The genus *Bellimeris* Betrem (Hymenoptera: Scoliidae, Campsomerinae)

G.G.M. Schulten, H.R. Feijen & C. Feijen

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Gerard G.M. Schulten, Hans R. Feijen & Cobi Feijen, Netherlands Centre for Biodiversity Naturalis, P.O. Box 9517, 2300 RA Leiden, The Netherlands (ggm.schulten@planet.nl) (corresponding author).

Key words: Hymenoptera; Scoliidae; *Bellimeris*; *Megacampsomeris*; lectotype, redescriptions; Oriental region.
A diagnosis is given for the genus *Bellimeris* Betrem 1972. The lectotype female of its type species, *B. bella* (Bingham, 1897), is designated and described. The holotype female of the closely related *Campsomeris stoetzneri* Betrem, 1928 is redescribed. This species was found to be very similar or possibly a junior synonym of *B. bella* and is now included in the genus *Bellimeris.* More material, in particular males, has to become available and studied to accept or reject the synonymy. Three additional females of *B. bella* and one female of *B. stoetzneri* are described. A key is provided to separate both species. *Campsomeris szetschwanensis* Betrem, 1928 or the forma C (Betrem, 1941) could be the male of *B. stoetzneri.* The holotype of *C. szetschwanensis* is redescribed. A key is provided for the recognition of *C. szetschwanensis* and two closely related species. The literature for this species and genus is reviewed.

Introduction

Elis bella was described by Bingham in 1897 on the basis of two female specimens, respectively from Assam (India) and Tenasserim (Myanmar). One of these specimens was reported as a variety, because of the light fuscous wings. Bingham did not indicate to which specimen he was referring to. The body length of the specimens is given as 25 and 19 mm respectively and the wingspan as 46 and 36 mm. Betrem (1928) reported this species as *Campsomeris* (*Megacampsomeris*) *bella* (Bingham). The subgenus was raised to generic level by Betrem (in: Betrem & Bradley, 1972). Bradley studied the Scoliidae of the Humboldt-Universität in Berlin during several visits from 1928 onwards and published the results in 1972. He designated the smaller specimen from Myanmar as the holotype since it agreed best with Bingham's description. He had labelled this specimen as such already in 1929. Bradley (1972) gave as the updated name for this specimen *Megacampsomeris* (*Bellimeris*) *bella* (Bingham) Betrem. A note in Bradley (1972) explains that the subgenus name between brackets had not been published before and that Betrem placed this species in the subgenus *Bellimeris*. This subgenus, however, was never described.

Osten (2005) listed *Elis bella* as *Megacampsomeris bella*. Betrem (unpublished), and Argaman (1996), however, considered *Bellimeris* a valid (sub)generic group name. We agree on this since the name is combined with a valid, already described species (cf. Article 13.1.2 of the International Code of Zoological Nomenclature (ICZN 1999).

Bingham (1897) emphasized in his description of the female "front above the antennae remarkably prominent and convex, unlike any species known to me." Couplet 127

of Argaman's 1996 synoptic key to the genera of Scoliidae separates *Bellimeris* and *Niyaranta* Argaman, 1996 females from closely related genera. It reads: "mid dorsal area of the female propodeum with distinct, sharp, acute tubercle posteriorly." Neither Bingham nor Gupta and Jonathan (2003) mention such a tubercle. *Elis bella* was redescribed by Gupta and Jonathan (2003) as *Sericocampsomeris bella* (Bingham) on the basis of the very sharp mesopleural crest, in particular on the lower portion and the impunctate upper plate of the metapleuron. The spurs on the hind tibia are not mentioned in the redescription, but they described the hind tibial spurs in the characterization of the genus *Sericocampsomeris* Betrem 1941 as "black, longer spur blunt or obtuse, not spatulate."

Betrem (unpublished) gives a key to identify the subgenera and sections of *Megacampsomeris* recognized by him. This key identifies only females. He also gave a very brief description of these subgenera and sections and a list of species belonging to these groupings. The first couplets of his key separate the subgenus *Bellimeris* from almost all other subgenera by the spatulate dark or rather dark spurs on the hind tibia. Spatulate spurs on hind tibia are not mentioned by Bingham (1897), neither by Jonathan and Gupta (2003) or Argaman (1996).

Betrem (1928) gave a brief description of the female holotype *Campsomeris* (*Megacampsomeris*) *stoetzneri* from Kwanhsien (China, Sichuan prov.), in particular the colour and punctation of head, mesoscutum, scutellum, metanotum and propodeum. Betrem (1941) repeated more or less his original description, but also described the spurs on the hind tibia as somewhat spatulate, distinctly broadened apically. He remarked that *Campsomeris bella* is very close to *Campsomeris stoetzneri*, because of the punctation of the posterior mid vertical portion of the propodeum, but he considered both species clearly different. Additional female specimens from China and one from Japan (Yokohama) were listed in his 1941 publication. The male is unknown.

Tsuneki (1972) suggested that *Megacampsomeris stoetzneri* is "probably a geographical race of the Indian scoliid *Campsomeris bella* Bingham." In his short description of a female specimen from Botel Tobago Island (China, Taiwan), he described the inter-antennal area as "medially longitudinally raised, the elevation of the inner margins of the antennal hollows is also fairly high, but not broad. Thus the area appears to be tri-carinate." This description agrees with the dorsal view of the head as described in this paper for *Bellimeris bella* and *B. stoetzneri*. The spurs on the hind tibia were not mentioned. Only tergites 1-3 had interrupted yellow apical margins. The wings are described as fairly strongly clouded with a yellowish-brown tinge. When Tsuneki wrote his publication, the diagnostic differences between *B. bella* and *B. stoetzneri* were unknown. So it is not clear to which species he was referring to.

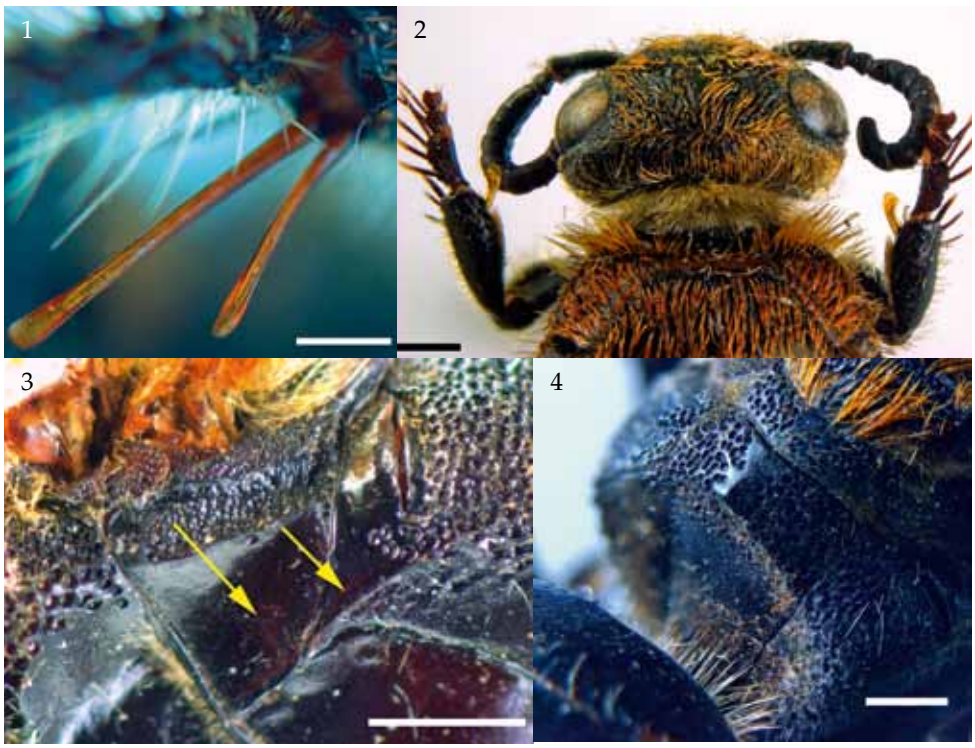
To resolve the above identified inconsistencies and to characterize the genus *Bellimeris,* the lectotype *Elis bella* and the holotype of *Campsomeris stoetzneri* are now compared and redescribed as *Bellimeris bella* and *Bellimeris stoetzneri,* respectively. In addition, two females of *C. stoetzneri* from China, specimens identified and mentioned by Betrem (1941), were studied and three unidentified female *"Megacampsomeris"* specimens in the RMNH collection. *Campsomeris (Megacampsomeris) szetschwanensis* Betrem, 1928 and related formas could be the male of *Bellimeris stoetzneri* (Betrem, 1928, 1941). Therefore the holotype, paratype and specimens of the formas A, B and C were studied.

Bellimeris bella (Bingham, 1897)
(figs 1-4)

Elis bella Bingham, 1897: 93.
Campsomeris (*Megacampsomeris*) *bella* (Bingham): Betrem, 1928: 140.
Megacampsomeris (*Bellimeris*) *bella* (Bingham): Bradley, 1972: 6.
Sericocampsomeris bella (Bingham): Gupta & Jonathan, 2003: 60.
Megacampsomeris bella (Bingham): Osten, (2005): 6.

Type material.— ♀ lectotype of *Elis bella* Bingham here designated ("holotype" of Bradley, 1972). **Myanmar (**Burma) Tenasserim, Haundraw valley, 8-94, Bingham Coll.; and the identification label *aurulenta* Sm. ♀. Var.?, (MNHB); ♀ paralectotype from **India** (British India) Assam, Bingham Coll. (MNHB). Other material.— **Indonesia (**Nederlands Indië), E. Sumatra, Riouw Res, Inderagiri, Pangkalan Kasai, iv-1939, 1♀ **(**P. Buwalda. RMNH); **People's Republic of China**, Fou-Kien prov. (presently Fujian prov. on Southeast coast), without date and collector, *Campsomeris stoetzneri*, det. Betrem, 1♀, (RMNH); Pingloo, Kwansi prov. (presently Guangxi prov. Southern China), 1933, 1♀, (G. Liu; RMNH).

Diagnosis.— Medium-sized to large black species with two recurrent veins, two submarginal cells, three discoidal cells, narrow yellow interrupted posterior margins



Figs 1-4, *Bellimeris bella* (Bingham, 1897). 1, holotype ♀, Myanmar, Tenasserim, hind tibial spurs; 2, holotype ♀, head and thorax; 3, ♀. China, Fou-Kien prov., upper plate of metapleuron and spiracular angle (arrows point to impunctate vertical portion of metapleuron and spiracular angle); 4, ♀. Indonesia, East Sumatra, dorsal and vertical posterior portion of propodeum; fig. 1 scale 0.5 mm, other figs scale 1 mm.

on tergites 1-3 and brownish- or yellowish-hyaline wings. Vestiture largely brown to golden-brown, white on pleura, legs and anterior segments of metasoma, black on apical segments. Hind tibial spurs spatulate. Head, pronotum, mesoscutum, scutellum, metanotum and propodeum, except anterior inner corners of vertical lateral portions and larger part of posterior vertical portion, densely and deeply punctate. Mid dorsal portion of propodeum convex with an irregular median smooth stripe, slightly raising towards posterior margin and terminating as a small smooth ridge.

Redescription of female lectotype.— Length of body: 19 mm. Integument black with broadly interrupted narrow yellow posterior margins on tergites 1-3. Two recurrent veins. Two submarginal cells. Three discoidal cells. Subcostal, stigmatal and upper margin of marginal cells, posterior one-third of upper margin of median cell and first submarginal cell except apical corner setose. Fore wing light brownish-hyaline, apex and below anterior margin somewhat darker. Hind wing brownish-hyaline. Wings with light yellowish or dark bluish tinge depending on light. Setae and veins on wings dark brown. Vestiture white on clypeus, around occiput, pleura, propodeum except mid dorsal portion, legs, tergites 1-3 and sternites 1-4; brown to golden-brown on head, mesoscutum, scutellum, metanotum and dorsal mid portion of propodeum; vestiture of tergite 4 white and brown, apical fringe dark brown in the middle, white laterally. Vestiture of apical segments dark brown. Spines on femora and tibial spurs brown. Longest hind tibial spur distinctly spatulate, meaning broader at the apex, excavated and rounded. The smaller spur less broadened at the apex (fig. 1). Length of vertical plate on hind femora about two-thirds the length of the underside of the femur.

Head.— Mandible with two teeth. No temporal groove. Head in frontal view somewhat broader than long. Clypeal margin medially angulated, the sides oblique. Clypeal rim distinctly broadened in the middle, gradually narrowing laterally and somewhat enlarged on side lobes. Antennal sockets protruding, area in between slightly raised towards the middle. Frons in dorsal view remarkably convex (fig. 2). Vertex broad. Scapus of antenna rather densely punctate, antennal segments short. Clypeus with disc impunctate but on lower half with some irregular length-wise wrinkles, laterally rather densely punctate. Area frontalis densely punctate but with a narrow irregular impunctate vertical stripe that terminates at the slightly but distinctly raised area between antennal sockets. Spatium frontale densely punctate but with some small impunctate areas of about puncture diameter. Frons densely punctate but with some small irregular impunctate areas of about puncture diameter between spatium frontale and anterior ocellus and laterally. Fissura frontalis not indicated. Anterior ocellus in a narrow, largely impunctate pit. Ocellar triangle punctate. Ocellar furrow well defined and continues over a short distance laterad of posterior ocelli. These ocelli laterad with a small triangular impunctate area. Vertex strongly raised above ocellar triangle. In frontal view outer contour almost reaches the level of sini ocularis. Vertex and its vertical portion densely punctate at interspaces mostly smaller than puncture diameter but vertex medially with a narrow impunctate stripe length-wise, running from ocellar furrow to vertical portion of vertex. Base of stripe distinctly broader along ocellar furrow and tapers towards vertical portion of vertex. Occipital carina complete but less distinct over a short median portion.

Mesosoma.— Dorsal and vertical portion of pronotum densely punctate. Impunctate area behind callosities rather large. Callosities broad in the middle, deeply and

rather densely punctate. Dorsal portion of upper area of mesopleuron densely punctate, anterior portion with large punctures at increasing interspaces but large anterior inner corner impunctate; posterior portion only punctate along upper margin. Lower area of mesopleuron divided by a sharp crest into an anterior and posterior portion. Anterior portion rather densely punctate above coxa II, continued parallel with the crest as a narrow band, 2-5 punctures wide, but broadly impunctate along pronotum. Posterior portion with dispersed punctures over a short distance above coxa II and along crest, but leaving larger part impunctate. Upper plate of metapleuron divided by a well-defined ridge in a punctate dorsal portion and an impunctate vertical portion. Lower plate with a band of punctures along lower margin above coxa II and some dispersed punctures above coxa III. Spiracular angles and areas impunctate except for some punctures below lower tip of the spiraculum. It was not possible to make a good picture of upper plate and spiracular angle because of condition of specimen. Fig. 3 shows this area in a specimen from China. Carina lateralis just exceeds level of spiracle. Lateral vertical portion of propodeum very densely punctate with large punctures, but large anterior inner corner impunctate continued over some distance as a narrow impunctate area along lower plate of metapleuron.

Mesoscutum.— Densely punctate at interspaces mostly smaller than puncture diameter. Scutellum densely punctate but posteriorly with larger interspaces. Metanotum densely punctate but with narrow impunctate vertical median stripe. Mid dorsal portion of propodeum distinctly convex, anterior width about 2.7 times median length, deep and densely punctate but with irregular broad impunctate median stripe slightly raised towards posterior margin and terminating as a small smooth ridge, not exceeding posterior margin. Transition to concave posterior mid vertical portion abrupt. Dorsal lateral portion of propodeum densely punctate with large punctures but upper inner corner up to below the spiracle with much smaller punctures. transition to vertical lateral portion rounded and not bordered by a carina on posterior upper corner. Upper margin of posterior mid vertical portion well defined. Posterior mid vertical portion densely and coarsely punctate over short distance below upper margin but narrow underside of raised ridge impunctate. Posterior lateral vertical portion with upper portion densely punctate continued along lateral margin.

Metasoma.— Tergite 1 broad, posterior width about three times median length of horizontal portion, irregularly punctate and with large impunctate areas. Transition from dorsal to anterior vertical portion rather abrupt, rounded and without tubercle. Tergite 2 with a similar punctation but more densely punctate along posterior margin. Tergites 3-4 have an irregular pre-apical line of punctures. Area between this line and posterior margin largely impunctate, but less so laterally. Width of posterior margin of sternite 1 about 1.8 times median length. Transition from horizontal to anterior vertical portion of sternite 2 rather abrupt, rounded and without tubercle. Sternite 3 perfectly smooth basally and without a gradulus.

Other female specimens.— The specimen of Assam (MNHB) differs in size (length of body 25 mm) from the lectotype and has more fuscous wings.

The Indonesian specimen is very similar to the lectotype of *B. bella* but differs by an entirely black tergite 3 and a body length of 25 mm. The fore wing is brownish-hyaline, somewhat darker along the anterior margin; the hind wing is brownish-hyaline. The fore wings have a bluish tinge in certain lights, the hind wings pinkish or purplish. The

fissura frontalis is indicated on the spatium frontale and frons. The metanotum has a small impunctate area medially below the anterior margin. The vertical impunctate stripe on the mid dorsal portion of the propodeum is a little broader. The somewhat raised posterior ridge is as broad as the impunctate stripe and is clearly triangular on the posterior margin (fig. 4).

The Pingloo specimen has a length of 20 mm and is coloured as the holotype. The colour of wings as in the Indonesian specimen. The upper plate of the metapleuron has on both sides some punctures just on or below the transition between the dorsal and vertical portion. The spiracular angles have some dispersed punctures. The punctation of the mid vertical portion of the propodeum is irregular with sometimes large interspaces. The punctures are smaller.

The Fou-kien specimen is not *B. stoetzneri* but *B. bella*. It has a length of 25 mm and is coloured like the lectotype. The head in frontal view is somewhat broader than the head of the types of *B. bella* and *B. stoetzneri*. The left upper plate of the metapleuron has one puncture just below the transition between the dorsal and vertical portion.

The male of *Bellimeris bella*.— With Argaman's 1996 key, also the male of *Bellimeris bella* can be identified. However, there is no published description of the male of *B. bella* and the male on which Argaman based his key could not be located. The key suggests that the male has yellow posterior margins on tergites 1-4 and a white vestiture. The apical tergites are black with a black vestiture. The large yellow spot on the gena is considered an important diagnostic character. The diagnostic character given in the key to separate *B. bella males* from his new genus *Niyaranta* is a flat or raised vertex between the lateral ocelli. This character has been found very variable and therefore is considered of no value. We consider the male of *B. bella* as still unknown.

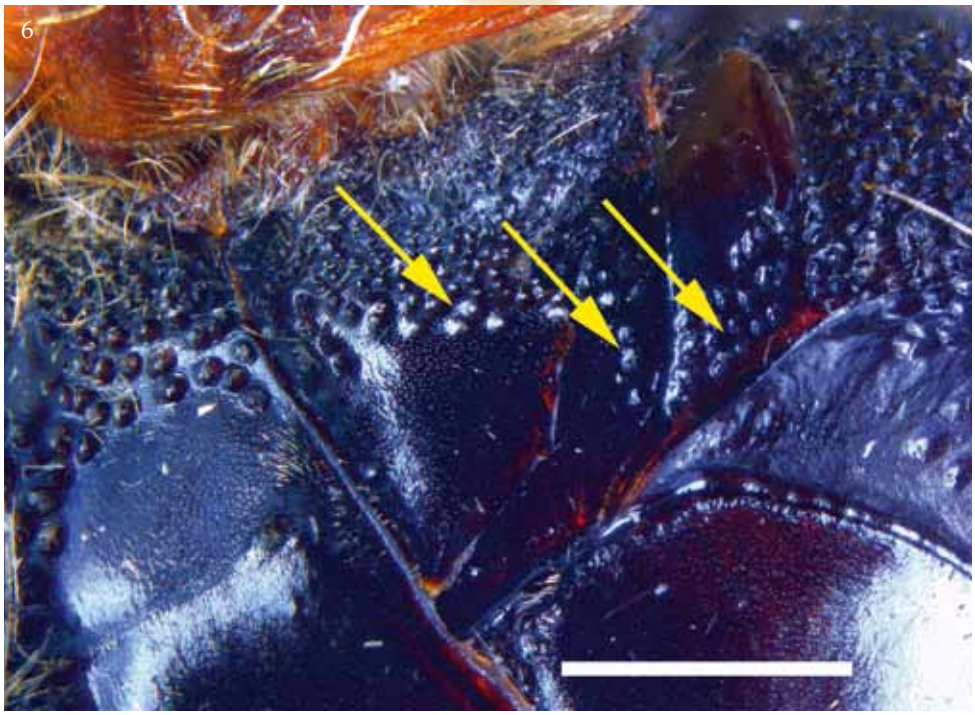
Remarks.— Argaman (1996) places *Bellimeris bella* in his new tribus *Megacampsomerini*. Diagnostic characters given for this tribus are among others: the hind tibial spurs of the female tapering to apex, rather acute apically and the combined length of the male maxillary palp segments from two-thirds to three-fourth as long as the hypostoma. Species with the hind tibial spurs very distinctly spatulate are placed in his new tribus Dielidini. Males of this tribus have the combined length of the maxillary palp from one-fourth to one-third as long as the hypostoma. This tribus presently consists of one Australian/Oriental genus, one Nearctic genus, three Neotropical genera, one Nearctic/Neotropical genus and five Afrotropical genera. *B. bella* can only be assigned to the correct tribus when the male is known.

Bellimeris stoetzneri (Betrem, 1928)

(figs 5-6)

Campsomeris (*Megacampsomeris*) *stoetzneri* Betrem, 1928: 139 (as *Campsomeris stoezneri*, but in Key and Table of Contents as *Campsomeris stoetzneri*).
Campsomeris (*Megacampsomeris*) *stoetzneri* Betrem: Betrem, 1941: 63.
Campsomeris (*Megacampsomeris*) *stoetzneri* Betrem: Tsuneki, 1972: 7.
Megacampsomeris stoezneri Betrem: Osten, 2005: 23.

Type material.— ♀ holotype *Campsomeris stoetzneri* Betrem, 1928; **People's Republic of China**, Kwanhsien, Szetschwan prov., Stötzner Exp. (presently Kwanhsien near Chengdu, Sichuan prov.) and a blue label with number 65 (ETHZ; type label).



Figs 5-6, *Bellimeris stoetzneri* (Betrem, 1928), holotype ♀, China, Kwanhsien. 5, habitus; 6, upper plate of metapleuron and spiracular angle (arrows point to punctures on vertical portion of metapleuron and punctate spiracular angle); scale 1 mm.

Other material.— **(China)**, Peiping, Hopei prov. (presently Beijing or Hopei prov.), vii-1933, 1♀ (G. Liu; RMNH).

Redescription of female holotype.— The holotype (fig. 5) looks very similar to the lectotype of *B. bella* and therefore only the differences with this lectotype are given. Length of body 28 mm. Tergites 1-4 with yellow apical margins, interrupted over a rather short distance. Fore wings with closed cell area hyaline to yellowish-hyaline, wing blade yellowish-hyaline with subapical slightly darker patch. Hind wings yellowish-hyaline. Wings darker in certain lights. Apical fringe on tergite 4 white. Hind tibial spur spatulate as in *B. bella*.

Head.— Clypeal disc without length-wise wrinkles.

Mesosoma.— Transition from dorsal to vertical portion of upper plate of metapleuron more gradual. Vertical portion punctate just below transition with dorsal portion and with some punctures along anterior and posterior sutures. Spiracular angles punctate (fig. 6). Lateral vertical area of propodeum almost entirely punctate but for rather small anterior inner corner. Scutellum with narrow irregular impunctate vertical stripe, broader above posterior margin. Metanotum with irregular median impunctate vertical stripe, lower portion sometimes with larger interspaces. Propodeum with upper portion of posterior vertical mid portion densely punctate as in *B. bella* but lower vertical area laterally with some dispersed punctures. Lower mid vertical portion densely covered with rather long white hairs, parallel running from base to punctate area of posterior mid vertical portion. Such hairs could not be seen on *B. bella* lectotype due to the closeness of metasoma to the propodeum but may be the "vertical striae" mentioned by Bingham.

Developmental aberration in the holotype.— Vertical portion of upper plate of metapleura of holotype shows on both sides an aberrant structure that likely has developed during juvenile development or metamorphosis. It can be described as two overlaying layers of which the upper layer is only partly developed. The border of this layer shows as an irregular ridge on the vertical portion. A similar but smaller aberration can be seen on the lower plate. It is possible that the development aberrations mentioned above have affected structure and punctation of the metapleuron. However, the other *B. stoetzneri* specimen, listed below, shows the same characteristic punctation as in the *B. stoetzneri* holotype and thus the aberrant development of the holotype did not noticeably affect the punctation of the metapleuron and spiracular angle.

Other female specimens.— The Peiping specimen (28 mm) is very similar to the holotype but the yellow apical margins on tergite 2 and 3 are narrowed in the middle and with only a very small interruption. Punctation of the mid vertical portion of the propodeum is as in *B. bella*.

Remarks.— One of the specimens from Hanchow (China, Hou-pei province, presently Hubei province), listed in Betrem (1941) as *Campsomeris stoetzneri* is present in the RMNH collection and was studied. It was identified as a female of *Megacampsomeris schulthessi* Betrem, 1928.

Betrem (1941) suggested that *Campsomeris ferox* de Saussure, 1859 (= *Campsomeris* (*Radumeris*) *tasmaniensis* (de Saussure, 1855) Betrem form *ferox* (de Saussure) Betrem n. status (Bradley, 1974)) could also belong to the *Campsomeris stoetzneri* group. This species, however, is without doubt a *Radumeris* species. Females of the genus *Radumeris*

share certain characteristics with the genus *Bellimeris* such as a convex frons, spatulate hind tibial spurs and a long vertical plate on the hind femur but frons and vertex are largely impunctate, the punctation in general is less dense and deep and the metasoma is largely yellow or reddish-yellow.

Diagnostic characters for females of the genus *Bellimeris* Betrem, 1972

Medium-sized to large species (19-28 mm). Body integument black but tergites 1-2, 1-3 or 1-4 with broadly or narrowly interrupted narrow yellow apical margins. Vestiture white and brown to golden-brown black on apical segments of the metasoma. Two recurrent veins. Two submarginal cells, three discoidal cells. Length of vertical plate on hind femora about two-thirds the length of femur. Larger hind tibial spur brownish, apically rounded, distinctly and gradually broadened and excavated (spatulate). Smaller spur similar or less distinctly broadening towards the apex.

Head.— Somewhat broader than long. Frons strongly convex, vertex strongly raised above ocellar triangle. Spatium frontale, frons and vertex deeply and densely punctate.

Mesosoma.— Callosities broad and rather densely punctate. Lower area of the mesopleuron divided by a sharp crest. Transition between punctate dorsal portion of upper plate of metapleuron and vertical portion well defined or rather gradual. Vertical portion impunctate or punctate just below transition with dorsal portion and with some punctures along anterior and posterior suture. Spiracular angles punctate or impunctate, spiracular areas impunctate. Pronotum, mesoscutum, scutellum, metanotum and dorsal and lateral portions of propodeum deeply and densely punctate. Propodeum with mid dorsal portion distinctly convex and with an irregular broad impunctate median stripe that apically terminates in a flat or slightly raised ridge. Upper inner corner of lateral dorsal portion punctate with small punctures. Transition of lateral dorsal portion to vertical lateral and posterior vertical portions rounded and without a carina. Upper area of posterior mid vertical portion concave and mostly densely and deeply punctate over some distance below sharp transition with dorsal mid portion, area below punctate zone impunctate but covered with parallel running white hairs.

Metasoma.— Tergites 3 and 4 with an irregular pre-apical line of punctures. Area between this line and posterior margin largely impunctate. Tergite 3 basally smooth and without a gradulus.

Females of the genus *Sericocampsomeris* share certain characteristics with the genus *Bellimeris* such as a strongly convex frons, a raised area between the antennal sockets, the broad, densely punctate callosities and the large vertical plate on the underside of the hind femora. *Sericocampsomeris* females differ in particular from the genus *Bellimeris* by a more or less rounded crest on the lower portion of the mesopleuron; an only partial punctate head, a less dense and less deep punctation of the mesosoma, in particular of the mesoscutum, scutellum, metanotum and dorsal lateral and vertical portions of the propodeum; an impunctate inner corner on the dorsal lateral portion of the propodeum; a weak carina in the upper corner of the transition between the dorsal and lateral vertical portions of the propodeum; a rounded, not well defined transition between the dorsal and posterior vertical portion and a less concave and a more punctate posterior vertical portion. The hind tibial spurs are apically rounded and excavated but not

distinctly broadened towards the apex. However, sometimes the larger spur looks weakly spatulate.

Key to female *Bellimeris bella* and *Bellimeris stoetzneri*

1 Spiracular angles and vertical portion of upper plate of metapleuron impunctate. (fig. 3) ..... *B. bella* (Bingham)
– Spiracular angles punctate. Vertical portion of upper plate of metapleuron punctate just below transition with dorsal portion and with some punctures along anterior and posterior sutures. (fig. 6) ..... *B. stoetzneri* (Betrem)

The possible male of *B. stoetzneri*: *Megacampsomeris szetschwanensis* Betrem, 1928
(figs 7-8)

Betrem (1928) described the male *Campsomeris* (*Megacampsomeris*) *szetschwanensis* as a new species. In a note he remarked that the new species could be the male of *C. grossa* Fabricius, 1804, *C. schulthessi* Betrem, 1928 or *C. stoetzneri*. A specimen in the same collection but without locality label was described as a "paratype" but Betrem indicated that it could also be a different species. For a description of this specimen see below. In Betrem (1941), he described five formas (A-E) of *C. szetschwanensis* with a key for their identification. A specimen, labelled by Betrem as the Forma A and another specimen labelled as the Forma B were available for study. He considered the forma A the "typical" forma of *C. szetschwanensis*. Formas A and B have a tubercle on sternite 2; the other formas are without tubercle. The holotype of *M. szetschwanensis* and the Forma A are conspecific. The Forma B is the male of *M. schulthessi*. The paratype without the locality label keys out with Betrem's 1941 key as the Forma C. It is clearly a different species. Betrem (1941) suggested that it could be the male *Megacampsomeris grossa* (Fabricius, 1804).

The forma A specimen carries an identical collection label (Szetschwan. Kwanhsien; Stötzner Exp.) as the holotype female of *B. stoetzneri*, a second rather confusing label *setzschwanensis* (sic, in handwriting) and det. Schulthess 92 (in print) and a third label *Campsomeris szetschwanensis* Forma A (in writing) and det. Betrem (in print). The holotype and "paratype" carry blue labels with the numbers 65 and 58 respectively. This suggests that the holotype *M. szetschwanensis* came from the same lot as the holotype *B. stoetzneri* that carries an identical blue label with the number 65. However, the holotype female of *Campsomeris schulthessi* Betrem, 1928 with the same collection labels as the holotype female of *B. stoetzneri* also carries a blue label with the number 65.

Megacampsomeris szetschwanensis Betrem, 1928

Campsomeris (*Megacampsomeris*) *szetschwanensis* Betrem, 1928: 140.
Campsomeris (*Megacampsomeris*) *szetschwanensis* var. Betrem, 1928: 140.
Campsomeris (*Megacampsomeris*) *szetschwanensis* Formas A-E. Betrem, 1941: 67.
Megacampsomeris. schulthessi schulthessi Betrem, 1928 = ?*szetschwanensis* Betrem, 1928: Osten 2005: 21.

Type material.— ♂ Holotype *Campsomeris szetschwanensis* Betrem, 1928; **People's Republic of China,** Kwanhsien, Szetschwan prov., Stötzner Exp. (presently Kwanhsien, near Chengdu, Sichuan prov.) and a blue label with the number 65 (ETHZ, type label).

Other material.— *Campsomeris szetschwanensis* Betrem, 1928, "paratype", blue label with number 58 but no locality label, 1♂ (ETHZ, cotype label); *Campsomeris szetschwanensis* Betrem, 1928 Forma A, **(China)** Kwanhsien, Szetschwan prov., Stötzner Exp. 1♂ (RMNH); *Campsomeris szetschwanensis* Betrem, 1928 Forma B. **(China)** Zõ-Pou, Chejiang prov., VI-32, 1 ♂ (RMNH).

Diagnosis.— The habitus is shown in fig. 7. This species can be recognised by the following combination of characters: Base of mandible and clypeus black, scrobes yellow. Head and mesosoma black. Metasoma black but tergites 1-4 and sternites 2-4 with yellow apical margins; apical three segments black and reddish-brown. Tibia I broadly yellow on outer side. Vestiture white but dark brown to black on apical three segments of metasoma. Hind tibial spurs white. Sternite 3 basally smooth and without a gradulus. Propodeum in dorsal view with a rather narrow, strongly sloping, mid subhorizontal portion, anterior width about three times median length, that merges with vertical portion. In lateral view subhorizontal portion slopes rather steeply and makes a more obtuse angle with vertical portion (fig. 8). *M. szetschwanensis* Forma C also has a largely black clypeus but propodeum in dorsal view with a longer mid subhorizontal portion, anterior width about 1.8 times median length, that is less sloping and makes a more or less straight angle with the vertical portion. In lateral view the subhorizontal portion slopes more gradually and makes a somewhat sharper angle with vertical portion (fig. 9).

Redescription holotype.— Length of body: 20 mm. Base of mandibles black, clypeus black. Scrobes yellow. Thorax black but upper half of callosities reddish-yellow, tegulae and posterior corners of pronotum yellowish. Apex of femora with yellow spot, upper side of tibia 1 broadly yellow, metatarsus and fifth tarsal segment reddish-yellow. Metasoma black with narrow apical yellow margins on tergites 1-4, apical margin of tergite 1 narrowly reddish-yellow along posterior margin of tergite. Sternites 2-4 with narrow yellow apical margins, somewhat interrupted medially by reddish-yellow area. Tergite and sternite 5 with a very narrow reddish-yellow apical margin. Apical three segments largely reddish-brown. Vestiture white but brown to black on apical three segments of metasoma. Antenna black, reaching almost posterior margin of tergite 1. Length of apical segment about three times maximum width. Wings yellowish-hyaline. Combined length of the maxillary palp about two-thirds of the length of the hypostoma.

Head.— Spatium frontale densely punctate but impunctate around frontal pit. Fissura frontalis visible up to frontal pit. Frons well separated from spatium frontale by impressed impunctate line, weakly angulated medially. Frons below anterior ocellus largely impunctate, laterally rather densely but irregularly punctate with smaller and larger punctures. In frontal view, posterior ocelli and area in between distinctly raised above level of eye lobes.

Mesosoma.— Dorsal and vertical portion of pronotum densely punctate. Narrow area behind callosities with dispersed small punctures. Dorsal portion of upper plate of metapleuron rather densely punctate, vertical portion with more dispersed punctures and lower inner corner impunctate. Lower plate with dispersed punctures but upper one-third impunctate. Carina lateralis abbreviated, not reaching level of spiraculum. Spiracular angles and areas punctate. Lateral vertical portion of propodeum rather slender, densely punctate along upper margin and gradually more dispersed punctate downwards. Mesoscutum punctate at interspaces smaller or about equal to puncture diameter but medially with larger impunctate interspaces. Scutellum with upper portion rather densely to densely punctate, central portion less densely punctate and

Figs 7-8, *Megacampsomeris* from China, Kwanhsien. 7, *Megacampsomeris szetschwanensis* Betrem, 1928, holotype ♂, habitus; 8, *M. szetschwanensis* Forma A Betrem, ♂. (= *M. szetschwanensis* Betrem), propodeum and tergite 1 in lateral view (arrows indicate steeply sloping mid subhorizontal portion of propodeum); fig. 7 scale 1 cm, fig. 8 scale 1 mm.

Figs 9-10, *Megacampsomeris* from China, Kwanhsien. 9, *Megacampsomeris* spec., ♂, propodeum and tergite 1 in lateral view (arrows indicate more gradually sloping mid subhorizontal portion of propodeum); 10, *Megacampsomeris* spec., ♂, habitus; fig. 9 scale 1 mm, fig. 10 scale 1 cm.

broadly impunctate along posterior margin. Metanotum very densely punctate but with a narrow impunctate vertical stripe. Propodeum in dorsal and lateral view as described in the diagnosis.

Metasoma.— Tergite 1 broad elongate, posterior width about twice median length of horizontal portion, transition from dorsal to anterior vertical portion gradual. Sternite 1, median length about 1.2 times posterior width, densely punctate but narrow mid line and above posterior margin impunctate. Sternite 2 with tubercle on transition from ventral to vertical portion. Outline of paramere given in Betrem (1928) plate 2 fig. 42.

M. szetschwanensis Forma A (= *M. szetschwanensis* Betrem, 1928) has the same structure as the holotype but upper half of callosities yellow, femur I with a short apical yellow stripe on the lower part; metatarsus I and the fifth tarsal segment yellow; tibia 2 with a short yellow stripe at the basis on upper side. Tergite and sternite 5 without reddish-yellow coloration. Length: 21 mm.

Megacampsomeris spec.
(*M. szetschwanensis*. Forma C, Betrem, 1941)
(figs 9-10)

Material studied.— *Campsomeris szetschwanensis* Betrem, 1928, paratype, blue label with number 58 but no locality label, 1♂ (ETHZ, cotype label).

Habitus (fig 10).— Length 23 mm. Distinct colour differences with the type *C. szetschwanensis* are: mandibles with a yellow base, clypeus black with yellow lateral spots at the basis, tibia and tarsalia dark brown, tergites 1- 5 with a yellow apical margins, the yellow margin on tergite 5 narrower; sternite 2 with an interrupted yellow apical margin, sternites 3 and 4 with broader interrupted yellow apical margins. Vestiture and colour of wings as in *M. szetschwanensis*. Antenna black, reaching posterior margin of tergite 1. Length of apical segment about 3.1 times anterior width. Wings yellowish-hyaline. Combined length of maxillary palp about two-thirds of the length of the hypostoma.

Head.— Frons well separated from spatium frontale by an impressed, angulated medially, impunctate line. Below this line an impunctate triangular area. (see Betrem, 1941, fig 9). In frontal view posterior ocelli and area between little raised above level of eye lobes.

Mesosoma.— Punctation similar to *M. szetschwanensis*. Propodeum in dorsal and lateral view as indicated in the diagnosis.

Metasoma.— Tergite 1 broad elongate, posterior width about 1.3 times the median length of horizontal portion. Transition to anterior vertical portion very gradual. Median length of sternite 1 about 1.3 times posterior width. Sternite 2 without tubercle.

Key to the male *Megacampsomeris szetschwanensis* Betrem, Formas A-C and "paratype"

1 Base of mandibles black, clypeus black. Tergites 1-4 with yellow apical margins. Vestiture mesoscutum white. In dorsal view, mid subhorizontal portion of propodeum narrow, anterior width about three times median length and strongly slop-

ing. In lateral view, mid subhorizontal portion of propodeum slopes rather steeply, making a more obtuse angle with vertical portion (fig. 8) ..... *M. szetschwanensis* Betrem (syn. *M. szetschwanensis* Forma A Betrem)

– Base of mandibles black or partly yellow. Clypeus largely black with a small yellow spot or line in anterior lateral corners. Tergites 1-5 with yellow apical margins. Vestiture mesoscutum white or pale brown. In dorsal view, mid subhorizontal portion of propodeum broad, anterior width about 1.8 times median length and only gently sloping. In lateral view, mid subhorizontal portion of propodeum slopes more gradually, making a sharper angle with vertical portion (fig. 9). 2

2 Vestiture mesoscutum white. Spatium frontale separated from frons by an impunctate triangular area, bordered above by an impunctate angulated impressed line. Posterior width of tergite 1 about 1.3 times the median length of horizontal portion. (fig.10) ..... *Megacampsomeris* spec. (syn. *M. szetschwanensis* Forma C Betrem)

– Vestiture mesoscutum light brown. Spatium frontale separated from frons by an impunctate gently curved impressed line. Area below over a short distance irregularly impunctate and often with a small depression in the middle. Posterior width of tergite 1 about twice the median length of horizontal portion ..... *M. schulthessi* Betrem, 1928 (syn. *M. szetschwanensis* Forma B Betrem)

Discussion

The inconsistencies in the descriptions of the *Bellimeris* species, as indicated in the introduction, are largely caused by differences in judgement as to the presence or absence of a "tubercle" and overlooking or misjudging the presence of spatulate tibial spurs. It is obvious that the posterior margin of the propodeum has a conspicuous small impunctate ridge, not a tubercle. The larger hind tibial spur of female *Bellimeris* is spatulate and clearly different from the similarly coloured, excavated, apically rounded but mostly not distinctly spatulate hind tibial spur of the genus *Sericocampsomeris*. The description given by Tsuneki (1972) of the interantennal area is correct. A gradually raised area between the antennal sockets is also found in some *Megacampsomeris* species such as *M. asiatica* (de Saussure, 1858), *M. binghami* Betrem, 1928 and *M. schulthessi*. The frons is distinctly more convex than in most *Campsomerinae* but a convex frons, although less distinctly is also present in certain *Megacampsomeris* species.

Betrem could not study the holotype of *Elis bella* when he wrote his 1928 and 1941 publications. Had it been possible, it may be questioned if he would have described *Campsomeris stoetzneri* as a new species. Betrem (1928, 1941) did not describe the metapleuron and spiracular angles of *B. stoetzneri*. The female types of both species look very similar but differ in the number of tergites with narrow yellow apical margins, the punctation of the spiracular angles and the punctation and structure of the upper plate of the metapleuron. In Scoliidae the punctation of the upper plate of the metapleuron, the transition between the dorsal and vertical portion of the plate and the punctation of the spiracle angle can be species-specific or show intra-specific variation. The *B. bella* specimen from Pingloo has some punctures on or below the transition to the vertical portion of the plate and in the spiracular angle and so shows some resemblance with *B. stoetzneri*. It could well be that *B. bella* is a species with a very wide distribution and some regional variation.

B. stoetzneri is besides the holotype only known from one additional specimen. There are no males known that can be associated with certainty to both species of *Bellimeris*. Until more material becomes available it seems best to consider specimens with a well defined transition between the dorsal and vertical portion of the upper plate of the metapleuron, an impunctate vertical portion and impunctate spiracular angles as *B. bella* and those specimens with a more gradual transition between the dorsal and vertical portion, a vertical portion with localized punctures and punctate spiracular angles as *B. stoetzneri*.

M. szetschwanensis Forma A and C could be the male of *B. stoetzneri* or the males of other species. There are three different female species known that were collected in Kwanhsien by the Stötzner Expedition: *M. grossiformis* holotype (RMNH) and "cotype" (ETHZ), *M. schulthessi* holotype (ETHZ) and *B. stoetzneri* holotype (ETHZ).

Betrem (1928) designated a specimen (RMNH), labelled 21-V-1912, Almora, Kumaon (= Almora, Kumaon hills, Uttaranchal, India) as paratype *M. grossiformis*. The holotype of *M. grossiformis* has a narrow and strongly sloping subhorizontal portion of the propodeum. This sloping is much steeper in the paratype from India. The male *M. grossiformis* has been described from India (Gupta & Jonathan, 2003). Two male specimens, coming from the same area where the female paratype of *M. grossiformis* had been collected, could be studied. The subhorizontal portion of the propodeum in dorsal view is sloping in a similar but distinctly steeper way as in *M. szetschwanensis*, while *M. grossiformis* males have the upper two-thirds of the clypeus yellow, a more extensive coloration of the legs and not interrupted yellow apical margins on the sternites. So *M. szetschwanensis* could be a regional variant of *M. grossiformis* or the *M. grossiformis*, described from India is a different species. The available material is too limited to elaborate this hypothesis. The female *M. grossa* also has a sloping subhorizontal portion of the propodeum and is also known from Sichuan. However, the taxonomy of *M. grossa* and related species is confusing and needs further study. The known material of this group of species is very limited. The identification of males with yellow apical margins on the metasoma is very difficult and identifications are often questionable. It could well be that there are still undescribed species in this group. Therefore the male Forma C is not described as a new species but listed as *Megacampsomeris* spec. More material is needed to ascertain the male of *B. bella* and *B. stoetzneri*.

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ETHZ Eidgenössische Technische Hochschule Zürich
MNHB Museum für Naturkunde - Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin
RMNH Netherlands Centre for Biodiversity Naturalis (formerly Nationaal Natuurhistorisch Museum or Rijksmuseum van Natuurlijke Historie), Leiden

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