Redescription of two West Himalayan Cheiracanthium (Aranei: Cheiracanthiidae)

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ABSTRACT: Two species of Cheiracanthium, known only from the original descriptions, C. adjacens O. Pickard-Cambridge, 1885 and C. approximatum O. Pickard-Cambridge, 1885, are redescribed based on their types. A lectotype is designated for C. adjacens. The type localities of the two species lie in Himalaya, not in Tibet (Yarkand, Xinjiang, China), as indicated in catalogs. The lectotype (designated here) of C. insulanum (Thorell, 1878) a species described from Ambon, Indonesia is illustrated for the first time. It was found that literature records and figures of C. insulanum refer to C. approximatum. Because of this, several species considered as junior synonyms of C. insulanum are moved to synonyms of C. approximatum: C. adjacensoider Song, Chen et Hou, 1990, syn.n., C. paradjacens Chen et Gao, 1990, syn.n., C. payateus Barrion et Litsinger, 1995, syn.n., C. tigbaaeensis Barrion et Litsinger, 1995, syn.n., C. tigilium Barrion et Litsinger, 1995, syn.n., C. bikakapenalcolium Barrion et Litsinger, 1995, syn.n. and Cheiracanthium hugiscum Barrion et Litsinger, 1995, syn.n.

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KEY WORDS: Araneae, O. Pickard-Cambridge, Ferdinand Stoliczka, Pakistan, India, new synonym, lectotype designation.
Jammu and Kashmir region of the Karakoram Mountains. The opportunity arose to study types of those species described by O. Pickard-Cambridge in 1885, and it was decided to redescribe them to allow further research of the genus in this region. Most of the species described in this work have for a long time remained unstudied because the vials belonging to the “Yarkand Mission” collection have no geographical or species labels [Marusik, Nadolny 2018; Marusik, Omelko 2018; Marusik, Zonstein 2019]. The only labels present state the bottle number, vial number, and sometimes, the number of specimens in the vial. Detailed work is required to identify the different species and no archival materials have been found to aid identification. Further difficulties resulted from the fact that in the species descriptions O. Pickard-Cambridge [1885] does not indicate how many specimens have been studied and therefore how large the type series are (numbers of syntypes).

Although descriptions of both *Cheiracanthium* species were supplied with figures we faced certain difficulties when trying to recognize species in amongst the Yarkand materials. In total we found four specimens, two males and two females, in three vials. One of the vials contained both a male and a female. The two males are identical to each other and closely resemble *C. insulanum* (Thorell, 1878) sensu Deeleman-Reinhold [2001]. The illustration [O. Pickard-Cambridge 1885: fig. 17c and Fig. 2] of the male palp of *C. adjacens* fits well to the specimens studied and it was at first assumed that *C. adjacens* were missing. After studying the available literature, and further specimens from India identified as *C. insulanum* we recognised that the male and females of *C. adjacens* were mismatched, and that from the description the males thought to be *C. adjacens* are actually conspecific with the female of *C. approximatum*. It then appeared that *C. approximatum* was the species conspecific with *C. insulanum* (sensu Deeleman-Reinhold [2001]) but a study of the syntypes of *C. insulanum* reveals that Deeleman-Reinhold [2001] and subsequent authors dealt with misidentified specimens.

### Material and methods

Specimens were photographed with a Canon EOS 7D camera attached to an Olympus SZX16 stereomicroscope and Pro-Microscan camera attached to the Olympus BH-2. Digital images were montaged using CombineZP and Helicon focus 3.10 image stacking software. Epigynes were cleared in a KOH/water solution until soft tissues were dissolved. Standard abbreviations are used for leg segments: Fe femur, Pa patella, Ti tibia, Mt metatarsus, Ta tarsus. Variations in number of spines are given in brackets. The measurements are in mm.

Acronyms for museums: MCSN — Museo Civico di Storia Naturale “Giacomo Doria”, Genova, Italy; OUMNH — Oxford University Museum of Natural History; SMF — Senckenberg Museum, Frankfurt am Main, Germany; ZMMU — Zoological Museum of the Moscow State University, Moscow, Russia.

### Taxonomic survey

**NOTE.** When we found that syntypes of *C. adjacens* are mismatched and males are conspecific with syntype females of *C. approximatum* we had two options: either to select a male of *C. adjacens* as lectotype and synonymize the two
species (then the females of *C. adjacens* will not have any name) or to consider one of the two syntypes females of *C. adjacens* as the lectotype, in which case both species names remain valid.

*Cheiracanthium approximatum*

O. Pickard-Cambridge, 1885

Figs 1, 2 'a–c, e', 4–17, 25–31.

*Cheiracanthium approximatum* O. Pickard-Cambridge, 1885: 24, pl. 2, f. 17 (♀ only).

*Cheiracanthium adjacenoides* Song et Hou, 1990: 427, f. 1–4 (♂♂), syn.n.

*Cheiracanthium paradjacens* Chen et Gao, 1990: 148, f. 186a–d (♂♂), syn.n.

*Cheiracanthium payateus* Barrion et Litsinger, 1995: 156, f. 87a–h (♂), syn.n.

*Cheiracanthium tigbauensis* Barrion et Litsinger, 1995: 161, f. 91a–f, 92a–d (♂♂), syn.n.

*Cheiracanthium tingilum* Barrion et Litsinger, 1995: 164, f. 93a–e (♀), syn.n.
Figs 10–15. Male palp of *Cheiracanthium approximatum*: 10–12 — paralectotype of *C. adjacens*, 13–15 — specimen from Punjab. 10, 13 — ventral; 11, 14 — retrolateral; 12, 15 — dorsal. Scale = 0.2 mm.

Рис. 10–15. Пальпа самца *Cheiracanthium approximatum*: 10–12 — паралектотип *C. adjacens*, 13–15 — экземпляр из Пенджаба. 10, 13 — снизу; 11, 14 — ретролатерально; 12, 15 — сверху. Масштаб 0,2 мм.
Cheiracanthium bikanapalanicolum Barrion et Litsinger, 1995: 165. f. 94a–e (†). syn.n.

Cheiracanthium hugiscium Barrion et Litsinger, 1995: 167. f. 95a–e (†). syn.n.

Cheiracanthium insulanum: Deeleman-Reinhold, 2001: 228. f. 272–279 (œ), misidentification).

NOTE. All references to C. insulanum except for Thorell [1878] in WSC [2020] refer to this species.

TYPE: Holotype ♂ from “Murree to Sind Valley, July 14th to August 5th, 1873”; should be in OUMNH, not found.

ADDITIONAL MATERIAL EXAMINED: PAKISTAN: paralectotypes of C. adjacens: 1 ♀ in vial with label “6, B[ottle] 378, v[ial] 20, 2sp[ecimens]”; 1 ♂ in vial with label “32”. Text contains following label: “Murree, June 11th to July 14th, 1873”, INDIA: 2 ♀♂ [ZMMU], Himachal Pradesh, Patlikuwal Town, 32º07.4’N, 120 m, 17–23.06.1999 (Y.U. Marusik), 1 ♂ 1 ♀ [SMF 61705], Punjab, Chandigarh, bus terminal, 30º43.01’N 76º46.78’E, 307 m, 12.03.2011 (P. Jäger).

DIAGNOSIS. This species is most similar to C. furculatum from the Afrotropical region, and recently found in Belgium, Germany and Poland [Entwigg et al., 2020]. Males of both species have sharply pointed tibial apophysis, strong retrolateral cymbial notch. Females have similar epigynes, with small receptacles, and a straight copulatory duct forming a small loop anteriorly. Males of C. approximatum differ from those of C. furculatum by having tibial apophysis shorter than tibia (vs. as long as tibia), embolus originating at 2 o’clock position (vs. 3 o’clock), and multibladed angular apophysis (vs. bilobate). Females of the two species differ through having an epigyne with relatively larger receptacles in C. approximatum, and a closely spaced loop of copulatory ducts (spaced apart by less than the diameter of the receptacle vs. by more than one diameter of the receptacle).

DESCRIPTION. Male [paralectotypes of C. adjacens, large (small)]. Total length 6.80 (6.30). Carapace 3.00 (3.13) long, 2.18 (2.25) wide. Abdomen (2.38) (3.55) long, 2.25 (2.30) wide. Carapace brown with radial stripes, fovea indistinct. Labium, maxillae and sternum brown. Chelicerae not modified, dark brown, with 2 promarginal and 3 retromarginal teeth. Abdomen yellowish in type. Freshly collected specimens yellowish with numerous guanine spots, absent only in cordial mark.

Leg segment lengths in the larger specimen:

| Segment | Fe | Pa | Ti | Mt | Ta | Total |
|---------|----|----|----|----|----|-------|
| I       | 4.95| 1.45| 5.25| 5.7 | 2  | 19.35 |
| II      | 3.7 | 1.3 | 3.6 | 3.95| 1.25| 13.8  |
| III     | 2.55| 1   | 2.3 | 3   | 0.9 | 9.75  |
| IV      | 3.5 | 1.25| 3.25| 4.65| 1.15| 13.8  |

Spination of legs in the larger specimen:

| Portion  | Fe | Ti | Mt |
|----------|----|----|----|
| I        | 2p 2r | 4-4v | 1-1v |
| II       | 2p 2r | 2-2v | 1-1v |
| III      | 2p 2r 2p | 1 r0-1v 2p 5r 0-2v |
| IV       | 2p 2r 2r | 2-2v 1-1v 2p 2r 2-2v |

Male palp as in Figs 2’c’, 10–16, 25–31; tibia 3.3 longer than wide, with 2 apophyses retro- (Ra) and prolateral (Pa); retrolateral apophysis long, sharply pointed and twisted around the axis, like a bongo antelope horn, 2 times shorter than tibia; prolateral apophysis shorter than tibia width, rounded on tip; bases of apophyses separated by weakly sclerotized ridge (Tr); cymbium asymmetric, 2 times longer than wide, with almost straight sword like apophysis, 1/2 of cymbium length; cymbium with protruding retrolateral part (1/2 of cymbial length) and groove (Cg); tegular (=median) apophysis (Ta) complex, flat, with two lobes; embolus long, base of embolus (Be) located at about 2 o’clock position.

Female. See Deeleman-Reinhold [2001]. Epigyne as in Fig. 17; fovea not rebordered anteriorly or posteriorly, but only laterally; receptacles relatively small, located posteriorly, spaced by about 2 diameters; copulatory duct with 1 loop, part of copulatory duct adjoining to receptacles parallel to each other.

COMMENTS. We studied males of C. approximatum from three localities, syntypes of C. adjacens collected between Murree and Sind Valley, specimens from Himachal Pradesh (coll. Marusik 1999) and Punjab (coll. Jäger 2011). The paralectotypes of C. adjacens and specimens collected from Himachal Pradesh have no differences, but the male from Punjab has abruptly tibial apophysis (Figs 13–15), as opposed to the sharply pointed tibial apophysis of the others (this is an unusual character for Cheiracanthium). In addition, specimens from Punjab have a differently shaped cymbium (cf. Figs 10 and 13) and a small difference in the proportions of the bulb (length width ratio 1.5 vs. 1.4). The illustration of the male palp of a Taiwanese specimen (fig 5B in Chen & Huang [2012]) depicts a sharply pointed tibial apophysis but the cymbium has a weak notch in comparison to those in the syntypes or specimens from Himachal Pradesh. These differences may indicate that the Punjabi specimens, as well as these from Taiwan and other published localities may represent a separate species, and some of species names considered as synonyms could potentially be valid. Further studies of a greater range of material and particularly large series of specimens from one locality would be required to establish this.

Figures of the female (Figs 8, 17) may refer to closely related species, indistinguishable by epigyne.

Among the material studied we have not found any specimens matching the description for C. approximatum. This species was described from females only (number not specified) from the Muree to Sind Valley. This locality can be either in Pakistan or India (see Map 1). This species is not known from “China (Yarkand)” as currently indicated in the WSC [2020].

DISTRIBUTION. It seems that species is distributed from Northeastern Pakistan (type locality) to Philippines.

Cheiracanthium adjacens
O. Pickard-Cambridge, 1885
Figs 2’d’, 3, 18–20.

Cheiracanthium approximatum
O. Pickard-Cambridge, 1885: 24, pl. 2, f. 17 (♀, ♂ mismatched).

Cheiracanthium adjacens: Caporiacco, 1935: 219 (may refer to C. approximatum).

TYPES: Lectotype ♂ (designated here) and paralectotype ♂ in vial with label “6, B[ottle] 378, v[ial] 20, 2sp[ecimens]”. Paralectotypes: 1 ♀ with label “23” and 1 ♀ with label “32”. Text contains following label: “Murree, June 11th to July 14th, 1873”. All from OUMNH.

NOTE. Syntypes males and females are mismatched. We decided to select a female as lectotype to keep both species names of Cheiracanthium described by O. Pickard-Cambridge from the region, C. approximatum and C. adjacens, as valid.

DIAGNOSIS. Epigyne of C. adjacens is similar to that of C. campestre Lohmander, 1944 known from Europe. It has numerous coils of copulatory ducts visible through integument and rebordered epigyne, but differs in the number of coils (3 vs. 4) and has smaller receptacles (spaced by about 2 diameters, vs. 1 diameter). It is also similar to C. falciforme Chen, Huang, Chen et Wang, 2006 known from Western Himalayan region.
Taiwan, but differs by being of smaller size (carapace 2.53–2.95 long, vs. 3.1–4.4), having narrower (less transverse) fovea, smaller receptacles (spaced more than 2 diameters apart vs. less than 2 diameters) and less inclined loops of copulatory ducts (cf. Figs 18–20 and figs 3D–E in Chen & Huang [2012]).

Female (paralectotype). Total length 5.50–7.10. Carapace 2.53–2.95 long, 1.95–2.20 wide. Abdomen 4.13–4.25 long, 2.25–3.05 wide. Colouration and chelicera as in males. Leg segment lengths in lectotype:

| Segment | Fe | Pa | Ti | Mt | Ta | Total |
|---------|----|----|----|----|----|-------|
| I       | 3.25 | 3.1 | 3.25 | 1.3 | | 11.9 |
| II      | 2.25 | 1  | 2.1 | 2.25 | 0.75 | 8.35 |
| III     | 1.9 | 0.75 | 1.55 | 1.8 | 0.75 | 6.75 |
| IV      | 2.75 | 1  | 2.5 | 2.9 | 0.85 | 10.0 |
Redescription of two West Himalayan *Cheiracanthium*

Figs 25–31. Male palp of *Cheiracanthium approximatum* from Himachal Pradesh. 25 — tibia and cymbium, dorsal; 26, 30 — cymbium and tibia, antero-dorsal and dorsal; 27–29 — bulb, retrolateral, ventral and ventro-prolateral; 31 — bulb, anterior. Scale = 0.1 mm.

Рис. 25–31. Пальпа самца *Cheiracanthium approximatum* из Химачал Прадеш. 25 — голень и цымбиум, сверху; 26, 30 — цымбиум и голень, спереди-сверху и сверху; 27–29 — бульбус, ретролатерально, снизу, и снизу-пролатерально; 31 — бульбус, спереди. Масштаб 0,1 мм.

Spination of legs in the lectotype:

|    | Fe | Ti | Mt |
|----|----|----|----|
| I  | 2p | 1-1v | 1-1v |
| II | 1p — | 1p 1-1(2)v |
| III | 1(0)p 1(0)r 1p1r 1p 1r 2-1v |
| IV | 1r 1r 2p 2r 2-2v |

Epigyne as in Fig 18–20, with large fovea, wider than high, receptacles globular, copulatory duct form 3 coils easily visible through integument; receptacles spaced by a distance greater than that of twice the diameter of the receptacle.

DISTRIBUTION. WSC [2020] indicates distribution of this species as Yarkand and Karakoram, although it was
Fig. 32. Type localities of *Cheiracanthium approximatum* (broken blue line) and *C. adjacens* (1) and recent records of *C. approximatum* in India (2 — localities in Himachal Pradesh; 3 — Chandigarh).

**DISTRIBUTION.** So far this species is known from the type locality.

**Discussion**

According to the WSC [2020], to date 25 species of *Cheiracanthium* are known from mainland India and Bangladesh. The genus was surveyed in two publications; Gravely [1931] and Majumder & Tikader [1991]. None of species are mentioned as occurring in the territory of Pakistan. In the most recent review of Indian fauna Majumder & Tikader [1991] listed 24 of these species, including *Cheiracanthium adjacens* and *C. approximatum* as occurring in “Yarkand, N. W. Himalayas, India”, a geographical inaccuracy given that Yarkand lies within China, and in the mountain region called Tibet, not Himalaya. The WSC [2020] catalog attributes *C. approximatum* to Yarkand (China) only.

We tried to check if any of the Indian species could be a junior synonym of *C. adjacens* or *C. approximatum* and recognized that it is impossible to make any conclusions based on figures in Majumder & Tikader [1991] or a later publication by Biswas & Raychaudhuri [2003]. Figures and descriptions are too schematic, and have been over-simplified to such a degree that in most cases it is not clear which family the species considered to be in *Cheiracanthium* are thought to belong. In addition, the types of species described by Tikader are unavailable for research, including those in collaboration with Majumder in 1991.

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