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The first species of *Systelloderes* (Hemiptera: Heteroptera: Enicocephalidae) from New Caledonia

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Abstract. The first species of the genus *Systelloderes* Blanchard 1852, from New Caledonia, *S. loebli* sp. nov., is described. The generic classification is tentative, and only the diagnostic autapomorphies are stressed, since the rich Oriental, Papuan, and Australian faunas of *Systelloderes* have not been studied and most species remain undescribed. The fore leg of the female of *S. loebli* sp. nov. is characterized by the presence of a long, erect ventral scale on the fore coxa (unique among the Enicocephalomorpha), and the occurrence of neopatella (new term, = sclerites within the femoro-tibial intersegmental membrane at the site of the lost patellar limb segment). A rasp-shaped sculpture on the fore coxa is interpreted as a stridulitrum rubbing against the edges of the prosternum, which acts as a plectrum.

Key words. Hemiptera, Heteroptera, Enicocephalidae, taxonomy, *Systelloderes loebli*, New Caledonia, morphology, neopatella, limb segmentation, stridulation

Introduction

In this paper we describe a new species of the Enicocephalidae, subfamily Enicocephalinae, from New Caledonia. The species is tentatively assigned to the probably Cosmopolitan genus *Systelloderes* Blanchard 1852. This discovery has been expected but is of particular interest for three reasons. First, this is the first *Systelloderes* in the Eastern Hemisphere outside the Afrotropical, Madagascan, and New Zealand regions. Second, the female fore leg shows several autapomorphies so far unknown in the Enicocephalomorpha. Lastly, the sculpture of the fore coxa is tentatively interpreted as used for stridulation – the first case within the infraorder.

Material and methods

The study is based on an examination of a single specimen. The label data are cited verbatim, using a slash (/) to separate rows on the label. Drawings of the legs were prepared from glycerine mounts, and the photographs were taken from the dry-mounted specimen. The terminology of forewing venation follows that of Štys (2002a,b) and Kukalová-Peck & Štys (in prep.).

All measurements are given in millimetres. We use the following abbreviations for measurements and some elements of vestiture and legs (italicised):

Cx_1, Cx_2, Cx_3 – fore, middle, and hind coxae, respectively;
F_1, F_2, F_3 – fore, middle, and hind femur, respectively;
FW – forewing;
L – length;
max – maximum;
min – minimum;
Ta_1, Ta_2, Ta_3 – fore, middle, and hind tarsus, respectively;
Ti_1, Ti_2, Ti_3 – fore, middle, and hind tibia, respectively;
Tr_1, Tr_2, Tr_3 – fore, middle, and hind trochanter, respectively;
trl – trichobothrium-like;
W – width.

Taxonomy

Systelloderes loebli sp. nov.

(Figs. 1-16)

Type locality. New Caledonia, Mount Koghi, 400-500 m a.s.l.
Type material. Holotype: ♀, 'New Caledonia / Mt. Koghi, prim. for. / 400-500m, 18.-19.x / 1998, I. Löbl, litter'. The specimen bears the following red label: 'HOLOTYPE / *Systelloderes* / *loebli* sp. nov. / Štys & Baňař det. 2007'; collection of Muséum d'Histoire Naturelle, Genève (Switzerland).

Diagnosis. Large species, over 5 mm long, macropterous, brownish. Antennal segment 2 longer than segment 3, segments 2-4 isomorphic, terete. Fore leg: coxa with a long, narrow, free, erect scale; femur with a prominent basidorsal extension rising high above the level of tarsus; femoro-tibial membrane with dorsal neopatellar sclerites; tibial process absent; tibial and tarsal armatures as illustrated.

Description. Body elongate, moderately robust, extremities short, coloration and vestiture uniform and inconspicuous (Fig. 1).

Measurements. ***Total body length*** – 5.75-5.85 (abdomen deformed). ***Head***. Anterior lobe, L – 0.71; posterior lobe, L – 0.31, W – 0.38; distance of eye to apex of antennifer – 0.49; diatone (max W across eyes) – 0.36; min interocular distance, dorsal – 0.24; min interocular distance, ventral – 0.18; eye, L – 0.15. ***Labium***. Total, L – 0.95; segment 1, L – 0.12; segment 2, L – 0.21; segment 3, L – 0.48; segment 4, L – 0.16. ***Antenna***. Segment 1, L – 0.24; segment 2, L – 0.62; segment 3, L – 0.56; segment 4, L – 0.42. ***Pronotum***. Total L (max) – 0.98; collum: L (median) – 0.18, max W – 0.49; midlobe: L (max) – 0.44, W (max) – 0.89; hindlobe: L (max) – 0.36, L (median) – 0.31, W (max) – 0.98. ***Forewing***. Max L – 2.95. ***Fore***

leg. Total L – 1.07, max W – 0.42; *Ti*$_1$: L – 0.87, max W – 0.41;.*Ta*$_1$: L – 0.29, max W – 0.17; anterior claw, L (basis – apex) – 0.31; posterior claw, L (basis – apex) – 0.26. ***Middle leg***. *F*$_2$: L – 0.84, max W – 0.18; *Ti*$_2$: L – 0.69, max W – 0.13; *Ta*$_2$: L (without claw) – 0.24, max W – 0.09. ***Hind leg***. *F*$_3$: L – 1.02, max W – 0.29; *Ti*$_3$: L – 1.16, max W – 0.14; *Ta*$_3$: L (without claw) – 0.38, max W – 0.09.

Coloration (Fig.1). Body nearly unicolorous, between light-brown (antennae, middle and hind legs) and brown to dark-brown (head and midlobe of pronotum).

Texture. Moderately shiny (including extremities), head lustrous. Dorsum of head with irregularly distributed, rather sparse, small setigerous tubercles, lateral and ventral sides of head, prothoracic collum, and dorsum of pronotal midlobe with a continuous cover of regularly distributed, minute setigerous tubercles (the latter particularly distinct in preocular area, on posterior cephalic lobe and on midlobe of pronotum, creating their shagreened appearance). Setigerous tubercles replaced by indistinct, large and shallow alveoles laterally on parts of prothorax and dorsum of pronotal hindlobe, the latter slightly rugulose. Mesoscutellum, wings and abdomen without particular structures. Antennae, labium, *Cx*$_1$, *Tr*$_1$, *Ta*$_1$, middle legs, and hind legs smooth. Anterior and posterior faces of *F*$_1$ and *Ti*$_1$ with scattered minute setigerous tubercles; longitudinal depression of anterior (mesal) face of *Ti*$_1$ with transverse wrinkles.

Vestiture. Macrotrichia golden, 'soft', mostly short, straight, oblique, on some body parts (particularly posterior lobe of head, pronotum, and forewings) moderately to strongly curved. Macrotrichia mixed with much longer, diagonal, semierect to erect, conspicuous, mostly straight to only slightly curved *trl* setae with bilaterally symmetrical position; some of these may represent true trichobothria although the bothrium itself was not observed. Scales absent, except on *Cx*$_1$ (see below). ***Head, labrum,*** and ***labium*****.** Distribution of *trl* setae (longitudinally arranged if more than 1+1) as follows. Head: several *trl* setae on and alongside anteclypeus and on labrum; 2+2 preocular (proximad to antennifers); 1+1 close to mesal eye margins, 2+2 postocellar; labial segment 1: dorsum/venter 1+1/0; 2: 3+3/0; 3: 3+3/2+2; 4: 3+3/3+3 (all strongly oblique and curved, similar to normal, elongate macrotrichia). Setation of ventral surface of head erect, short; longer and curved hairs on buccular part, gradually more curved and longer on proximal part close to neck, none trichobothrium-like. ***Antennae*** with uniform, short, straight, oblique setae; *trl* setae 1+1 on segment 1, then occurring from base of segment 2 to apex of segment 4, more elongate, denser and more erect distally. ***Prothorax***. Dense, 'soft', short, mostly curved setae; *trl* setae: collum 1+1 anterolaterally, 1+1 posteromedially; midlobe: 1+1 posteromedially. ***Mesoscutellum.*** *trl* setae 2+2, in proximal part. ***Forewings*** with sparse, short, curved microtrichia only on veins, none on wing membrane. ***Fore leg.*** *Cx*$_1$ with curved, nearly adpressed pubescence and two long, distiventral, diagonally pointing *trl* setae; a long, narrow, moderately ectally curved scale (L 0.12, W 0.02) subapically on ventral surface, nearer mesal face (Figs. 3, 6). *Tr*$_1$ with curved, long setae; on ventral face, with 3-4 long, curved *trl* setae: the most distal one inserted at identical point as coxal scale; a few setae directed proximad, the other distad. *F*$_1$ with short, oblique setae on dorsal and ventral faces, anterior and posterior faces nearly bare; erect *trl* setae as follows: about 5+5 in double-row in distal half of dorsal face and multiple terminal dorsal cluster, and about 5+5 *trl* setae regularly distributed on ventral face. *Ti*$_1$ anterior face nearly bare, posterior and ventral faces with long, straight, oblique setae (particularly in distal half), dorsal and ventral faces and distal edge with

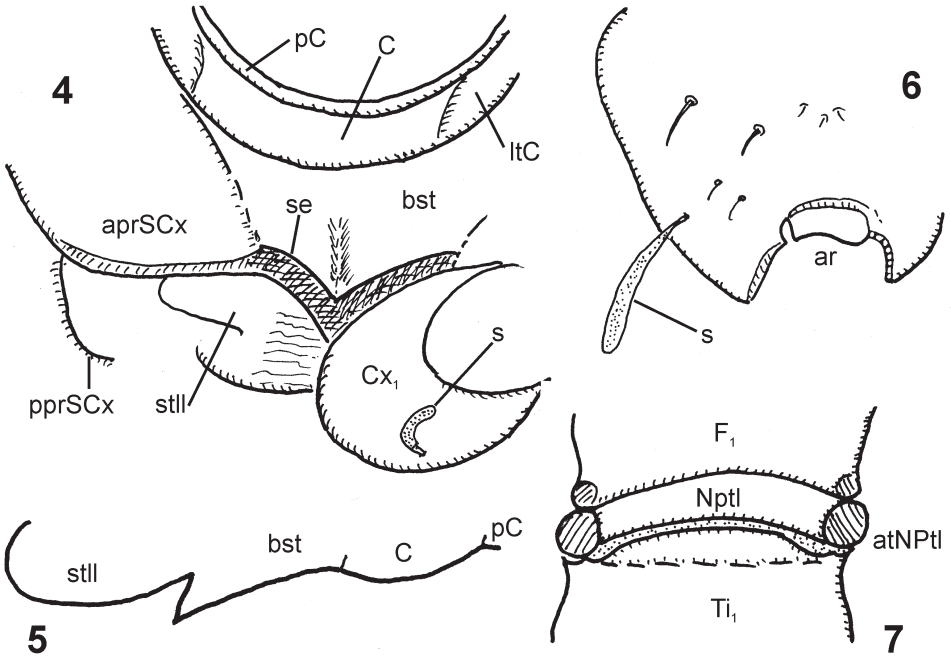
numerous, irregularly distributed *trl* setae; other conspicuous macrotrichia: a single subpatellar *trl* seta, and three very long, curly setae at distiventral angle. Ta_1 with long, straight, diagonal setae, especially dense and mostly curly on ventral face; conspicuous *trl* setae: 1+1 dorsal, subterminal, strikingly long, and 1+1 apicilateral claw-guarding setae (anterior one, close to the shorter claw, conspicuously shorter). ***Middle*** and ***hind legs*** densely covered with short oblique to semierect setae on all faces; tibial and tarsal setae radiating relative to tibial and tarsal axes. Tr_2 and Tr_3 with two conspicuous erect ventral *trl* setae each. Ventral faces of F_2 and F_3 each with one basal (adtrochanteral), one postmedial, and several distal suberect to erect *trl* setae, dorsal faces of F_2 and F_3 each with 1+1 erect subterminal (adtibial) *trl* setae. Ti_2 and Ti_3 with long, oblique to erect *trl* setae developed along entire length, >15 and >20 in number, respectively. Ta_2 and Ta_3 (second 'segments') with about 10 strongly oblique *trl* setae on Ta_2, over 12 on Ta_3; setae on the latter undoubtedly homologous but not thin and *trl* like, and nearly spiniform instead. The only visually undoubtedly *trl* seta on Ta_3 is a ventral erect seta on its first 'segment'. ***Abdomen***. Dorsum with short setae, without scales. Venter with golden short to moderately long, straight to slightly curved semierect macrotrichia (length and density increasing distally) intermixed with short, blackish, adpressed hairs. Some *trl* setae occurring marginally; distribution of long *trl* setae on posterior segments as follows: ventrite 7 – 1+1 at posterolateral angles, 1+1 submedial near posterior margin; subgenital plate: 1+1 submedial (extremely long) in basal part, 1+1 (very long) at posterior margin.

Structure. ***Head*** (Figs. 1-2) strikingly narrow and long, slightly longer than pronotum (1.04 times as long as pronotum). Anterior lobe markedly longer than posterior lobe, 2.3 times as long. Lateral margin of preocular region parallel-sided proximally, its long distal part slightly convex, diverging towards antennifers; anteclypeus very long, narrow. Eye 0.31 times as long as distance between eye and antennifer. Postocular impression broad, shallow; lateral margin of postocular part of anterior cephalic lobe straight, diverging towards convex side of posterior lobe – postocular impression not marked in lateral outline. Posterior lobe transverse, 0.82 times as long as wide, its dorsum strongly convex, lateral sides moderately so. Eyes small, in lateral view not exceeding dorsal or ventral outlines of head; facets individually convex. Ocelli large, ocellar tubercles low. Ventral outline of head continuous, very slightly concave, only apex (fused bucculae) and basis (association with neck) outstanding. Dorsal ocular index 6.0, ventral ocular index 4.0. ***Antennae*** moderately long, thin; first segment strikingly long, cylindrical; segments 2-4 terete (not flagelliform, neither segment 4 subfusiform); antennal formula (longest segment first) 2, 3, 4, 1; segment 2 being 1.11 times as long as segment 3. ***Labium*** (Fig. 2) moderately long, rather thin, directed anterad (segments 1, 2) and ventrad (segments 3, 4), without particular structures, labial formula (longest segment first) 3, 2, 4, 1. Segment 3: 2.2 times as long as segment 2. Ventral outline of segment 2 emarginate near base and at midlength. ***Labrum*** reaching to middle of segment 2.

Pronotum (Figs. 1-2). ***Collum*** short, 2.45 times as wide as long, with narrow precollum, dorsum with a linear impressed median area and pair of low and broad elevations, lateral area with low 'pleural' tubercle not visible in dorsal view. Collar constriction sharply delimited. ***Midlobe*** (dorsal side) with a linear, nearly percurrent median impression terminating just in front of posterior margin; disc with markedly plastic relief, with i) an inversely triangular anteromedial depression, ii) broad, not distinctly delimited, subcircular posteromedial depression, and iii) paired deep lateral pits emitting a lateral depression each; lateral margins

Figs. 1-3. *Systelloderes loebli* sp. nov., holotype, female. 1 – total view; 2 – head, lateral view; 3 – right fore leg, anterior view.

broadly convex, interrupted, slightly notched because of lateral pits; posterior margin entire, trisinuate, sublateral shallowly concave parts slightly depressed, medial convex part broadly rounded, without edge. No traces of Y-shaped impressions. Constriction between midlobe and hindlobe broad, sharply demarcated. Midlobe 2.5 times as long as collum, 1.2 and 1.45 times as long as hindlobe maximum and median length, respectively. Midlobe 2.0 times as long as wide. ***Hindlobe*** ample, its median twice as long as collum, indicated neither by ridge nor impression, lateral margins rounded, posterolateral angles (in strictly dorsal view) subrectangular; posterior margin bisinuate (tetrasinuate, if moderately protruding posterolateral angles are counted), medially broadly and shallowly concave, moderately convex sublaterally. Hindlobe 3.2 times as wide as medially long. '***Proepimeral lobe***' (see Štys & Baňař 2006) extensive, distinctly exceeding posterior prosupracoxale posteroventrad, but not enclosing fore acetabula. ***Mesoscutellum***. Concave central part equilaterally triangular,



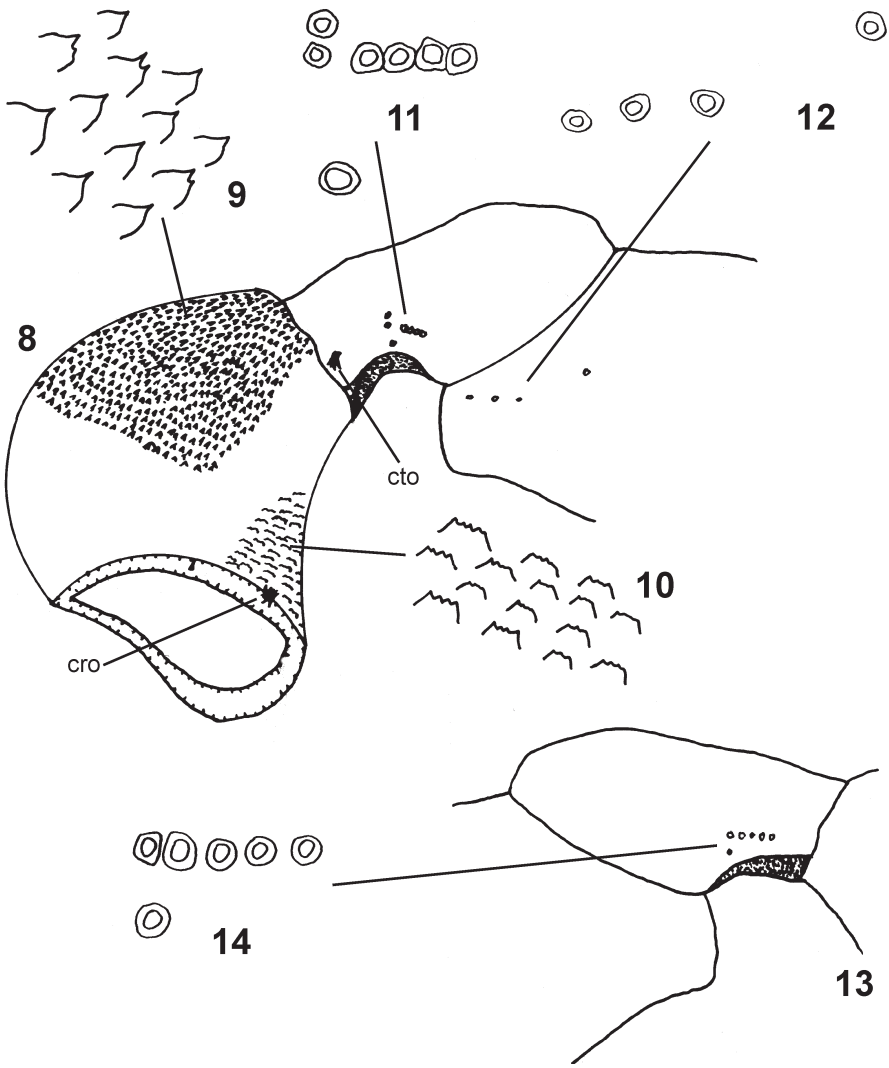
Figs. 4-7. *Systelloderes loebli* sp. nov., holotype, female. 4 – prosternum and associated structures, posteroventral view, diagrammatic; 5 – prosternum, sagittal section, diagrammatic; 6 – right fore coxa with a scale; anterior (mesal) view; diagrammatic; 7 – neopatella; lateral (dorsal) view on bent 'knee' of left fore leg; diagrammatic. Lettering: **aprSCx** – anterior prosupracoxale; **ar** – coxo-trochanteral articulation; **atNPtl** – articulatory tubercles of neopatella; **bst** – probasisternum; **C** – collum; **Cx_1** – fore coxa; **F_1** – fore femur and its articulatory processes; **ltC** – lateral tubercle of collum; **NPtl** – central part of neopatella; **pc** – precollum; **pprSCx** – (edge of) posterior prosupracoxale; **s** – coxal scale; **se** – stridulatory edge of basisternum; **stll** –prosternellum; **Ti_1** – fore tibia with a subdivided apex.

produced in long, apically rounded mucro and included into a larger triangle due to lateral association with forewing grooves. ***Prothoracic coxa***, ***prosupracoxale***, ***proacetabula***, and ***prosternum.*** For details see Figs. 4 and 6. *Cx_1* situated within proacetabulum, the latter open anteriorly and closed elsewhere. Proximal parts of lateral, anterior, and most of mesal faces of *Cx_1* fully enclosed and externally delimited by prosupracoxalia. Anterior prosupracoxale excessively developed, anteromesally extended, embracing *Cx_1* anterolaterally, anteriorly, and anteromesally. Transverse anterior part of anterior prosupracoxale fused with ventral part of collum (forming a not fully understood system of anteroventral prothoracic evaginations); anteromesal part of anterior prosupracoxale directed mesocaudad, fusing with triangular probasisternum, and taking part in formation of its strengthened, horizontal, sharp-edged lateral sides, here termed '***prosternal strigilatory edge(s)***' (see Discussion). This composite triangular probasisternum horizontal, clearly delimited by its sharp edges; prosternellum adhering to probasisternum, sinuate in sagittal plane, more dorsal than probasisternum, with only the posterior, rounded, tongue-shaped part posteriad to coxae visible in ventral view.

Legs rather short. ***Fore leg*** (Figs. 3, 6-16) extremely stout, femur and tibia incrassate. Cx_1 (Fig. 8) conical, anteroventral face with dense, prominent, drop-like cuticular thorns (Fig. 9) resembling and arranged like rasping files. Antero- and especially posterodorsal proximal parts of fore coxa with dense rows of different cuticular processes (Fig. 10), resembling serrate rasping files, each of those with several apical teeth, thus very similar to *Pseudohenschiella hauseri* Baňař & Štys 2006 from Madagascar (cf. Baňař & Štys 2006). Proximal region of $\boldsymbol{Tr_1}$ very narrow, more so than robust distal part, both regions separated by concave impression; entire adcoxal (dorsal) surface deeply concave (accommodating distal part of Cx_1 during flexion of Tr_1) and delimited by sharp, lateral, free anterodorsal and posterodorsal edges (about as long as one third of *tr-f* junction). $\boldsymbol{F_1}$ 2.5 times as long as wide, with basidorsal angle forming subrectangularly produced, apically rounded dorsal extension, the latter rising strikingly above dorsal surface of Tr_1, and as high as its proximal diameter. ***Knee***. Distinct remnant of a tripartite ***neopatella**** (new term) visible dorsally in intersegmental F_1-Ti_1 membrane when tibia maximally bent towards femur (Fig. 7). $\boldsymbol{Ti_1}$ broadly triangular, 2.1 times long as wide, compressed in anteroposterior plane, both anterior and posterior faces each with vaguely delimited longitudinal depression. Cleaning comb short, formed by tightly packed short setae; three ventralmost spiniform setae longer and stouter. Intersegmental tibiotarsal membrane forming an evaginated pocket stretching far ventrad beneath tarsus itself (enabling apparently its close appression towards distal margin of tibia). Distiventral, armature-bearing process absent. ***Apicitibial armature*** (Fig. 15) consisting of seven spiniform setae: two short ventral (straight), three long subventral (all slightly oblique towards tarsus), and two short dorsal (strongly oblique towards tarsus). $\boldsymbol{Ta_1}$ cylindrical, 1.7 times as long as wide, ventral surface slightly concave, ***tarsal armature*** (Fig. 16) of 1+1 proximal, curved spiniform setae and 1+1 distal setae (anterior one semicircular, posterior one broadly spiniform, shorter than proximal setae). ***Claws*** all of same shape, regularly curved, posterior one shorter and narrower.

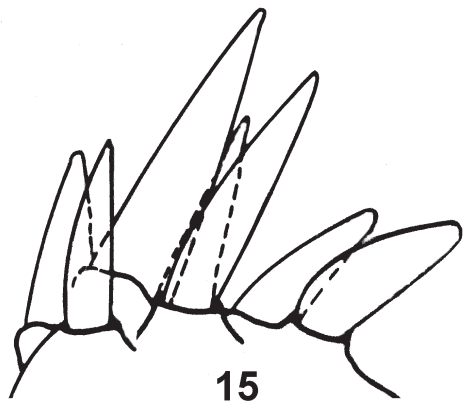
Fore leg sensilla on coxa, femur, and trochanter. Basal rim of Cx_1 anteromesally with coxal rim organ (Fig. 8), consisting of cluster of several (5-7) differently directed, straight setae and one distant short seta. Condylar trochanteral organ (Fig. 8) consisting of several (six?) poorly visible short setae. Anterior trochanteral organ (Figs. 8, 11) consisting of 6+1 campaniform sensilla (group of six, one isolated; posterior trochanteral organ (Figs. 13-14) consisting of six campaniform sensilla (five in straight row, one isolated). Anterior femoral organ (Figs. 8, 12) consisting of 3+1 campaniform sensilla (group of three and one isolated) very close to base of F_1.

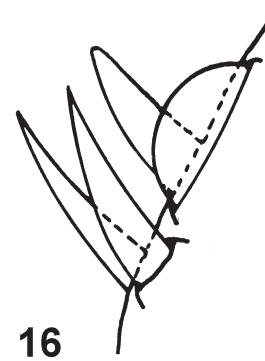
Neopatella (new term) = sclerite(s) situated within the dorsal section of the *F-Ti* intersegmental membrane in a position where the original patellar limb segment or its remnants would be situated (see Discussion). In fore leg of female *S. loebli* sp. nov., the dorsal apex of F_1 is concavely excised and the small dorsolateral projections of its posterior margin provide articulation with the neopatellar articulatory tubercles. The area between these projections is filled with a tripartite neopatella, its medial part forming a narrow arcuate strip adhering to the concavity of the apex of F_1, and its lateral parts being formed by strongly sclerotized, prominent, dorsally projecting articulatory tubercles associated with the medial strip of neopatella and articular projections of F_1. The distal margin of the neopatella is associated with a short intersegmental *F-Ti* membrane; the latter separates the neopatella from a produced and feebly delimited process of basidorsal margin of Ti_1.



Figs. 8-14. *Systelloderes loebli* sp. nov., holotype, female, right fore leg (8-12 anterior view, 13-14 posterior view). 8 – coxa, trochanter and base of femur (cleared, vestiture omitted, **cto** – condylar trochanteral organ, **cro** – coxal rim organ); 9 – droplet-shaped rasplike microsculpture on fore coxa; 10 – serrate rasplike microsculpture on fore coxa; 11 – anterior trochanteral organ; 12 – anterior femoral organ; 13 – trochanter (cleared, vestiture omitted); 14 – posterior trochanteral organ.

Middle leg and ***hind leg***. Lateral (dorsal, adfemoral) face of Cx_3 flat, largely covered by sandpaper-like file similar to that on Cx_1. F_3 moderately incrassate, its basidorsal margin arcuate, clearly extending above the level of dorsal face of Tr_3. Proximal segments otherwise without particular structures, anterior and posterior faces of Ti_2 and Ti_3 sulcate. Ta_2 and Ta_3





Figs. 15-16. *Systelloderes loebli* sp. nov., holotype, female, right fore leg (anterior view); vestiture omitted. 15 – apicitibial armature; 16 – tarsal armature.

two-segmented, segment 1 extremely short, without dorsal surface in lateral view (dorsal part of segment 1 visible as dorsal part of basitarsal ring filling up apex of tibia in anterodorsal view). Apices of both middle and hind tibiae each with strikingly short posteroventral and anteroventral setal combs; every comb terminating ventrally with a long spiniform seta. Claws and parempodial setae isomorphic.

Forewing as usual for *Systelloderes*. Pterostigma strikingly well formed, long and wide, RP arising from its middle; rp-mp (= the anterior crossvein) entering open discal cell strikingly more distad than CuA3+4 (= the posterior 'crossvein'); AP in claval area not developed.

Ventral side of ***abdomen*** (distorted in the holotype) with series of 1+1+1 large sclerites on ventrites 3-8. ***Terminalia*** (distorted in the holotype). Posteromedial part of ventrite 7 thickened. Ventral laterotergite 8 distinct from subgenital plate, the latter strongly sclerotized, elongate, basal margin convex, distal margin concave in front of proctiger.

Etymology. Dedicated to Ivan Löbl (Genève), an eminent coleopterist, our friend, and collector of the species.

Bionomics. The holotype was collected by sieving leaf litter in a patch of a primary tropical New Caledonian rainforest surrounded by a secondary forest (I. Löbl, in epist.).

Distribution. Known only from the type locality at Mount Koghi on the Grande Terre of New Caledonia.

Discussion

1. Generic classification of *Systelloderes loebli* sp. nov.

Štys (2002a) established three monotypic genera for the three Middle Eastern species of *Systelloderes*: *Kulichoderes* Štys 2002 (for *S. iranicus* Štys 1970), *Ugloderes* Štys 2002 (for *S. uvarovi* Štys 1970), and *Utukhengal* Štys 2002 (for *S. utukhengal* Linnavuori 1984). None of them is closely related to *Systelloderes* Blanchard, 1852 as typified by the Chilean

S. moschatus Blanchard 1852. In the same paper, a new genus, *Alkowdiella* Štys 2002, with two species from Yemen (*A. raunoi* Štys 2002 and *A. paleceki* Štys 2002), possibly a sister group to *Systelloderes*, was established.

Many species of *Systelloderes* have been described from the Americas (19 species; see Wygodzinsky & Schmidt (1991) for discussion and a list) and the Afrotropical region and Madagascar (22 species; see Villiers (1969) for a key and inadequate descriptions). Many additional species from both regions still remain undescribed. Rather surprisingly, only a few species have been described from the rest of the Eastern Hemisphere: *S. capillicornis* Bergroth 1918 (= *Henschiella capillaricornis* Jeannel 1943, unjustified emendation) from Luzon; *S. aetherius* Bergroth 1916 from Queensland (quoted also from Tasmania); and two species from New Zealand, *S. maclachlani* (Kirkaldy 1901; as *Henicocephalus*), and *S. notialis* Woodward 1956. However, the first two species in fact belong to the genus *Henschiella* Horváth 1888 (P. Štys, unpublished data). The two New Zealand species were classified by Štys (1970, 2002a) in *S. maclachlani*-group (all other species belong to *moschatus*-group), which is characterized by having antennal segment 2 distinctly longer than segment 3 (subequal in *moschatus*-group). Many new species of *Systelloderes* and *Systelloderes*-like genera from the continental and insular parts of the Oriental, Papuan, and (the rest of) the Malesian and Australian regions (including New Caledonia) are still awaiting description. As far as we are aware, *Systelloderes loebli* sp. nov. differs from all the American and African species, the *maclachlani*-group, and the undescribed Eastern Hemisphere taxa by the striking autapomorphies of the female fore leg.

The Eastern Hemisphere species of *Systelloderes* have to be compared with those of the Americas, with emphasis on the characters regarded by Wygodzinsky & Schmidt (1991) as diagnostic for the monogeneric tribe Systelloderini of the Enicocephalinae and checked only in American species (Štys 2002a). Until this comparison is completed, we should adopt a conservative approach to the generic classification of the Eastern Hemisphere species of *Systelloderes*.

In Štys's (2002b) key to the genera of the Enicocephalomorpha of the World, *Systelloderes loebli* sp. nov. would fall to couplet 47 including *Systelloderes* and *Alkowdiella*, but fitting none of these genera.

2. Leg peculiarities of *Systelloderes loebli* sp. nov.

2.1. Strigilatory sculpture of fore coxa? In *S. loebli* sp. nov., the dorsal part of the mesal face of the fore coxa is devoid of vestiture and provided with a regular serrate, rasplike sculpturing; we hypothesize that this area is rubbed against the sharp lateral edge of the triangular probasisternum, strengthened by fusion with the mesal extensions of the anterior prosupracoxalia (see Description: Prosternum), and suggest that they form a strigilatory device. The rasplike sculptured coxa may act as a movable stridulitrum (a 'file') and the edges of probasisternum as a stationary plectrum (a 'scraper').

Similar structures have been found in other enicocephalids, namely in *Pseudohenschiella hauseri* Baňař & Štys 2006 (Baňař & Štys 2006) from Madagascar and in *Heissaptera janaki* Štys & Baňař 2006 (Štys & Baňař 2006) from Mauritius. We propose a broader investigation

of this character system to determine its distribution and possible universality in the family. No other frictional stridulatory device has been encountered in the Enicocephalomorpha, and no strigilatory system involving the fore coxa and prosternum is known in the Heteroptera.

The only somewhat similar stridulatory device utilizing the fore coxa and the acetabular cavity is known in *Ranatra* Fabricius 1790 (Nepidae; cf. Schuh & Slater 1995), and an analogue occurs in males of the Corixidae: Corixinae and both sexes of some genera of Neotropical Colobathristidae, which have a stridulitrum on the fore femora, and the plectral edge is formed by a subocular ridge on the maxillary plate or genae, respectively.

Many species of the Enicocephalidae, particularly those belonging to highly isolated Oriental clades (such as the Phallopiratinae and the Megenicocephalinae), exhibit striking species-specific differences in the shape of their fore trochanters provided with various processes (Štys 1985). One wonders whether these structures may modify the sound production rather than play roles in mechanisms of reproductive isolation, specific mate recognition systems, or grasping.

2.2. The fore-coxal scale. The occurrence of scales is rare in the Enicocephalomorpha. They are unknown in the Aenictopecheidae, and their occurrence in the Enicocephalidae is limited to the nominotypical subfamily and the Alienatinae. Scales occur commonly over many parts of the body in *Hoplitocoris* Jeannel 1942, *Embolorrhinus* Jeannel 1942, and *Neoncylocotis* Wygodzinsky & Schmidt 1991, and in some species of *Oncylocotis* Stål 1856, and in females of *Alientaes* Barber 1953. Scales commonly occur on forewing veins, but also on the head, pronotum, legs, and abdomen; their existence on the abdominal dorsum of *Neoncylocotis* is a generic autapomorphy according to Wygodzinsky & Schmidt (1991).

No scales have been reported in *Systelloderes* and no specialized fore-coxal scales are known in the enicocephalomorphans. The presence of a single, long, narrow fore-coxal scale in *S. loebli* is probably unique among the Heteroptera. The coxal regions surrounding the scale are not modified (except for a close presence of an alleged stridulitrum – see Discussion 2.1). We tentatively suggest that it serves an unspecified function in sound production and its alteration.

2.3. Neopatella. Kukalová-Peck (1983, 1991) identified the **patella** as a limb segment pertaining to the hexapod groundplan and situated between the femur and tibia. The patella is well preserved in some of the primarily wingless insects and in some nonthoracic appendages of some extinct and extant pterygotes but is otherwise mostly suppressed and lost, or fused with the tibia in modern Pterygota.

Another possibility is a multiple reduction of the patella into a system of sclerites situated in the intersegmental femoro-tibial membrane, and their involvement in the articulation between these segments. There are sclerites in the dorsal part of this membrane in many insects, particularly large ones. However, no comparative morphological or developmental studies of the 'patella' of the insect leg have been carried out, and it is therefore impossible to estimate whether remnants of a true patella or structures evolved de novo for functional reasons are involved.

No attention has been paid to sclerites occurring between the femur and the tibia in the Heteroptera, although their study may be of a great morphological interest. The patellar area

in *Systelloderes loebli* sp. nov. is reminiscent of a reduced limb segment. However, in absence of any evidence on its origins, we prefer to call it *neopatella* and regard it tentatively and provisionally as a secondarily evolved structure.

2.4. Middle and hind basitarsus. The **basitarsus** (often called 'the first tarsal segment' or the 'first tarsomere', and in an older, abandoned terminology, also the 'metatarsus') is in the Heteroptera, as in other insects, a limb segment that articulates with the apex of the tibia, and provides attachment for the *musculus flexor tarsi* inserted in the tibia. It is never subsegmented, and does not bear the posttarsus unlike the following, more distal limb segment. The latter segment is confusingly called 'tarsus s. str.'or 'eutarsus' in various writings by J. Kukalová-Peck (e.g., Kukalová-Peck (1991) and references therein). Preferably, it should be called the **distitarsus** as in arachnology.

In the Enicocephalomorpha, the basitarsus tends to be shortened on the middle and hind legs to the extent that it becomes merely a small sclerite mediating and transmitting the action of muscles flexing the 'tarsus' and depressing the claws. The articulation between the basitarsus and distitarsus becomes acondylar, the possibility of mutual movement is lost, and the dorsal part of the distitarsus is reduced, losing most or all of the vestiture and being often telescoped within the tibial apex. However, the extreme reduction of the basitarsus to a mere bare semi-ring in *Systelloderes loebli* sp. nov. is certainly unusual, although it might have been overlooked in other species.

Hoberlandt & Štys (1979) attempted to use the degree of reduction of the basitarsus and particularly its dorsal face in the generic classification of the Aphelocheiridae; this attempt was, however, criticized by Polhemus & Polhemus (1988).

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