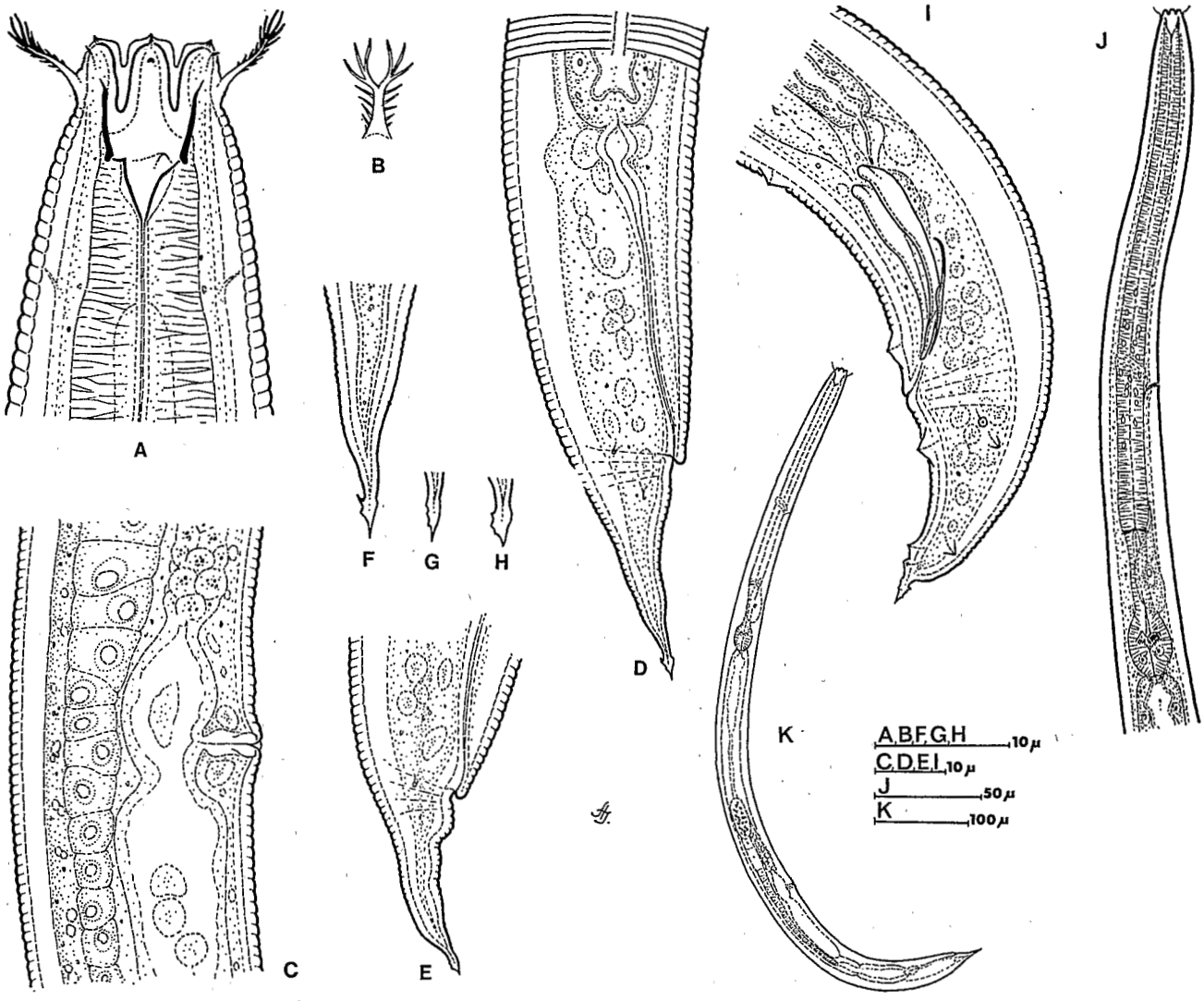

Fig. 1. *Bicirronema caledoniense* n. gen., n. sp. A : Anterior end, lateral ; B : Cirrus, dorso-ventral ; C : Vulva region ; D : Posterior end of female ; E : Tail of female ; F, G, H : Tail tips of different females ; I : Posterior end of male ; J : Oesophageal region ; K : Entire view of female.

Description

Cuticle finely striated, loose, on the mid-body region 1.3-1.5 µm thick ; striae 1.2-1.4 µm broad. Lateral field simple, consisting of two incisures and reaching to the middle of the tail length.

Head 10-12 µm wide, slightly set off, with six broadly rounded lips which are separated by deep furrows each from the other and bear two circles of small, pointed papillae. Between the submedian lips an antler-shaped cirrus arises on both side of the head. They are 6-7 µm long and armed with fine branches or fringes (Fig. 1B). Amphids inconspicuous, on the lateral lips.

Stoma consisting of an anterior broader chamber (promesostom) and a posterior narrower funnel (meta-+telostom) ; the anterior part is 8-9 µm long (from the lips) and 6-7 µm wide, the total length of the mouth cavity 13-15 µm. Cheilostom insignificant, not

cuticularized, pro- and mesostom fused and heavily cuticularized. Metastom with a small dorsal tooth-like projection and two subventral swellings. Prostom free, meso-, meta- and telostom surrounded by oesophageal tissues.

Oesophagus unusually long, 36-38% of the total body length, with three parts well separated. Corpus very long, 76-79% of the length of œsophagus and about seven times as long as isthmus. Bulbus well developed, 24-28 µm long, with cuticularized valvular apparatus. Cardia small. Excretory pore at the posterior third of the corpus, at 50-58% of the oesophagus length. Nerve ring just before the excretory opening, surrounding the corpus. (This is a rather rare phenomenon within the order Rhabditida, since almost in every case it is the isthmus or the intermediate region between corpus and isthmus which is encircled by the nerve ring). Lumen of intestine with sclerotized walls. About one and a half body lengths before rectum the intestine is marked by a constriction, so that its hindmost portion can be considered as a prerectum. Rectum strikingly long, 47-53 µm, 3.7-4.5 times as long as the anal diameter of body.

Vulva lips small, vagina 10-12 µm long, occupying 1/4 of the corresponding body diameter. Gonad one, prodelphic, extending back almost to prerectum. *Receptaculum seminis* present, large, oval, between ovary and oviduct. Post-uterine sac 75-88 µm long, i.e. 2.3-2.5 vulval body diameters.

Testis single. Spicules 28-32 µm long, slightly bent ventrally, distally not joined. Gubernaculum relatively strongly cuticularized, 16-18 µm long, simple. Eight pairs of genital papillae, of which three pairs pre-, five pairs postanal. Of the preanal pairs, the first lies just before the cloacal opening, the second somewhat before the proximal ends of the spicules, and the third two body widths before the second one. Of the postanal pairs three papillae are subventral, one is sublateral and one subdorsal. All papillae are finely pointed.

Tails of both sexes similar in habit, that of female 26-30 µm long, 1.8-2.3 times as long as anal body width, that of male 32-35 µm long, 1.5-1.8 times as long as the width of the anal body region. Female tail mostly straight, male tail slightly curved ventrally. On both sexes the tail is terminated in a peculiar, arrow-like tip. Phasmids conspicuous, at level of anus or somewhat before that.

Holotype, female, on the slide No. NC-7932 ; *allotype*, male, on the slide No. NC-7934. Type and paratype specimens (4 females, 5 males and 1 juvenile) in the collection of the author.

Type habitat and locality: Wet litter from a rain forest at 700 m above sea-level, Mt. Ounda, Pomerihue, New Caledonia ; collected in October 1969 by Dr. J. Balogh.

Further specimens: Litter from a mixed palm-bamboo forest, Mt. Mandjéla (3 females, 2 juveniles), and soil from a primary rain forest, Mt. Koghi (8 females, 1 male), both localities in New Caledonia, collected in February 1977 by Dr. J. Balogh.

Amphidirhabditis n. gen.

Rhabditidae, Amphidirhabditinae n. subfam. Cuticle smooth, lateral fields narrow. Lips six, hardly differenciated, with two circles of bristle-like papillae. Amphids conspicuous, large, at level with promesostom. Stoma very characteristic : cheilostom cuticularized, composed of six pairs of cheilorhabdions widening anteriorly ; promesostom fused, well cuticularized, relatively short ; metastom with three flattened swellings each bearing a large spoon-shaped projection (tooth) ; telostom short. Oesophagus with swollen corpus and strong terminal bulb. Female gonads paired and symmetrical. *Receptacula seminis* present. Spicules fused distally, gubernaculum simple. Bursa leptoderan, with notched margin. Papillae long, arranged in three groups. Tails of both sexes very long, filiform. Phasmids large.

TYPE SPECIES : *Amphidirhabditis longipapillata* n. sp.

In general organization the new genus conforms to the conditions of the family Rhabditidae, it has, however, some characteristics that distinguish it from all genera of this family. These are : the peculiar building of

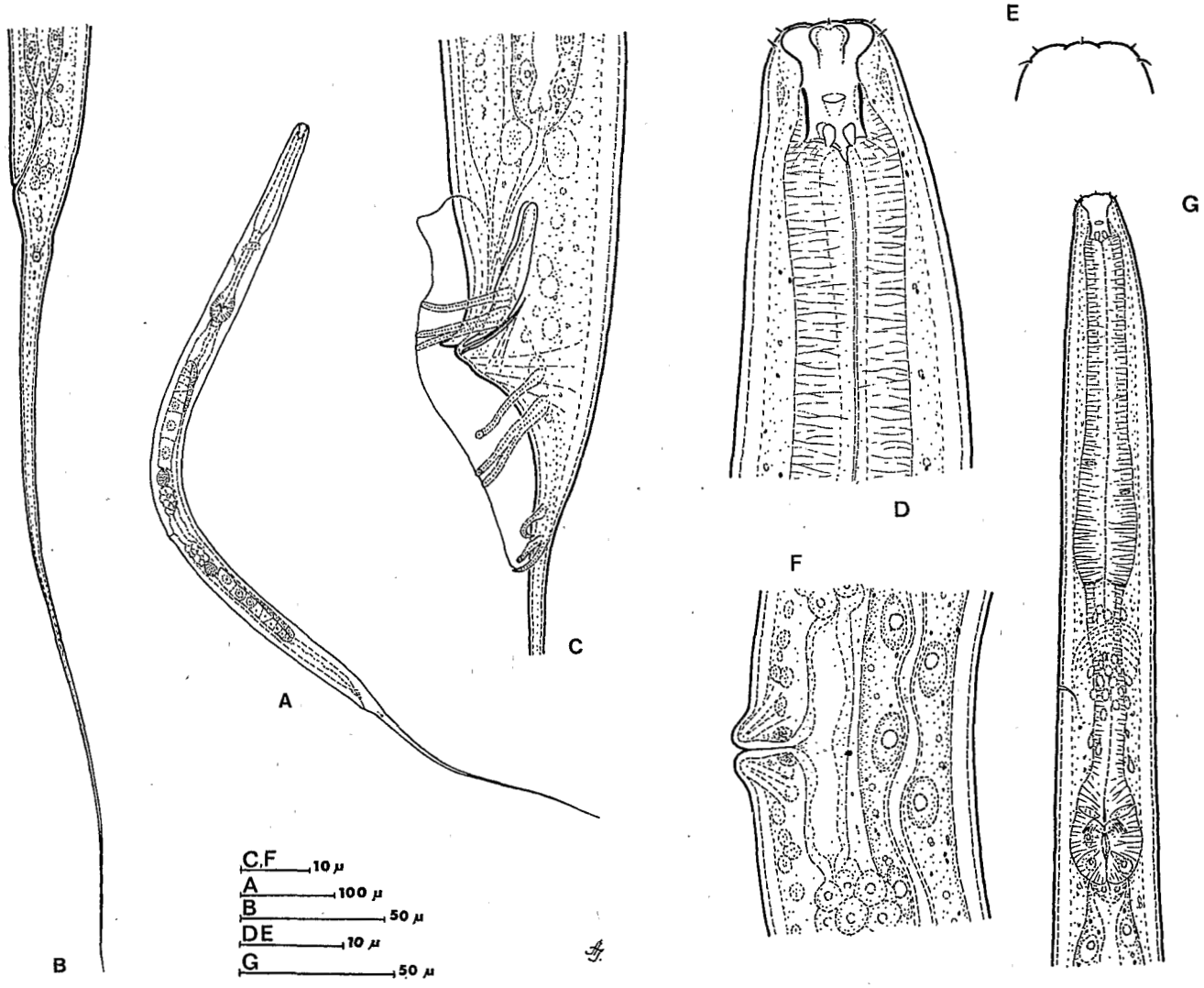

Fig. 2. *Amphidirhabditis longipapillata* n. gen., n. sp. A : Entire body of female ; B : Tail of female ; C : Anal region of male ; D : Anterior end of female ; E : Arranging of papillae on male head ; F : Vulva region ; G : Oesophageal region.

the mouth cavity (cheilostom cuticularized and arched specially, promesostom very short, metastom with unusual teeth), the large amphids and their position, and the shape of bursa. Only the genus *Colporhabditis* Andrássy, 1976 shows in the cheilostom a similar appearance, but *Amphidirhabditis* can be separated by a number of characteristics from it, too (lips not set off, without cuticularized furrows or borders, stoma much shorter, amphids large, metastomatal teeth different in shape, tail filiform, etc.). As for the amphids, a few species of the Rhabditidae have been described showing conspicuous amphids (e.g. *Rhabditis friderici* Hirschmann, 1952), *Amphidirhabditis* can be distinguished however from all of them by the posterior position of these organs (lying behind the middle of stoma). Having so numerous and essential distinguishing characteristics I propose to separate *Amphidirhabditis* n. gen. on subfamily level from all other genera of the family Rhabditidae.

The new subfamily, Amphidirhabditinae n. subfam. is characterized by the data given for its type and unique genus.

Thus, the family Rhabditidae can be divided into the following subfamilies :
Protorhabditinae Dougherty, 1955 : 5 genera (see Andrássy, 1976).
Mesorhabditinae Andrássy, 1976 : 6 genera.
Peloderinae Andrássy, 1976 : 5 genera.
Rhabditinae Örley, 1880 : 8 genera.
Ablechroiulinae Andrássy, 1976 : 2 genera.
Stomachorhabditinae Andrássy, 1970 : 1 genus.
Amphidirhabditinae n. subfam. : 1 genus.
Diploscapterinae Micoletzky, 1922 : 1 genus.

Amphidirhabditis longipapillata n. sp. (Figs. 2, A-G)

DIMENSIONS

Holotype, female : L=1.02 mm ; a=30 ; b=4.4 ; c=3.8 ; V=46%.

Allotype, male : L=0.92 mm ; a=28 ; b=4.6 ; c=4.6.

DESCRIPTION

Cuticle smooth, only about 1 µm thick. Lateral field narrow, 2.5-3 µm broad, 1/13-1/14 of the mid-body diameter, with two incisures.

Head 12-13 µm wide, broadly rounded, not set off in any manner. Lips six, low, hardly differenciated, papillae fine bristle-like, in two circles, the posterior ones a little longer and directed on female forward, on male, however, backward. Amphids large, 3-3.5 µm wide, oval, relatively far (7-10 µm) from the lips, in level of the promesostom, i.e. behind the middle of the stoma ; both on female and male easily remarkable.

The constitution of the mouth cavity is rather unusual. Cheilostom wide, about as long as promesostom ; cheilorhabdions cuticularized and consisting of six double, distal broadly widened arches (Fig. 2D). Promesostom heavilier sclerotized than cheilostom, relatively very short, about as long as wide (6-7 µm), surrounded by an oesophageal collar ; mesorhabdions somewhat diverging proximally. Metastom with three flattened swellings, each bearing a large but only slightly cuticularized spoon-shaped outgrowth (tooth). Telostom short, dorsal with a very small tooth-like projection.

Oesophagus composed of the three usual regions, of which the corpus is the longest : it occupies 54-56% of the total length of the oesophagus. Metacorpus conspicuously swollen. Isthmus about twice as long as the correspondent body diameter, nerve ring encircles its anterior half. Terminal bulb in female 33 µm, in male 26 µm long, with strongly developed valvular apparatus and three gland nuclei. Excretory pore at the middle of isthmus. Intestine with large cell nuclei and cuticularized intima. Rectum 1.5 times as long as anal-body width.

Female genital organs paired. Vulva lips projected, vagina occupying 1/3 of the correspondent body width. Ovaries reflexed dorsally. A globular *receptaculum seminis* between each ovary and oviduct. Egg cells mostly in a single file.

Spicules slightly cuticularized, almost straight, equal in size, 23-24 µm long, probably fused distally. Gubernaculum thin, 12 µm long. Bursa leptoderan, well developed, characteristically undulated, both anteriorly and posteriorly closed. Nine pairs of papillae arranged in three groups ; three pairs pre- and six pairs postanal. The 2nd and 3rd, as well as the 5th and 6th papillae are fused proximally ; the 4th, 7th and 8th papillae do not reach to the margin of the bursa. The longest papillae measure 18 µm. Sperms large, globular, 5-6 µm.

Tails of both sexes very long, filiform ; that of female 270 µm long and 15 times as long as anal-body width, respectively, that of male 200 µm long. Phasmids large, 23-25 µm or 1.2-1.3 anal body diameters from the anal opening.

Holotype, female, on the slide No. NC-7942 ; *allotype*, male, on the slide No. NC-7932 ; both specimens in the author's collection.

Type habitat and locality: Wet litter from rain forest at 700 m above sea-level, Mt. Ounda, Pomerihue, New Caledonia, collected in October 1969 by Dr. J. Balogh.

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REFERENCES

ANDRÁSSY, I. (1973). Ein Meeresrelikt und einige andere bemerkenswerte Nematodenarten aus Neuguinea. *Opusc. Zool. Budapest,* 12 : 3-19.

ANDRÁSSY, I. (1976). *Evolution as a basis for the systematization of nematodes.* Akadémiai Kiado, Budapest, 288 p.

COBB, N. A. (1920). One hundred new nemas. Type species of 100 new genera. *Contrib. Sci. Nematol., Baltimore,* 9 : 217-343.

SANWAL, K. C. (1957). Chambersiellidae n. fam. (Nematoda) with emended diagnosis of the genus *Chambersiella* Cobb, 1920, description of *C. bakeri* n. sp. and discussion of taxonomic position. *Canad. J. Zool.,* 35 : 615-621.

SANWAL, K. C. (1971). *Geraldius* n. gen., Macrolaiminae n. subfam., with a revision of the subfamilies and genera of Chambersiellidae (Nematoda). *Canad. J. Zool.,* 49 : 965-967.

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