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A New Species of the Genus *Carniella* Thaler & Steinberger from the Nepal Himalayas (Araneae: Theridiidae)

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ABSTRACT

A new species, *Carniella nepalensis* sp. n., is described from eastern Nepal. The male of new species is most similar to *C. forficata* (Gao and Li, 2014) and clearly differs by the shape of the embolus. The type locality of new species is northwesternmost for the genus in Asia.

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Authors' Contribution
AVT conceived the idea of the study. AVT and YMM analyzed the data, created images and wrote and edited the manuscript.

Key words
Comb-footed spiders, Asia, New taxa.

INTRODUCTION

Carniella Thaler & Steinberger, 1988, is a small genus of theridiid spiders distributed in Eurasia and Africa (World Spider Catalog, 2018). Eleven species of *Carniella* are restricted to southeastern Asia, and two others, including the type species, *C.brignolii* Thaler & Steinberger, 1988, are known from Europe and Namibia (World Spider Catalog, 2018). The genus has never been revised, but all species are well illustrated. Most are known by one sex only: three species are known from females and five from males. All representatives of the genus are very small, the total length ranges from 0.82 to 1.3 mm. Males of *Carniella* can be very easily recognized due to a type of clypeal rostrum that is bent upwards. The genus has several characters unknown or untypical for theridiids, *e.g.,* the basal position of the paracymbium, the modified tip of the cymbium, the high carapace in the female, the lack of the epigynal scuta (but with well developed epigastral scutum in the male) is well developed, the basal part of the embolus with outgrowth, and others.

While studying material from Nepal, we recognized that tiny specimens sorted as Linyphiidae belong to *Carniella*. A literature search revealed that the specimens from Nepal belong to a new species that we describe here.

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MATERIALS AND METHODS

This paper is based on material taken by Jochen Martens and Wolfgang Schawaller in Nepal, deposited at the Senckenberg Museum, Frankfurt on Main, Germany (SMF). Two paratypes are kept at the Zoological Museum of the Moscow State University (ZMMU). The sample number is given in square brackets. All specimens are preserved in 70% ethanol and studied using a MBS-9 stereo microscope. Specimens were photographed using a Canon 70D camera attached to an Olympus SZX16 stereomicroscope. Digital images were prepared using "CombineZP" and Zerene Stacker image stacking software. The sequence of leg segment measurements is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are given in millimetres.

Carniella Thaler & Steinberger, 1988

Carniella Thaler and Steinberger (1988: 998), Wunderlich (1995: 553), Wunderlich (2008: 250) and Gao and Li (2014: 17).

Marianana Georgescu (1989: 89).

Type species

Carniella brignolii Thaler & Steinberger (1988), by original designation (from Austria).

Comments

Brief diagnoses are given in the papers mentioned

above. The genus can be easily recognized by the modified male carapace with a clypeal rostrum (Fig. 1A, B), by the proximal position of the paracymbium (vs. anterior in all other theridiids except *Tekellina* Levi, 1953 (cf. Figure 2A-D in Marusik and Omelko, 2017) and by the lack of an epigynal plate (epigyne not sclerotised). As in all minute araneoids, tarsi in *Carniella* are longer than the metatarsi (Wunderlich, 1995).

While studying new species from Nepal we noticed some other characters in *Carniella* either not mentioned or not emphasized in other papers. Both sexes have an equally high carapace in profile (Fig. 1A, D); fovea of the carapace absent; male has epigastral scutum (Fig. 1C and Fig. 2 in Wunderlich, 1995); the labium is fused with the sternum (Fig. 1C); the sternum is almost triangular, not truncate posteriorly and extends between coxae IV (Fig. 1C, F); females have an unsclerotised epigynal plate; both sexes have no book lungs (Fig. 2E).

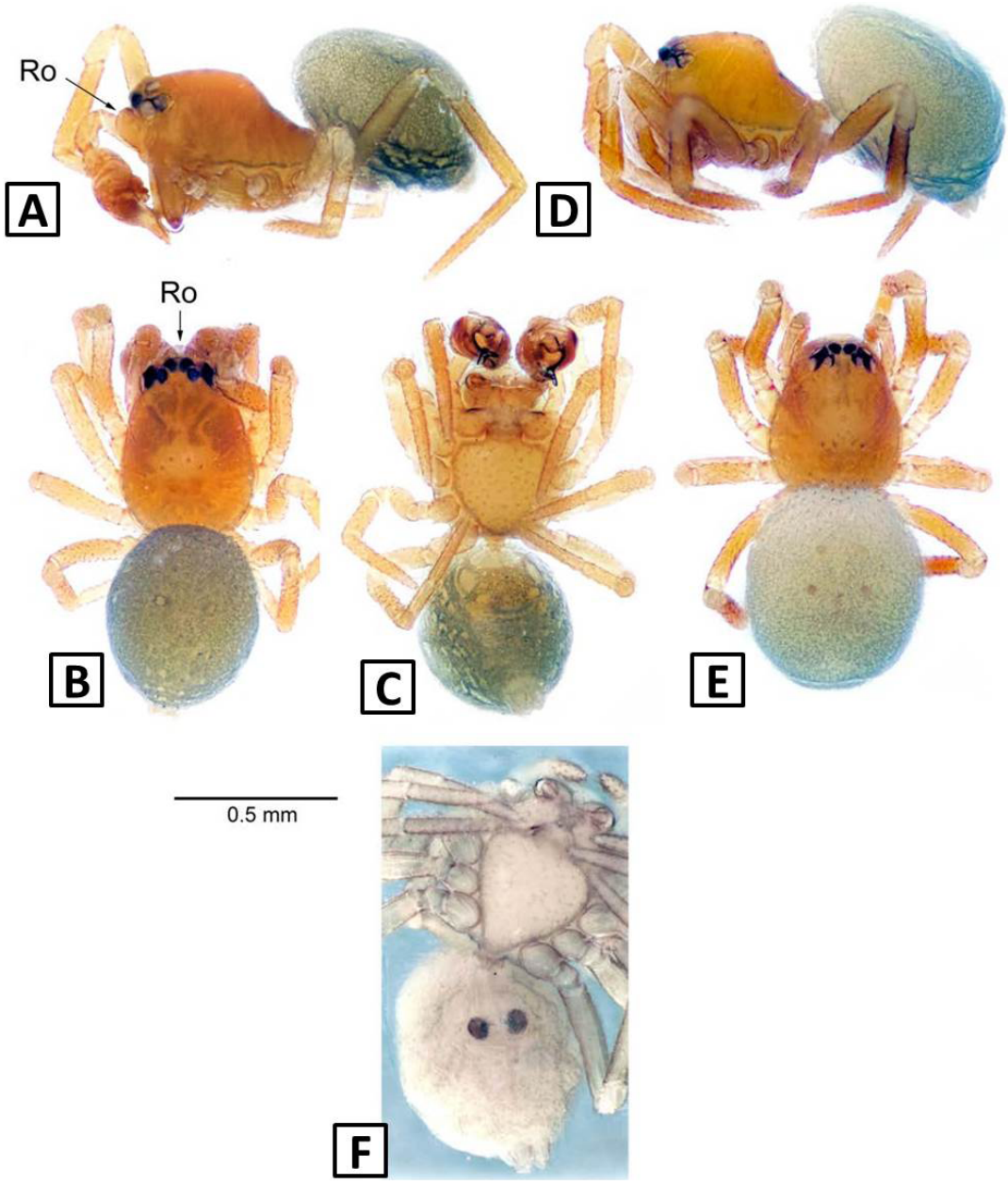

Fig. 1. Male (**A-C**) and female (**D-F**) of *Carniella nepalensis* sp. n., paratypes. **A and D**, lateral view; **B and E**, dorsal view; **C and F**, ventral view. Ro, rostrum.

Relationships

Agnarsson (2004) and Agnarsson *et al*. (2007), based on cladistic analysis, placed *Carniella* close to *Robertus* O. Pickard-Cambridge, 1879 and *Pholcomma* Thorell, 1869. Wunderlich (2008) considers the genus among Pholcommatinae, but this subfamily does not include *Robertus*. Two genera of Pholcommatinae have similar modification to the male carapace, *Magnopholcomma* Wunderlich (2008) and *Proboscidula* Miller (1970). Both the copulatory organs and somatic characters in *Pholcomma* and *Carniella* differ from one another (*i.e.,* the position of the paracymbium, the shape of the embolic base, the presence/absence of the embolic apophysis and book lungs, *etc*.), and therefore the position of *Carniella* requires further clarification.

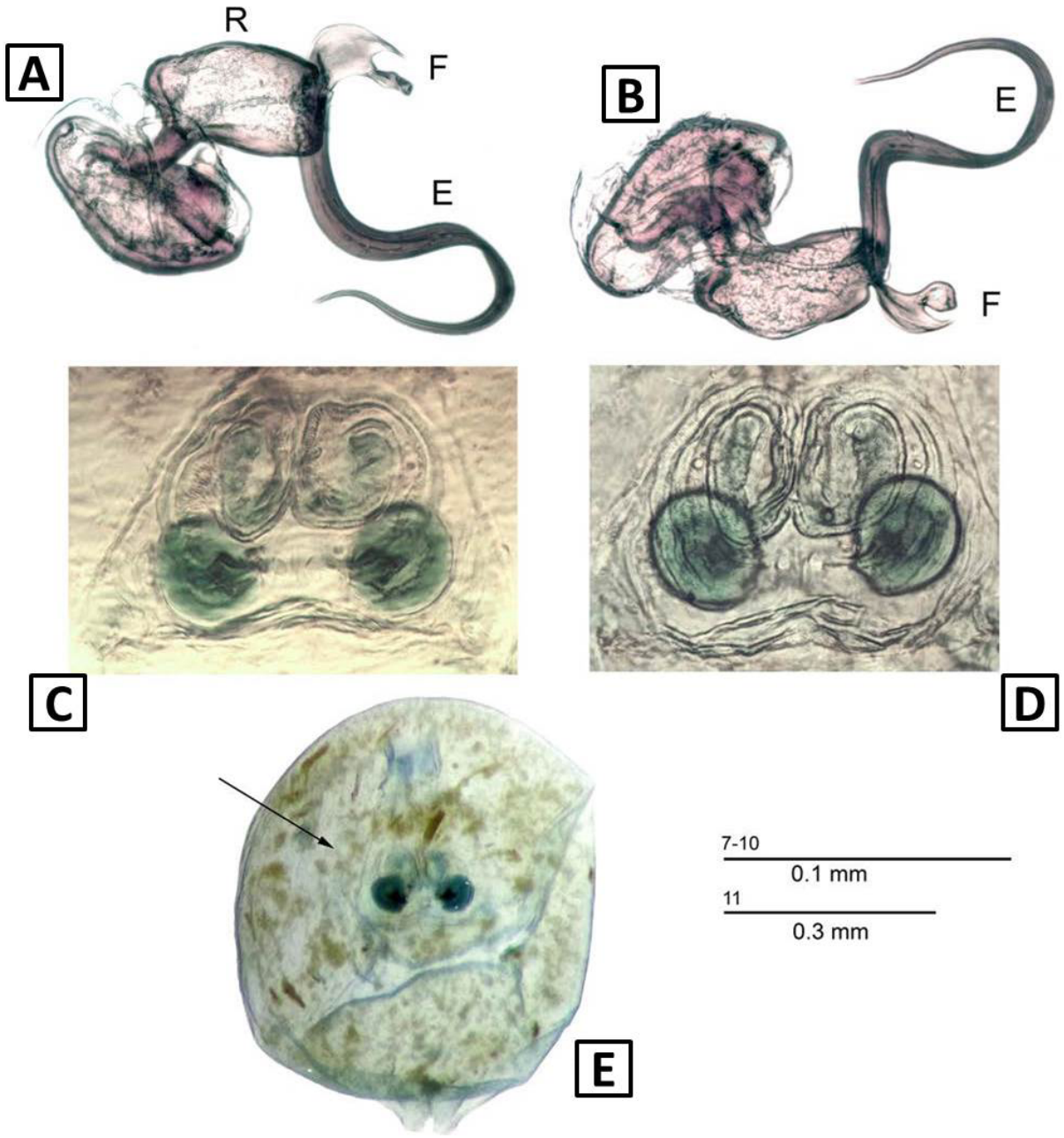

Fig. 2. *Carniella nepalensis* sp. n., paratypes, male (**A, B**) and female (**C-E**). **A and B**, embolus, different aspects; **C and D**, vulvae, ventral view; **E**, abdomen, ventral view, arrow indicates lack of book-lungs. E, embolus; F, fork; R, radix.

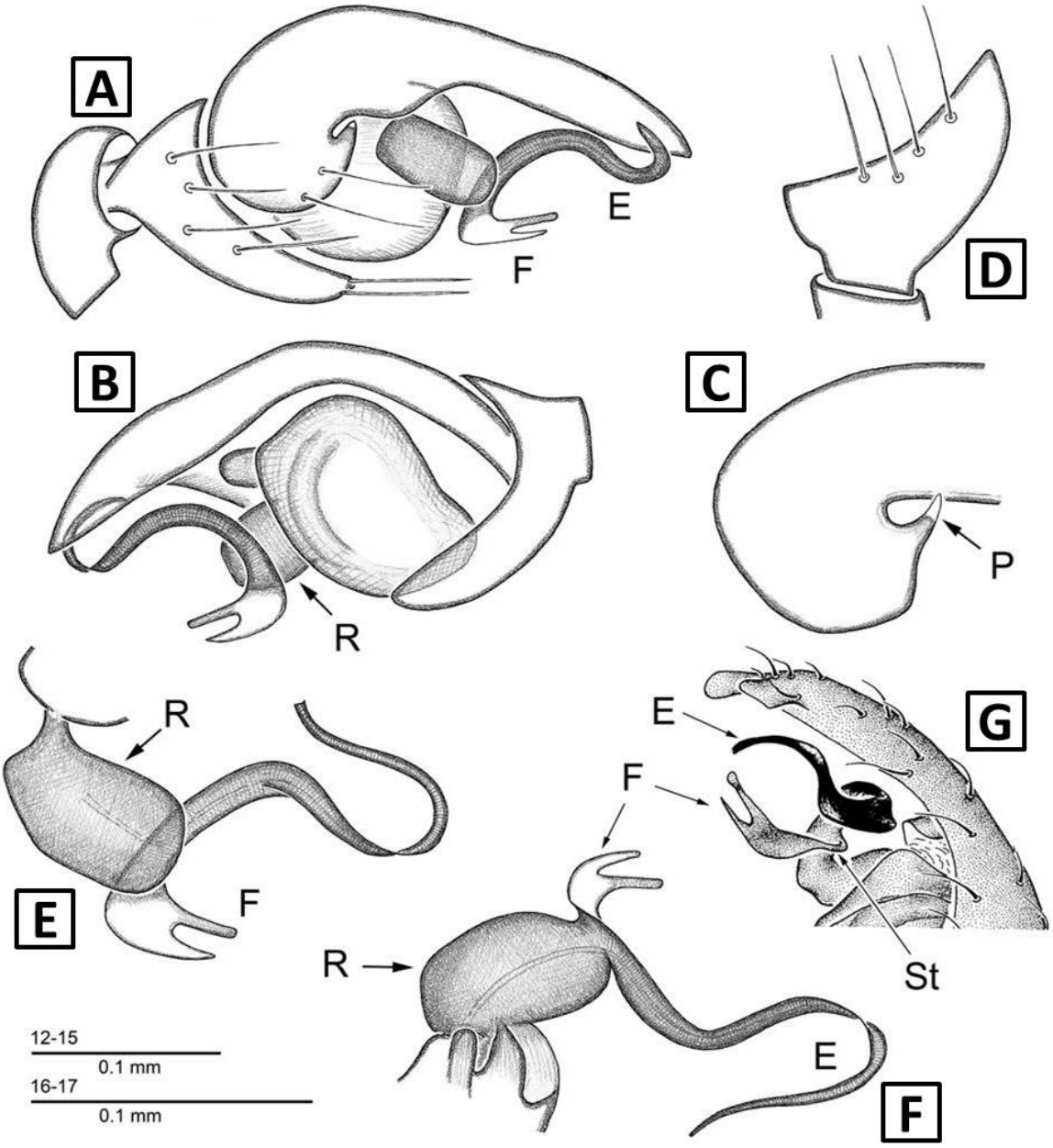

Fig. 3. Male palps of *Carniella nepalensis* sp. n., paratype (**A-F**) and C. *forficate* **(G)**; **A and B**, right palp, retrolateral and prolateral views, respectively; **C**, proximal part of cymbium, lateral view; **D**, palpal tibia, dorsal view; **E and F**, embolus, different aspects; **G**, distal part of palp after Gao and Li (2014, Fig. 16A), not to scale. E, embolus; F, fork; R, radix; P, paracymbium; St, stem of fork.

Distribution

The genus has a rather unusual distribution: Central Europe, southeastern Asia and Namibia. Wunderlich (2008: 248) assumes that the presence of *C. brignolii* in Europe is a recent introduction. However, the range of this species is rather large: Belgium, Germany, Austria, Switzerland and Romania), and it occurs not only in anthropogenic habitats, but also in natural habitats like debris block field (Austria), riparian zones of alpine streams (South Germany) or caves in Romania (Nentwig *et al*., 2018). Another species from outside the main range of the genus is *C. detriticola* (Miller, 1970) from Namibia. Although only known from the female, it is easily diagnosed as *Carniella*, based on its description and the somatic characters and the shape of

epigyne. In our opinion, the unusual range can be explained either by the contraction of a previously wide range or just improper sampling/identification of these tiny spiders. It seems that genus is present in Tasmania also (YM saw one female from the island that looks like *Carniella* sp.)

***Carniella nepalensis*, new species**

Fig. 1-3

Type

Holotype: ♂ (SMF), NEPAL, Taplejung District, above Yamputhin (= Yamphudin), *ca* 27°27'N 88°00'E, left bank of Kabeli Khola, bushes, open forest, 1800–2000 m, 27–29.IV.1988, leg. J. Martens and W. Schawaller [#352].

Paratypes: 2 ♂♂, 2 ♀♀ (SMF), 1 ♂, 1 ♀ (ZMMU), collected together with the holotype.

Etymology

The specific name is a Latin adjective, referring to the region of origin, Nepal Himalayas.

Diagnosis

The male of *C. nepalensis* sp. n. is most similar to that of *C. forficata* Gao & Li, 2014, known from males collected in southern Yunnan, China (Gao and Li, 2014). The new species can be easily distinguished from *C. forficata* by the larger radix and embolus, as well as by a shorter stem of the embolic apophysis (*cf*. Fig. 3F, G). The new species has a less prominent modification to the cymbial tip and a shorter male palpal tibia. The female of the new species is most similar to the Namibian *C. detriticola* (*cf*. Fig. 2C, D; Miller, 1970, Plate 52, Figs. 1–5). The two species have small copulatory openings close to each other, whereas in other species known from females the epigynal atria are present. The new species differ by the copulatory ducts (anterior part) being longer than the receptacles *vs*. shorter than the receptacles.

Description

Male paratype: Total length 1.08. Carapace modified, clypeus with distinct rostrum (Fig. 1A, B), 0.57 long, 0.44 wide, 0.25 high, pale brown. Anterior median eyes black, others white. Chelicerae 0.20 long. Sternum triangular. Legs pale brown, almost yellow. Leg I, 1.38 long (0.48+0.15+0.27+0.21+0.27), IV, 1.32 long (0.41+0.14+0.29+0.21+0.27). Tarsi of all legs longer than metatarsi. Abdomen 0.60 long, 0.45 wide, pale grey. Palp as in Figure 3A-F. Tibia with extended prolateral tip, edges with set of long setae. Cymbium long and narrow, tip modified, with small flat projection; paracymbium (P) like in all congeners located almost basally. Tegulum without distinct apophyses. Embolus complex, with large radix (R), embolus (E) long, filiform, with several bends; a short bifurcated apophysis (F) rising at the base of embolus.

Female: Total length 1.05. Carapace modified, cephalic part higher than thoracic one (Fig. 1D), 0.45 long, 0.38 wide, 0.25 high, pale brown. Chelicerae 0.21 long. Sternum triangular. Legs pale brown, almost yellowish. Leg I 1.00 long (0.27+0.14+0.21+0.15+0.23), IV 1.03 long (0.29+0.14+0.24+0.15+0.21). Abdomen 0.60 long, 0.51 wide, pale grey.

Epigyne as in Figures 1F, 2C and D: plate not sclerotised, edge of epigyne with dark, poorly defined margin; two round receptacles separated by one diameter, visible through integument (Fig. 1F), shape and location of copulatory openings indistinct; macerated epigyne with pair of white dots, that may correspond to fertilization ducts; copulatory ducts long, coiled, posterior part broad, about ½ of receptacle width, anterior loop of copulatory duct as long as receptacle.

Distribution

Known only from the type locality in eastern Nepal. It is the northwesternmost species of the genus in all of Asia.

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Statement of conflict of interest

Authors have declared no conflict of interest.

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