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Taxonomic revision and reconstructed phylogeny of the weevil genus *Nanomicrophyes* PIC, 1908 (Coleoptera: Curculionidae, Curculioninae)

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Abstract

The poorly known genus *Nanomicrophyes* PIC, 1908 (Coleoptera: Curculionidae) is studied in detail for the first time; its placement in the tribe Cionini is confirmed. On the basis of a phylogenetic analysis it appears to retain most plesiomorphic character states of this tribe, but to possess also some distinctive autapomorphies, by which it can be easily separated from the more homogeneous generic assemblage of the rest of the tribe. *Nanomicrophyes* is shown to be monobasic, since *N. alutaceus* (REITTER, 1881) is newly synonymized with *N. cyanipennis* (WEISE, 1880).

Key words: Coleoptera, Curculionidae, Curculioninae, Cionini, *Nanomicrophyes*, taxonomic revision, phylogenetic analysis.

Introduction

WEISE (1880) described the new genus *Microphyes* based on a new species, *M. cyanipennis* from the Caucasus (Georgia). One year later, REITTER (1881) described *M. alutaceus*, also from Georgia. No other species have been described in this genus.

PIC (1908) noticed that the name *Microphyes* WEISE, 1880 had been preoccupied by *Microphyes* MACLEAY, 1872 for a genus of Tenebrionidae and replaced this name with *Nanomicrophyes*.

WINKLER (1932) included *Nanomicrophyes* together with *Nanophyes* SCHOENHERR, 1838 in the subfamily Mecininae, whereas KLIMA (1934) considered *Nanomicrophyes* to belong to the subfamily Nanophyinae.

In his revision of the supraspecific taxa in the Palaearctic Apionidae, ALONSO-ZARAZAGA (1989) excluded *Nanomicrophyes* from Nanophyinae, pointing out that this genus shares with Nanophyinae only two characters, which he considers as convergences: the geniculate antennae and the five-segmented funicle. He gave no opinion about the subfamily in which *Nanomicrophyes* should be placed. Recently, ALONSO-ZARAZAGA & LYAL (1999) included *Nanomicrophyes* in the tribe Cionini of the subfamily Curculioninae.

Thanks to the opportunity to carefully study some specimens of *N. cyanipennis* preserved in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, we are now able to redescribe this poorly known genus in detail and to clarify its systematic position.

Acronyms

CSM Coll. V.Yu. Savitskii, Moscow
SMTD Staatliches Museum für Tierkunde, Dresden
ZISP Zoological Institute of the Russian Academy of Sciences, St. Petersburg

Material and Methods

We have studied about 70 % of the Palaearctic taxa and several Afrotropical species included in the tribe Cionini belonging to the genera *Cionellus* REITTER, 1904, *Cionus* CLAIRVILLE, 1798, *Cleopus* DEJEAN, 1821, *Stereonychidius* MORIMOTO, 1962, and *Stereonychus* SUFFRIAN, 1854, whereas data on the recently described genus of this tribe, *Patialus* PAJNI, KUMAR & ROSE, 1991, reported herein are based only on the original description. We have also examined many representatives of the tribes which are generally included in the subfamily Curculioninae according to THOMPSON (1992) and ALONSO-ZARAZAGA & LYAL (1999), with particular attention to the tribe Mecinini, here used as sister-group of the Cionini as recently proposed by CALDARA (2001).

Phylogenetic reconstruction

A phylogenetic approach (HENNIG 1966), as discussed by WILEY (1981), was used in reconstructing the phylogeny. The outgroup criterion was used to polarize character states (WATROUS & WHEELER 1981).

Phylogenetic reconstruction was undertaken manually and with the help of the cladistic computer programme Hennig86 (FARRIS 1988), using the implicit enumeration option (ie-). This option identifies one tree, certain to be of minimal length, and has the advantage of being faster than other options.

The presumably plesiomorphic state of each character was coded as 0, and the apomorphic states as 1 or 1-2. Autapomorphies were included only in case of reversals or parallelisms of characters used for the reconstruction of the tree, but not as exclusive character states for one genus among the groups studied, i.e. colour of integument and lack of wings in *Nanomicrophyes* (see diagnosis of this genus). Character weighting was not employed in the computer analysis.

Characters used for the phylogenetic reconstruction

1. Frons between eyes at narrowest point: 0. Slightly narrower than base of rostrum; 1. Narrower than half width of rostrum.

In the outgroup, the frons between the eyes is usually slightly narrower than the base of the rostrum and this state is regarded as plesiomorphic. Cionini, with the exception of *Patialus* and *Cionus alauda* (HERBST, 1784), and also *Nanomicrophyes* share state 1.1. The same is also true for other Curculioninae such as Ellescini, Ochyromerina (Tychiini) and some Rhamphini.

2. Frons between eyes: 0. Parallel-sided; 1. Narrower posteriorly than anteriorly.

In the outgroup the inner margin of the eye is usually parallel to the longitudinal axis of the head. In Cionini and in *Nanomicrophyes* as well as in Ellescini, the frons is narrower posteriorly than at its anterior margin, since the inner margin of the eye diverges anteriorly from the longitudinal axis of the head to the base of rostrum.

3. Segment 2 of antennal funicle: 0. Shorter than segment 1; 1. As long as, or slightly longer than segment 1; 2. Distinctly longer than segment 1.

Generally in Curculioninae and in the outgroup segment 2 of the antennal funicle is shorter than segment 1. Conversely, in *Cleopus*, *Stereonychus* and *Nanomicrophyes* segment 2 is as long as, or slightly longer than segment 1 (3.1), whereas it is distinctly longer in *Stereonychidius*, *Cionus*, *Cionellus* and *Patialus* (3.2).

4. Anterior margin of prosternum: 0. Straight to slightly sinuate, 1. Distinctly emarginate.

In most Curculioninae, "primitive" Mecinini (*Mecinus* GERMAR, 1821, *Gymnetron* SCHÖNHERR, 1825, *Rhinusa* STEPHENS, 1829), *Cleopus* and *Nanomicrophyes* the prosternum has a nearly straight anterior margin. In other cionines and some Curculioninae (mostly the species with a prosternal sulcus) the anterior margin of the prosternum is markedly emarginate.

5. Prosternal sulcus: 0. Absent; 1. Present, but shallow; 2. Present and deep.

A prosternal sulcus anterior to the fore coxae, into which the rostrum fits in repose, occurs independently in several subfamilies of Curculionidae including Curculioninae (Smicronychini and part of the Rhamphini and Mecinini) and is considered apomorphic. *Nanomicrophyes* and *Cleopus* possess the presumably plesiomorphic state 5.0, whereas *Stereonychus* has the apomorphic condition 5.1. A deep prosternal sulcus is present in *Stereonychidius*, *Cionus*, *Cionellus*, and *Patialus* (5.2).

6. Fore coxae: 0. Contiguous: 1. Separated.

Usually in Curculioninae and in the "primitive" Mecinini the cavities of the fore coxae are contiguous. On the contrary, in all Cionini with a deep prosternal sulcus (5.2), except *Cionus*, the coxae are separated.

7. Mesosternal process: 0. 1/4 - 1/3 as wide as the middle coxa; 1. At least 1/2 as wide as the middle coxa.

Usually in Curculioninae and in the "primitive" Mecinini (*Mecinus* and *Gymnetron*) the mesosternal process is distinctly narrower than the middle coxa. In Cionini, *Nanomicrophyes*, some genera of Mecinini (*Rhinusa*, *Rhinumiarus* CALDARA, 2001, *Cleopomiarus* PIERCE, 1919 and *Miarus* SCHÖNHERR, 1826), and some tribes of Curculioninae (Acalyptini, Curculionini, Derelomini, and Rhamphini) the mesosternal process is moderately wider than, or also as wide as, the middle coxa.

8. Mesosternal process: 0. Convex; 1. Flat; 2. Concave.

In most taxa of the outgroup the mesosternal process is distinctly convex. *Nanomicrophyes* and *Cleopus* possess this presumably plesiomorphic condition. In *Stereonychus*, *Stereonychidius* and *Cionus*, as well as in Acalyptini, Derelomini and some Rhamphini and Curculionini (*Archarius* GISTEL, 1856), the mesosternal process is flat (8.1). In *Cionellus*, *Patialus* and in some genera with a prosternal sulcus, such as *Miarus* and *Cleopomiarus* (Mecinini), the mesosternal process is distinctly concave (8.2).

9. Median portion of metasternum: 0. Flat to slightly concave; 1. With distinct fovea in anterior 2/3.

Usually in the outgroup and also in *Nanomicrophyes*, *Cleopus*, *Stereonychus*, *Stereonychidius* and *Cionus* the metasternum is medially flat to slightly concave. In the taxa possessing the character state 8.2 the metasternum is distinctly depressed in the anterior 2/3.

10. Ratio width of prothorax to elytral base: 0. Prothorax at least 2/3 as wide as base of elytra; 1. Prothorax at most 1/2 as wide as base of elytra.

In most taxa of the outgroup, the prothorax is more or less transverse but only slightly narrower than the elytra at base. *Nanomicrophyes* possesses the same presumably plesiomorphic condition, whereas in all other genera of Cionini as well as in Ochyromerina (Tychiini) the prothorax, which is often conical, is distinctly narrower than the base of the elytra, where prominent humeri are usually present.

11. Integument: 0. Clearly visible between vestiture; 1. Nearly completely concealed by vestiture.

Usually in Mecinini as well as in many species of Curculioninae of several tribes, the integument is clearly visible between the vestiture which is composed of variously shaped scales or setae. *Nanomicrophyes* possesses the plesiomorphic state, whereas in all other genera of Cionini the vestiture covers the integument more or less completely.

12. Femora: 0. Unarmed; 1. Dentate.

In most Mecinini and in many species and genera of several tribes of Curculioninae, the femora are unarmed and we consider this character state as plesiomorphic. *Nanomicrophyes* presents this condition, whereas in all other genera of Cionini the femora are distinctly dentate.

13. Uncus on fore tibiae in male: 0. Present; 1. Absent.

Males of most Curculioninae, including Mecinini, have unci on the fore tibiae. This is also true for *Nanomicrophyes* and *Cleopus*. On the contrary, in *Stereonychidius*, *Stereonychus*, *Cionus*, *Cionellus* and *Patialus*, as well as in other tribes (Acalyptini and some Rhamphini), the fore tibiae lack unci.

The use of the term "uncus" in this and in the following four characters, instead of "mucro" as in CALDARA (2001), needs a brief explanation. For the traditional terminology, "mucro" is the spine arising from the inner (ventral) edge of the tibial apex, whereas "uncus" is the spine arising from the outer (dorsal) edge. THOMPSON (1992) pointed out that uncus and mucro are the same thing, except that the uncus is associated with the inner apical flange, whereas the mucro is not. He also showed that this association may break down, so that "uncinate" and "mucronate" tibiae may occur in the same specimen. We observed this association in the same genus, i.e. *Rhinusa*, where the species of the *R. tetra* group have unci and other species have mucrones. Unfortunately, a new terminology was not suggested as Thompson did for the "corbel", so the problem remains. Thompson (pers. comm.) believes that it would be confusing, not to say illogical, to use two terms for the same structure in the same specimen, or group. He suggests that at present it is better to use "mucro" (a point) in the Entiminae and "uncus" (a hook) in other, mostly long-nosed, groups. This conforms with traditional usage and avoids introducing any new terms. In the present paper we decided to follow Thompson's opinion.

14. Uncus on middle tibiae in male: 0. Present; 1. Absent.

Males of most Curculioninae, including Mecinini, have unci on the middle tibiae. This plesiomorphic condition is also present in *Nanomicrophyes*, *Cleopus* and *Stereonychidius*. On the contrary, in *Stereonychus*, *Cionus*, *Cionellus* and *Patialus*, as well as in other tribes (Acalyptini and some Rhamphini), the middle tibiae lack unci.

15. Uncus on hind tibiae in male: 0. Present; 1. Absent.

Males of most Curculioninae, including Mecinini, have unci on all tibiae, although those on the hind tibiae are sometimes slightly reduced. This character state is present in *Cleopus*, *Stereonychidius*, as well as *Nanomicrophyes,* whereas *Cleopus*, *Stereonychus*, *Cionus*, *Cionellus* and *Patialus*, Acalyptini and some Rhamphini manifest the presumptive apomorphic state.

16. Uncus on fore tibiae in female: 0. Present; 1. Absent.

Females of most Curculioninae, including Mecinini, have unci on the fore tibiae. In the females of Cionini, as well as *Nanomicrophyes*, Acalyptini and some Rhamphini, the fore tibiae lack unci.

17. Uncus on middle tibiae in female: 0. Present; 1. Absent.

Females of most Curculioninae, including Mecinini, have unci on the middle tibiae. In the females of *Nanomicrophyes* as well as in other Cionini (except *Stereonychidius*), Acalyptini and some Rhamphini, the middle tibiae lack unci.

18. Claws: 0. Of equal length; 1. Outer claw reduced or lacking.

In Curculionidae in general and in most taxa of the outgroup, the two claws are of equal length and this is also true for *Nanomicrophyes*, *Cleopus*, and *Patialus*. In *Cionus*, *Cionellus*, especially in the male, and, apparently as a result of parallelism, in a few *Mecinus* the outer claw is shorter than the inner one. *Stereonychidius* and most *Stereonychus* (with the exception of at least one species, *S. rufobrunneus* (LINDBERG, 1953) from the Canary Islands which possesses a short outer claw), have a single claw. This character state is occasionally found in some other unrelated genera, i.e. *Mononychus* GERMAR, 1824 (Ceutorhynchinae), several genera of Baridinae, and some *Magdalis* GERMAR, 1817 (Mesoptiliinae).

19. Combined length of ventrites 1 and 2: 0. At most 2.3 times of combined length of ventrites 3 and 4; 1. Distinctly longer, at least 2.6 times as of combined length of ventrites 3 and 4 taken together.

In most Curculioninae and in the "primitive" Mecinini, the combined length of the first two ventrites is about twice that of ventrites 3 and 4. On the contrary, in *Nanomicrophyes* and other Cionini, as well as in some "advanced" Mecinini (*Rhinumiarus*, *Cleopomiarus* and *Miarus*) and in other tribes of Curculioninae (Derelomini, Smicronychini, and Storeini), the first two ventrites combined are nearly three times as long as ventrites 3 and 4 taken together.

20. Pygidium: 0. Present and clearly visible; 1. Very short to absent.

In Mecinini, tergite VIII in males and tergite VII in females are more or less exposed, forming a pygidium. This character state is also present in other Curculioninae (Curculionini and males of Acalyptini and Tychiini), probably due to homoplasy. A clearly visible pygidium is present also in *Nanomicrophyes*, whereas in other Cionini it is very short (males of *Cleopus* and some species of *Cionus*) or absent.

21. Spermatheca: 0. With body not globose and ramus more or less pronounced; 1. With body markedly globose and ramus very short.

In Curculioninae, including Mecinini, the spermatheca is variously shaped, but its body is usually not globose and the ramus is more or less pronounced. Conversely, *Nanomicrophyes*, other Cionini and several Anthonomini examined possess a spermatheca with a markedly globose body and very short ramus.

	1 2
	123456789012345678901
Mecinini	00000000000000000000
Nanomicrophyes	11100010000000011010 1
Cleopus	11100010011000110111
Stereonychus	11111011011111111111
Cionus	11212011011111111111
Stereonychidius	11212111011110010111 1
Cionellus	11212112111111111111
Patialus	01212112111111110111

Table: Data matrix for the tribe Mecinini and genera of Cionini.

Results

Phylogenetic analysis

We examined the distribution of 21 character states, of which we could hypothesize the polarity at a level of reasonable probability (see table) and which were already used in part recently for the study of the phylogenetic relationships between Cionini and Mecinini (CALDARA 2001).

The computer-aided analysis with 21 unweighted characters and using Mecinini as outgroup produced one tree of 29 steps in length with consistency and rescaled consistency indices 82 and 83 respectively. This tree (Fig. 6) agrees completely with the tree reconstructed manually and shows a high level of resolution due to the small number of reversals and absence of parallelisms.

Phylogenetic relationships

Our data strongly support placement of *Nanomicrophyes* in the tribe Cionini as already suggested by Korotyaev (in litteris) and reported by ALONSO-ZARAZAGA & LYAL (1999). This genus possesses all three character states which Cionini share with their sister-group, the Mecinini, according to CALDARA (2001), i.e. antennal funicle 5-segmented, tarsal socket obscured partially by an extension of the ventral face of the fore tibia, and claws fused at base. Moreover, it shows the following eight synapomorphies with other Cionini: frons between eyes narrower than half width of rostrum (character 1) and narrower posteriorly than anteriorly (character 2), segment 2 of antennal funicle as long as, or slightly longer than, segment 1 (character 3), mesosternal process at least half as wide as a coxa (character 7), uncus in all tibiae in female lacking (characters 16, 17), ventrites 1 and 2 much longer than ventrites 3 and 4, at least 2.6 times as long as these (character 19), and spermatheca with body markedly globose and ramus very short (character 21).

It appears that *Nanomicrophyes* is more "primitive" than other Cionini because of the presence of four plesiomorphic characters, i.e. prothorax only slightly narrower than base of elytra (character 10), dorsal integument clearly visible between the vestiture (character 11), femora without tooth (character 12), and pygidium clearly visible (character 20). This last character is particularly worth noting, since the present placement of *Nanomicrophyes* in Cionini caused an inversion of the polarity of its character states with regard to the conclusion hypothesized in the phylogenetic analysis of Mecinini (CALDARA 2001). As for the remainder, in this new phylogenetic analysis the position of other genera of the Cionini previously considered (CALDARA 2001) is unchanged. However in the present analysis two other genera (*Stereonychidius*, *Patialus*) were added. These appear to be related to *Cionus* and *Cionellus*, with which they form a single lineage based on two synapomorphies: segment 2 of antennal funicle distinctly longer than segment 1 (character 3), and prosternal sulcus deep (character 5). Moreover, *Patialus* seems very closely related to *Cionellus*, with which it shares the concave mesosternal process (character 8) and the presence of a distinct fovea in anterior 2/3 of the median portion of the metasternum (character 9).

Nanomicrophyes PIC

Microphyes WEISE, 1880: 482 (non MACLEAY, 1872) (type species *M. cyanipennis* WEISE, 1880, by monotypy).
Nanomicrophyes PIC, 1908: 2 (replacement name for *Microphyes* WEISE, 1880).

DIAGNOSIS: This genus can be distinguished from other Cionini by four plesiomorphic characters, i.e. prothorax only slightly narrower than base of elytra (character 10), dorsal integument clearly visible between the vestiture (character 11), femora without tooth (character 12), pygidium present and clearly visible (character 20), and three autapomorphies, not included

in our phylogenetic analysis, i.e. rostrum in dorsal view gradually widening from base to apex (in Mecinini and other Cionini the rostrum widens only in apical 1/4), integument mostly metallic blue (in Mecinini, except for *Mecinus janthinus* (GERMAR, 1817) and related species, and in other Cionini the integument is reddish, brown or black), wings completely aborted and, consequently, humeri smoothed and elytra locked together and distinctly rounded at sides from base to apex (Mecinini and other Cionini have well developed and functional wings and more or less pronounced humeri).

DESCRIPTION: Since the genus is presently monotypic, for a detailed description see that of the type species.

REMARKS: *Nanomicrophyes* is a highly modified genus of Cionini due to several remarkable external characters; on the contrary it shares the shape of both male and female genitalia with the other genera of the tribe, and this close similarity includes the presence of a flagellum in the internal sac of the median lobe, which is considered a plesiomorphic condition in the lineage Cionini + Mecinini (CALDARA 2001).

Cleopus is closest to what may be imagined as a probable ancestor of *Nanomicrophyes*, as shown by the structure and proportions of the head, rostrum, antennae, tibiae, including the armament of male tibiae, and abdomen. Moreover in *C. pulchellus* (HERBST, 1795) the sides of the elytra are noticeably rounded and, at least in the mountain specimens from Armenia, the wing is slightly reduced. The very unusual appearance of *N. cyanipennis* has probably resulted from a number of reductions, presumably associated with its alpine habitat. The almost glabrous body with completely reduced wings and, consequently, smoothed humeri are the perfect expression of the so-called "aptery syndrome" by ZHERIKHIN (1991), very typical of alpine weevils. The metallic blue colour of the pronotum and elytra is apparently a consequence of the reduction of the vestiture, and is found in many groups of Ceutorhynchinae and Baridinae with bare or sparsely pubescent elytra.

Due to the affinities of *Nanomicrophyes* with the Cionini, we might expect it to have an exophytic larva. This would not be remarkable as one of the commonest weevil groups in the alpine environment are the Hyperinae which have exophytic larvae.

Regarding the host plant, *Nanomicrophyes* might live on Scrophulariaceae, which may have been the family parasitized by primitive cionines and their sister-group, Mecinini, and in which still live all Palaearctic *Cleopus* and *Cionus*. Moreover, one of the Palaearctic *Cionus*, the southern Siberian and Mongolian *C. zonovi* KOROTYAEV, 1989, lives above the tree-line in the southern Siberian mountains. However it is known that *Stereonychus* and *Cionellus* live on Oleaceae (*Fraxinus*, *Phillyrea*), and *Patialus* lives on Bignoniaceae (*Tecomella*), which are families apparently unrelated to Scrophulariaceae. Consequently, it is not unlikely that *Nanomicrophyes* also may develop on plants of a family other than Scrophulariaceae. The very restricted range of *Nanomicrophyes* may be an artifact due to incomplete collecting, but may also result from the restricted range of the host plant, which is unfortunately unknown. Speculations on the host plant of *Nanomicrophyes* may be of no value, but there is a species of the family Scrophulariaceae, *Paederota pontica* RUPR., with a range similar to that of *Nanomicrophyes* (GROSSGEIM 1949), and it would be worth of trying to look for *Nanomicrophyes* on this plant. There are also several species of *Scrophularia* with similar distribution, such as *S. lateriflora*, *S. minima*, and *S. ruprechtii* (the latter two species, however, lacking in Georgia). All these species are petrophilous, living mostly on rocks (GROSSGEIM 1949), which may perhaps explain the rare collecting of *Nanomicrophyes* in spite of extensive studies of the Caucasian carabids, as well as its escaping from sweep-nets which seems least probable if *Nanomicrophyes* lives on *Pedicularis*, the commonest genus of Scrophulariaceae in wet alpine habitats. Rather broad tarsi in *N. cyanipennis* suggest its close association with plants rather than often walking on stones.

Fig.1: Habitus of *Nanomicrophyes cyanipennis*

Nanomicrophyes cyanipennis (WEISE)

Microphyes cyanipennis WEISE, 1880: 482. REITTER, 1881: 516.
Nanomicrophyes cyanipennis, PIC, 1908: 2. WINKLER, 1932: 1619. KLIMA, 1934: 3.
Microphyes alutaceus REITTER, 1881: 516 (syn.n.).

TYPE LOCALITY: Kobi (Georgia).

TYPE MATERIAL: At SMTD we found one male syntype labelled "Caucasus, Weise \ cyanipennis W. \ Coll. J. Faust, Ankauf 1900 \ Type".

SYNONYMY: *Microphyes alutaceus* was described by REITTER (1881) from specimens collected at Martkopi, which is a locality in Georgia not far from the type locality of *N. cyanipennis*. In the short original description, the author reported that his new species is very closely related to *N. cyanipennis*, from which it differs only in the shorter elytral vestiture, the smaller punctures of the elytral striae and the denser but less deep punctures on the pronotum. We did not find the two syntypes of *M. alutaceus*, but by the examination of several specimens of *N. cyanipennis* we could ascertain that the differences reported by REITTER (1881) fall within the range of variability of this latter species.

REDESCRIPTION: Male. Length 2.1 mm.

Body broad, oval, robust.

Rostrum blackish blue, moderately elongate (length/width at antennal insertion 3.44; rostrum length/pronotum length 1.24), subcylindrical; in lateral view slightly curved, slightly attenuated

from antennal insertion to apex, with scrobes oblique, reaching ventral margin of rostrum between basal and middle 1/3 of rostrum; in dorsal view gradually widening from base to apex, with scrobe not visible, distinctly punctate and striate from base to apical 1/4, covered with moderately sparse, recumbent, moderately elongate (length/width 4-7), seta-like, whitish scales. Frons between eyes at narrowest point narrower than half width of rostrum, without fovea. Eyes following curvature of head. Antennae blackish, inserted between middle and apical 1/3 of rostrum; scape long, reaching anterior margin of eye; funicle slightly shorter than scape, with segment 1 1.5X as long as wide, distinctly more robust and slightly shorter than segment 2, which is 2.0X as long as wide; segments 3 and 4 nearly as long as wide, segment 5 moderately transverse; club oblong-oval, with all segments similarly pubescent.

Pronotum blue, moderately convex and transverse (width/length 1.34), with sides moderately rounded, widest at middle, without pre-apical constriction; punctures moderately deep and dense, regular; intervals between punctures sometimes wider than punctures, finely rugulose and shiny, clearly visible between sparse, recumbent, moderately long (length/width 4-7), seta-like, whitish scales. Prosternum not sulcate and with nearly straight anterior margin.

Scutellum black, small, triangular, covered with sparse seta-like, whitish scales.

Elytra blue, broad, short (length/width 1.08), oval, with base moderately emarginate, humeri rounded and not pronounced, sides distinctly rounded from base, at base 1/3 as wide as pronotum, widest at middle and here distinctly wider than pronotum (elytral width/pronotum width 1.79), distinctly convex on disc; interstriae weakly convex, clearly visible between sparse, recumbent, small, moderately long (length/width 4-7), seta-like, whitish scales arranged in three irregular rows; length of scales equal to width of interstria; striae distinct, 1/2 as wide as interstriae, with moderately deep and regular punctures and a row of scales shorter than those of interstriae; stria 3 merging with stria 8 at apex. Wings lacking.

Legs black, moderately long, covered with sparse, seta-like, whitish scales, these latter shorter than width of tibia; fore coxae contiguous; femora subclavate, unarmed; tibiae moderately robust, with unci, those of hind tibiae smaller than others; tarsi with segment 1 1.3X as long as wide, segment 2 transverse, segment 3 bilobed and distinctly wider than segment 2, claw-segment shorter than segments 1-3 combined; claws short, of equal length, connate in basal 1/2.

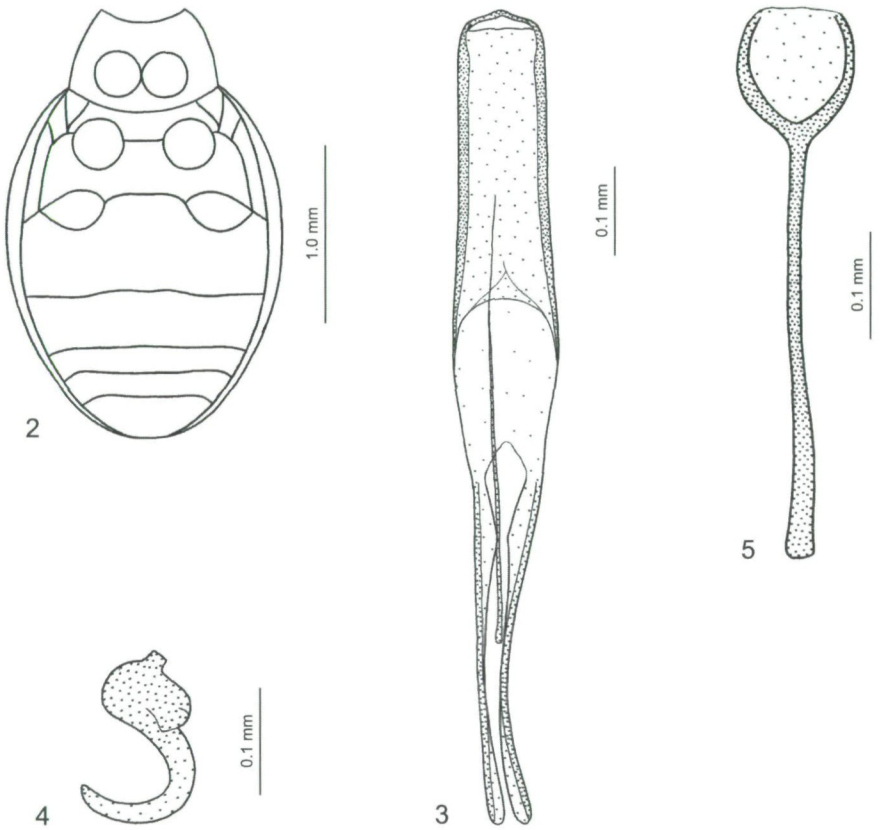
Venter (Fig. 2) with irregularly arranged moderately deep and dense punctures, covered with sparse, seta-like, whitish scales. Mesosternal process blue, convex, as wide as coxa. Metasternum blue, flat in middle, moderately swollen in front of, and somewhat produced over hind coxa; distance between middle and hind coxae much less than diametre of middle coxa. Mesepimera, mesepisterna and metepisterna black. Abdomen with ventrites 1 and 2 blue, 3-5 black; length of ventrites 1 and 2 3.1X that of ventrites 3 and 4; punctation of abdomen becoming much finer apically, very dense and fine on sternite 5. Ventrite 1 with a transverse sulcus between hind coxae formed by merged punctures. Tergite VII smooth and shiny, sparsely punctate; pygidium densely punctate, moderately exposed.

Median lobe of aedeagus as in Fig. 3.

Female. Similar to male except tibial unci lacking, ventrite 1 flat, spermatheca as in Fig. 4, spiculum ventrale as in Fig. 5.

Variability. Length 2.0 - 2.3 mm. Sometimes the pronotum is nearly black and its sculpture is denser than described. The elytral scales vary slightly in length. The sides of the elytra are moderately to rather strongly rounded.

DISTRIBUTION: Georgia, southern Russia (Republics of Adygea, Kabardino-Balkaria, and North Ossetia).



Figs. 2 - 5: *Nanomicrophyes cyanipennis*, 2) venter, 3) median lobe of aedeagus, 4) spermatheca, 5) spiculum ventrale.

ADDITIONAL MATERIAL EXAMINED:

G E O R G I A: Gudaur, leg. Balassoglo (1 ♂, SMTD).

R U S S I A: REPUBLIC OF ADYGEA: NW Caucasus, Republic of Adygea: Kishi River, 18.VI.1911, leg. Volnukhin (3 ♂♂ and 4 ♀♀, ZISP); Mt. Dzhuga, 17.VI.1911, leg. Volnukhin (1 ♂, ZISP); 35 km SW of Psebai, 2170 m, subalpine meadow with small *Geranium* sp. and *Polygonum* sp. on a plateau, 24.VII.1998, leg. V.M. Gnezdilov (1 unsexed specimen, ZISP); Mt. Bol'shoi Tkhach, alpine meadow, 6.VI.1993, leg. A.G. Koval (1 ♂, ZISP); REPUBLIC OF KABARDINO-BALKARIA: upper reaches of the Kayarda River (tributary of the Shakashil-Su River) upstream of Tyrnauz, alpine zone, 2300-2700 m, meadow with abundant *Hedysarum* sp., 4.VI.1999, leg. E.M. Davidyan (2 unsexed specimens, ZISP); REPUBLIC OF OSSETIA: North Ossetia: Skalistyi Range, Fiagdon River basin, 3150 m, SSE slope of Mt. Karivkhokh, sparse alpine herbaceous vegetation, 7.VI.1986, leg. S.K. Alekseev (1 ♂, CSM); Skalistyi Range, Mt. Khumaratkhokh, Khamon locality, 2000 m, sparse *Betula raddeana* TRAUTV. forest with tall grass, 3.VI.1985, leg. S.K. Alekseev (1 ♂, CSM).

Key to genera of Cionini

1 Elytra, and usually prothorax, metallic-blue, clearly visible between sparse vestiture; elytra at base only slightly wider than pronotum, locked together, with smoothed humeri, distinctly rounded at sides; pygidium present and clearly visible; femora unarmed; rostrum in dorsal view gradually widening from base to apex; size small (length 2.0 - 2.3 mm) ..... *Nanomicrophyes*

- Body reddish to black without metallic reflection; surface scarcely visible between more-or-less abundant vestiture; elytra at base distinctly wider than pronotum, free at suture, with markedly pronounced humeri, slightly rounded at sides; pygidium very short or absent; femora dentate; rostrum in dorsal view widening only apically; size small to medium (length 2.5 - 6.0 mm) 2

2 Anterior margin of prosternum straight; prosternal sulcus lacking; mesosternal process convex. ..... *Cleopus*

- Anterior margin of prosternum distinctly emarginate; prosternal sulcus present; mesosternal process flat to concave 3

3 Segment 2 of antennal funicle slightly longer than segment 1; prosternal sulcus shallow; tarsi usually with a single claw ..... *Stereonychus*

- Segment 2 of antennal funicle distinctly longer than segment 1; prosternal sulcus deep; tarsi with two claws 4

4 Fore coxae contiguous; elytra usually with two large rounded black sutural spots ..... *Cionus*

- Fore coxae separated; elytra without large sutural spots 5

5 Mesosternal process flat; median portion of metasternum slightly concave; uncus on middle and hind tibiae present; elytra at most 1.3 times as long as wide ..... *Stereonychidius*

- Mesosternal process distinctly concave; median portion of metasternum with distinct fovea in anterior 2/3; uncus on middle and hind tibiae absent; elytra elongate, at least 1.5 times as long as wide 6

6 Frons between eyes slightly narrower than base of rostrum; claws of equal length ..... *Patialus*

- Frons narrower than half width of rostrum; outer claw reduced ..... *Cionellus*

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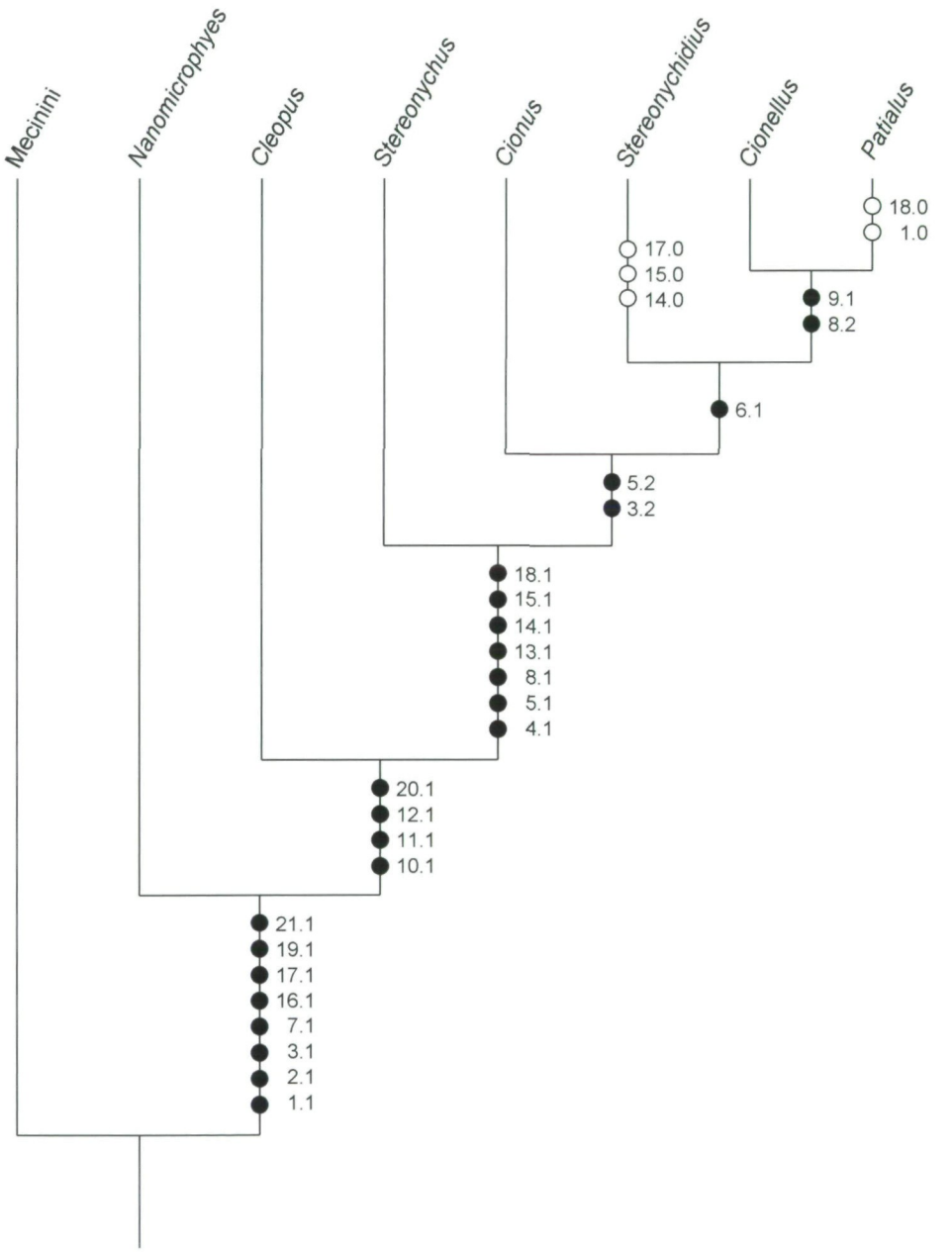

Fig. 6: Reconstructed phylogeny illustrating hypothesized phylogenetic relationships among the genera of the tribe Cionini. Dots indicate apomorphic character states, whereas open circles indicate reversals.

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