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On the Identity of the Genus *Crassolabium* Yeates, 1967 (Dorylaimida: Qudsianematidae)

Reyes Peña-Santiago,[1] Marcel Ciobanu[2]

Abstract: The identity and taxonomy of the genus *Crassolabium* are discussed based on examination of material of *C. australe*, its type species and its comparison with Iberian species of close genera. The existence of refractive masses (thickenings) at the inner core of lateral lips, the most distinctive diagnostic feature of *Crassolabium*, is considered to be of minor taxonomical significance because of its interspecific and even intraspecific variability. It is concluded that *Crassolabium* and *Thonus* are identical, and a reversal of precedence among both genera is suggested. *Crassolabium australe* is re-described, and some comments are provided on *C. robustum*, the second species in the genus.

Key words: *Crassolabium australe*, *Crassolabium robustum*, morphology, synonymy, taxonomy, *Thonus*.

Yeates (1967) described the new genus *Crassolabium*, with *C. australe* as its type and only species, under Dorylaiminae. This taxon has been matter of discussion and controversy almost since its description. Siddiqi (1969) regarded it as a synonym of *Eudorylaimus* Andrássy, 1959. Andrássy (1976) retained it as valid genus under Qudsianematidae, later (1986) transferred *C. australe* to *Thonus* Thorne, 1974 and, in 1990, considered *Crassolabium* to be a junior synonym of *Discolaimium* Thorne, 1939. Finally, according to Jairajpuri and Ahmad (1992), *Crassolabium* is a valid genus. In all cases, no or weak arguments were given by the respective authors to support their opinions and decisions.

Crassolabium australe has never been reported after its original description, and no additional information on its morphology and taxonomy was available during the last 40 years. The main aim of this contribution is to discuss and clarify both the identity and the taxonomy of this taxon based on new evidence.

Materials and Methods

Type material of *C. australe*, consisting of three females, was available for study by courtesy of two New Zealand colleagues (Drs. T. Crosby and Zeng Qi Zhao). Unfortunately, only one out of the three female paratypes was in good condition and allowed a detailed study. The remaining two females were in bad condition, not allowing their critical examination.

For comparative purposes, Iberian material of four dorylaimid species belonging to three genera (*Aporcelaimellus* Heyns, 1965, two species; *Labronema* Thorne, 1939 and *Thonus* Thorne, 1974) was studied. This material was collected on 10 December 1994 from a pine forest (*Pinus silvestris*) located at an altitude of 1,300 to 1,500 m in Navacerrada, Segovia province, central Iberian Peninsula (Spain).

Microphotographs were taken with a Nikon Eclipse 80i light microscope provided with differential interference contrast optics (DIC) and with a Nikon Digital Sight DS-U1 camera.

The fourth edition of the International Code of Zoological Nomenclature (*ICNZ*) was consulted for nomenclatorial purposes (http://www.iczn.org/iczn/index.jsp).

Results and Discussion

On Crassolabium and their relatives: Yeates (1967) defined the new genus as follows (p. 773): "Dorylaiminae. Lip region offset, lateral lips each with two thickenings in their outer portion. Spear dorylaimoid, spear extensions simple. Oesophagus dorylaimoid. Spicules dorylaimoid. Supplements comprising adanal pair and contiguous ventromedian series. Tails of sexes similar." *Crassolabium* was characterized "by the presence of paired thickenings in each lateral lip . . . " and briefly compared with the genera *Pungentus* and *Dorylaimellus* because both of these have perioral refractive pieces or platelets, a particular differentiation of anterior end of cheilostom which is completely different from the labial thickenings observed in *Crassolabium*.

Our examination of one female paratype of *C. australe* revealed (Fig. 1) the presence of two small, close-together refractive masses at the inner core of both lateral lips, totally lacking in subdorsal and subventral lips, thus confirming Yeates' observations. The precise nature of these structures has not been determined and should be the subject of further studies (see below). Andrássy (1990), justifying his proposal of synonymy of *Crassolabium* with *Discolaimium*, stated that "thickening-like structures in lips are fairly common in different genera in Qudsianematidae, and they are rather optical features than sclerotized pieces." Andrássy's opinion is

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[1] Departamento de Biología Animal, Vegetal y Ecología, Universidad de Jaén, Campus "Las Lagunillas" s/n, Edificio B3, 23071- Jaén, Spain.
[2] Institute of Biological Research, Department of Plant and Animal Taxonomy and Ecology, Str. Republicii 48, RO-400015 Cluj-Napoca, Romania.
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E-mail: icb@cluj.astral.ro
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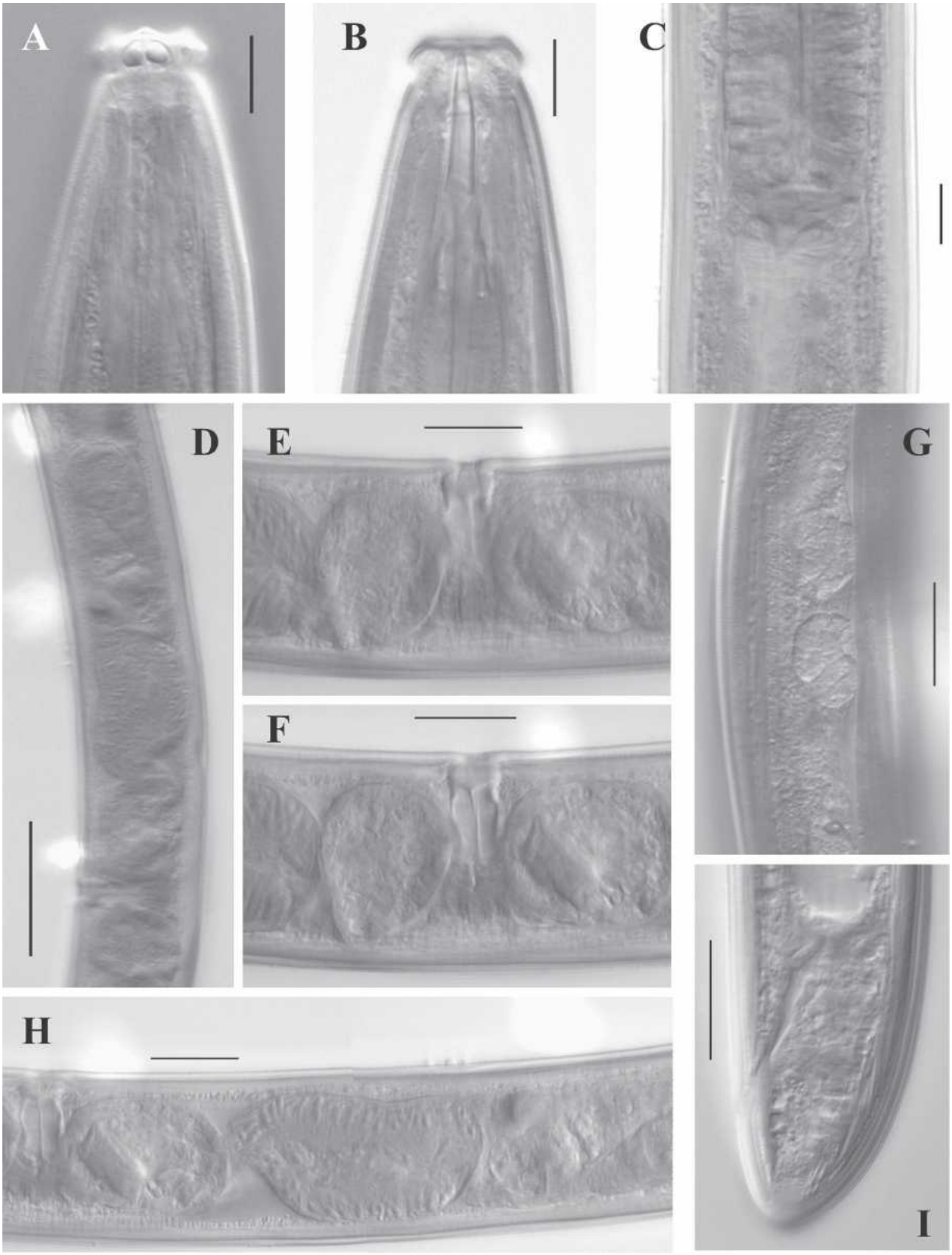

FIG. 1. *Crassolabium australe* Yeates, 1967 (female). A: Lip region in lateral surface view showing two refractive masses at inner core of lateral lip. B: Same in lateral median view. C: Pharyngeal base and cardia. D: Anterior genital branch. E: Vagina in more surface view. F: Same in more median view. G: Lateral field. H: Anterior genital branch in more detail. I: Caudal region in lateral median view (Scale bar A–C = 10 μm; D = 50 μm; E–I = 20 μm).

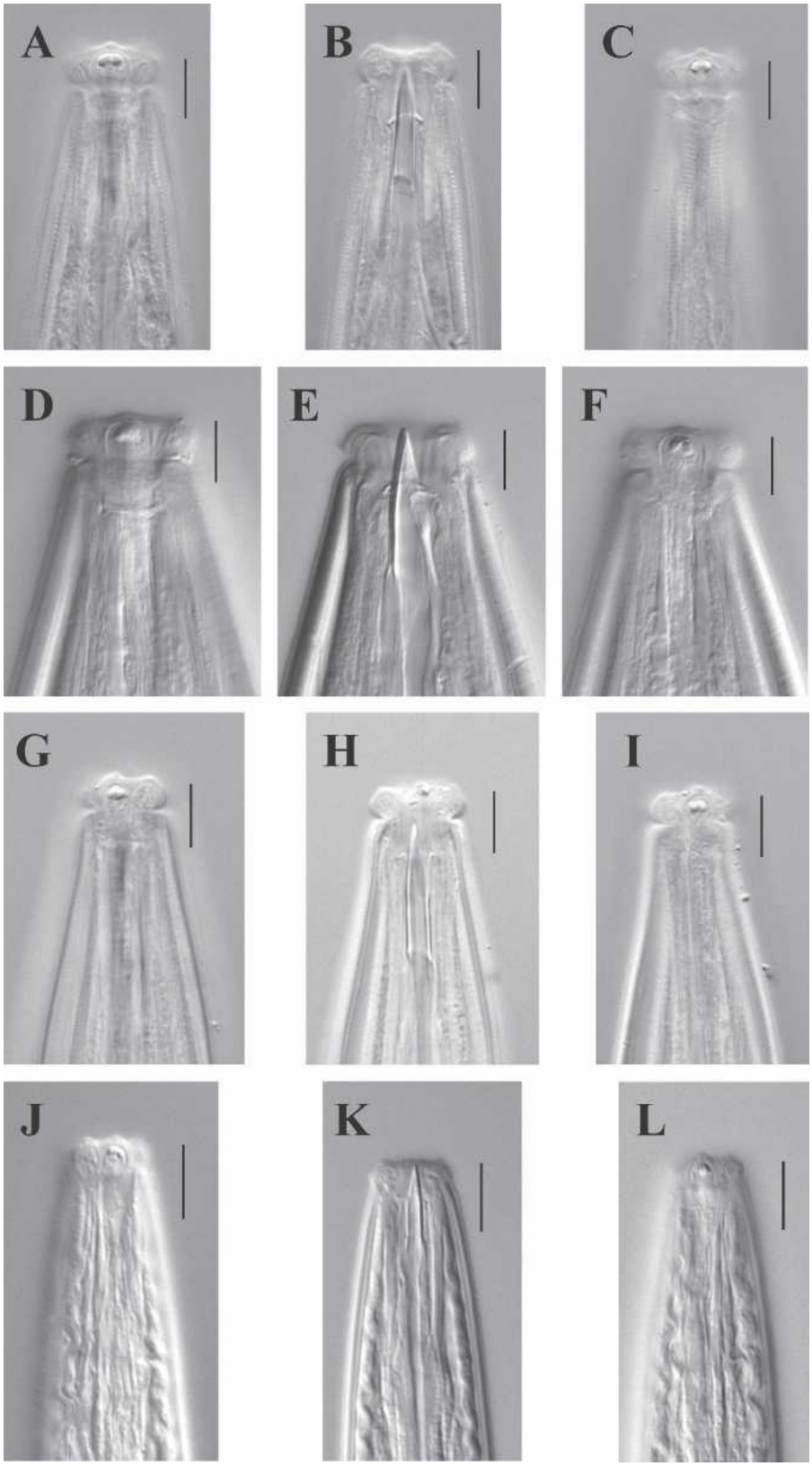

FIG. 2. Lip region in lateral surface view and median view, showing the aspect of intracuticular thickenings in *Labronema* sp. (A–C), two species of *Aporcelaimellus* sp. (D–F and G–I), and *Thonus* sp. (J–L). A, D, G, J: Left lateral lip in submedian view. B, E, H, K: Lateral medium view of the corresponding specimen. C, F, I, L: Right lateral lip in submedian view of the corresponding specimen (Scale bar = 10 µm).

confirmed in most part by our recent observations of the Iberian material in which comparable refractive structures inside both lateral lips are also very conspicuous (Fig. 2). Nevertheless, these structures are highly variable in consistency among the different species and even among the specimens belonging to the same species (Fig. 3), and they never reach the development observed in the sole specimen examined of *C. australe*.

The presence of such refractive masses simultaneously in four species collected at the same time (and in the same locality) suggests that this feature might be the result of the processing method (including killing, fixation and mounting). On the other hand, the intraspecific variability observed in this feature also indicates that it might be influenced by the individual condition of each nematode. Nevertheless, relevant questions remain. Why do only the lateral lips show this modification or alteration? Do the lateral lips have any peculiar differentiation, either anatomical or physiological, which distinguishes them from the other lips? According with Yeates (1967, p. 775, Fig. 9C), the lateral lips are about twice as large as subventral and subdorsal lips, and the relationship between the lip size and the presence of the inner refractive masses might be matter of further study. It is obvious that the existence of refractive masses in the lateral lips of Qudsianematidae species is not an exceptional feature (cf. Andrássy, 1990) and that they may occur in other dorylaims as well (e.g., *Aporcelaimellus* species). Moreover, the intrageneric (and even intraspecific) variability observed in this character suggests that it might not have a significant taxonomical weight, and, as a consequence, its diagnostic value is questionable.

Putting aside the labial thickenings (refractive masses), the original diagnosis of *Crassolabium* does not include any peculiar autapomorphy or apomorphy since it is characterized by having, among other features (see Fig. 2 and the re-description of *C. australe*, below): lateral chords with abundant glandular bodies, lip region offset by depression, odontostyle moderately robust, guiding ring simple, female genital system didelphic, *pars refringens vaginae* with two separated pieces, vulva longitudinal, tail short convex conoid and males with contiguous ventromedian supplements and hiatus. This diagnosis fits that of *Thonus* well (see new data provided by Peña-Santiago and Ciobanu, 2007), mainly the aspects concerning odontostyle and tail morphology, but also those referring to the presence of glandular bodies in the lateral chords, *pars refringens vaginae*, vulva longitudinal and contiguous ventromedian supplements, that, although not usual in *Thonus* species, do occur. Thus, *Crassolabium* and *Thonus* are herein regarded as synonyms (cf. Andrássy, 1986).

As mentioned in the introductory section, Andrássy (1990) considered *Crassolabium* to be synonymous to *Discolaimium*, but the diagnostic features of the former do not fit those of the latter: (i) Body moderately slender (a = 22–32; vs. slender to very slender in *Discolaimium* species, very exceptionally $a < 32$); (ii) Lip region

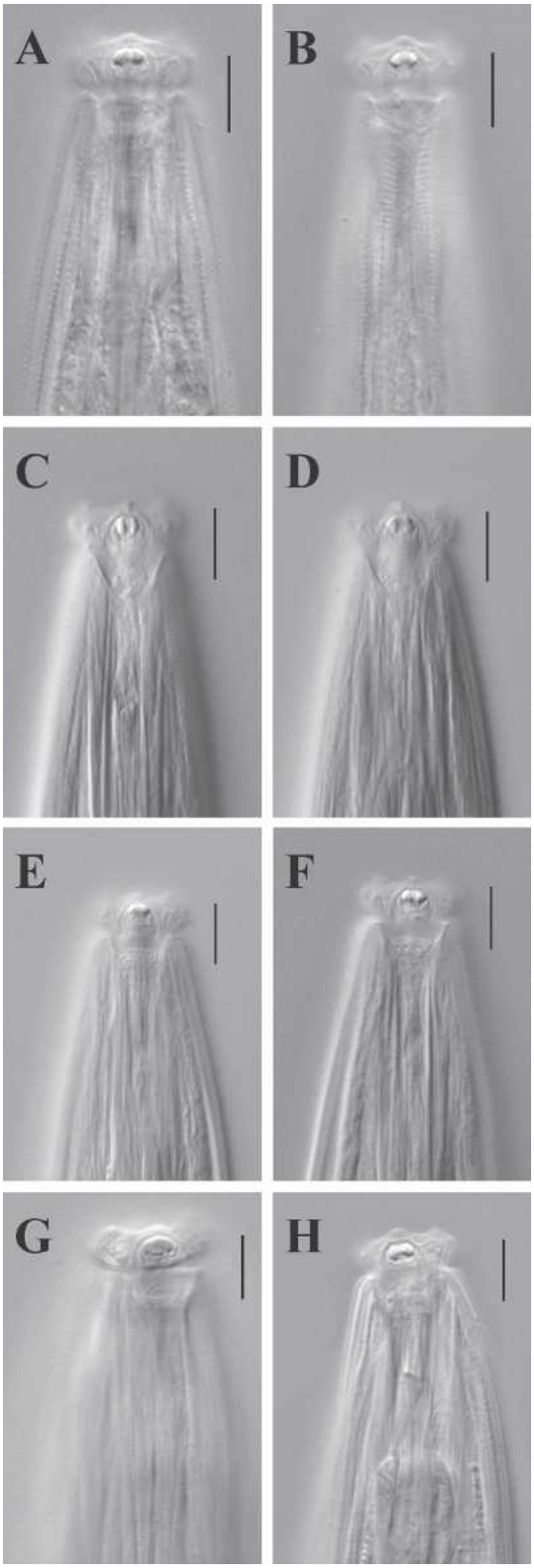

FIG. 3. Lip region in lateral surface view, showing the variation in the aspect of intracuticular thickenings (right and left lateral lip) in four specimens of *Labronema* sp. (Scale bar = 10 μm).

offset by marked depression (vs. deep constriction) and not expanded (vs. expanded, sometimes discolaimoid); (iii) Vagina not comparable in both taxa: *pars refringens* present, even wider than adjacent *pars proximalis* (vs. absent in *Discolaimium*) and *pars distalis* poorly demarcated (vs. a distinct tube-like section); (iv) Vulva longitudinal (vs. transverse); and (v) Supplements spaced. According to Andrássy (1990), the males of *Discolaimium* are known in only two out of 21 species (*D. cylindricum* Thorne, 1939 and *D. latum* Thorne, 1939). They bear three and five widely spaced ventromedian supplements, respectively. On the contrary, *C. australe* has 11 to 14 contiguous (cf. Yeates, 1967) ventromedian supplements, although Yeates' Fig. 9I shows spaced (but close together) supplements.

Precedence among Crassolabium and Thonus: Assuming that *Crassolabium* and *Thonus* are identical, it is evident that the former should be considered the senior (older) synonym and the latter its corresponding junior (younger) synonym, if the criterion of priority of date is taken into consideration. Nevertheless, the International Commission of Zoological Nomenclature (ICZN) admits some exceptions to this general rule, including one that might apply to this case. In its Article 23.9.3, the ICNZ (1999) states that "If the conditions of 23.9.1 are not met but nevertheless an author considers that the use of the older synonym or homonym would threaten stability or universality or cause confusion, and so wishes to maintain use of the younger synonym or homonym, he or she must refer the matter to the Commission for a ruling under the plenary power [Art. 81]. While the case is under consideration use of the junior name is to be maintained [Art. 82]."

The reversal of precedence might be justified in this case: (i) The name *Thonus* identifies a highly diversified taxon (more than 40 species are currently named with this generic substantive; see Jairajpuri and Ahmad, 1992), meanwhile *Crassolabium* is a poorly known and seldom used name, with only two species; (ii) *Thonus* is a name that identifies a worldwide-distributed taxon, recorded in many (50) bibliographic references on taxonomical, faunistical and ecological subjects, whereas by contrast only a few (10) references are available on *Crassolabium*, mostly discussing its taxonomy and status; (iii) *Thonus* is a name that identifies a rather well-defined morphological pattern among dorylaimid nematodes, and relevant morphological (and also biogeographical and ecological information) is associated with it, obviously, that is not at all the case of *Crassolabium*; (iv) the etymology of *Crassolabium*, meaning 'thick or fat lip,' refers to a peculiar morphological feature that does not fit the *Thonus* pattern and whose taxonomical value has been demonstrated to be of minor significance and interest.

Since the case is being referred to the ICZN for ruling, and according with the ICZN Article 23.9.3, the use of *Thonus* is maintained.

Re-description of *Crassolabium australe* Yeates, 1967 (Fig. 1)

Material examined: One female paratype on slide 1182, collected from the Himatangi Beach, Manawatu, New Zealand.

Female: L = 1.0; a = 24.5; b = 3.5; c = 51.6; c′ = 0.8; V = 55.8. Moderately slender nematode of medium size. Habitus slightly ventrad arcuate upon fixation, adopting an open 'C' shape. Body cuticle 1.5 µm thick at anterior region, 1.5 µm at midbody and 3.5 µm at tail tip; outer cuticle layer thin and with fine but distinct transverse striations; inner layer about two times thicker than the outer one. Lateral chord 10 µm wide and occupying about one-fourth of the midbody diameter; abundant large glandular bodies distinct throughout the body. Lip region angular, offset by marked depression, 14.0 µm wide, 2.3 times as wide as high and about one-third of body diameter at neck base. Lips mostly amalgamated; each lateral lip includes inside two distinct, small refractive masses, which are lacking in subventral and subdorsal lips; labial and cephalic papillae protruding, following the usual 6+6+4 pattern. Amphid fovea funnel-like, opening at level of the cephalic depression and occupying 8.0 µm or about three-fifths of lip region width. Odontostyle moderately robust, 16.5 µm long at ventral side and 18.0 µm long at dorsal side, about 1.3 times the lip region width, 7.2 times as long as wide, and thicker than cuticle at its level; its aperture scarcely two-fifths of its total length. Guiding ring simple, somewhat plicate. Odontophore 21 µm long or about 1.2 times the odontostyle. Pharynx 286 µm long, consisting of a slender but muscular anterior portion that extends gradually; basal expansion 131 µm long, occupying about 46% of total neck length, 5.7 times as long as wide, and 3.2 times longer than body diameter at neck base. Pharyngeal gland nuclei and outlets obscure. Nerve ring located at 38% of the total neck length. Cardia conoid, 11.5 µm long, wider than long; a ring-like structure surrounds its junction to pharyngeal base. Genital system didelphic-amphidelphic, with the two branches very well and almost equally developed. Ovary reflexed, reaching and even surpassing the sphincter level; oocytes arranged first in several rows and then in one single row. Oviduct joining subterminally the ovary and consisting of a tubular part and a moderately developed *pars dilatata*. A sphincter separates oviduct from uterus. Uterus contorted, but very long and tripartite, i.e., consisting of a distinct spheroid *pars distalis*, an intermediate narrower region and a tube-like proximal part with wide lumen; abundant spindle-shaped spermatozoa 5.0–6.0 µm long inside the uteri. Vagina extending inwards to about half of the corresponding body diameter; *pars proximalis* 9.0 × 14.0 µm, with sigmoid walls which are surrounded by moderately developed musculature; *pars refringens* with two close drop-shaped pieces measuring 3.0–3.5 × 4.5 µm,

with a less refractive intermediate area, and with a combined width of 11.0 µm; *pars distalis* short, measuring 2.0 µm. Vulva a post-equatorial longitudinal slit. Prerectum 1.7 times, rectum 1.3 times longer than anal body diameter. Tail convex conoid to rounded, 19.5 µm long, somewhat more straight ventrally. Two pairs of caudal pores, one ventral and subterminal, another dorsal at the middle of tail.

Remarks: Our re-description fits the original one, except that the outer cuticle layer has fine but distinct transverse striations (vs. smooth), the lip region is offset by marked depression (vs. distinct constriction) and the vulva is longitudinal (vs. transverse). Some morphological details are now added, for instance, those concerning the morphology of the genital branches.

Notes on Crassolabium robustum Mukhina, 1992: Mukhina (1992) described *C. robustum*, the second species in the genus, from the former Soviet Union. However, many doubts persist on the identity of this taxon. Its general aspect, as well many morphological details, better fits the pattern of the genus *Aporcelaimellus*: large (L = 2.10–2.48) and relatively robust (a = 21–27) body, lip region offset by deep constriction, lips rounded and separated, odontostyle aperture about one-half its length, guiding ring apparently plicate, dorsal and ventral cervical pores present, large spicules and 20–24 contiguous ventromedian supplements. On the other hand, *C. robustum* is characterized by the presence of refractive masses at the inner core of lateral lips, a feature that has been observed in two Iberian *Aporcelaimellus* species.

In the original description, Mukhina (1992) compared the new species with *C. australe* Yeates, 1967, but did not raise or consider the possibility that it might be related to or belong to the genus *Aporcelaimellus*. Thus, examination of *C. robustum* type material is needed to confirm its true identity.

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