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Coccygidium transcaspicum (Kokujev) (Hymenoptera: Braconidae) parasitizing larvae of invasive pest *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in India

ANKITA GUPTA[1,4], P. LAKSHMI SOUJANYA[2] , CORNELIS VAN ACHTERBERG[3] & J.C. SEKHAR[2]
[1]*ICAR-National Bureau of Agricultural Insect Resources, H. A. Farm Post, Bellary Road, Hebbal, Bengaluru—560024, Karnataka, India*
[2]*Winter Nursery Centre, ICAR-Indian Institute of Maize Research, Rajendra Nagar, Hyderabad 500 030*
[3]*Naturalis Biodiversity Center, Darwinweg 2, 2333 CR Leiden, Netherlands*
[4]*Corresponding author. E-mail: drankitagupta7@gmail.com*

The parasitoid *Coccygidium transcaspicum* (Kokujev) (Hymenoptera: Braconidae: Agathidinae) was reared from fall armyworm or *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) in maize fields in South India (Telangana) during 2019. It is the first report of a host for *C. transcaspicum* and the first report of *C. transcaspicum* as a parasitoid of *S. frugiperda* across the globe. The present study contains the first report from India and the Oriental region, provides morphological identification details of *C. transcaspicum* and comparison notes from its closely allied species *C. melleum* (Roman) which is basically an Afrotropical species.

Spodoptera frugiperda (J. E. Smith) (Lepidoptera: Noctuidae), the fall armyworm (FAW), is considered as one of the most important and notorious transboundary pests. This pest which is native to North and South America has invaded and spread across South East Asian countries in 2019 and has already been detected and officially reported from many countries *viz*., Argentina, Bangladesh, Brazil, Canada, China, France (Mayotte, La Reunion), India, Indonesia, Japan, Mexico, South Africa, South Korea, Sri Lanka, Thailand, United States, and Yemen (FAO 2019; Rakshit *et al*. 2019). During 2018 and in early 2019, Indian farmers and researchers witnessed the spread of FAW from peninsular India to north and north eastern parts of India. In India, the states with most FAW affected areas (arranged in decreasing order) are Karnataka (2,11,300 ha), Telangana (24,288 ha), and Maharashtra (5,144 ha), with several other states having smaller areas affected (Rakshit *et al*. 2019; Vennila *et al*. 2019). As the spread of this pest was noticed so the native parasitoid complex was observed and documented in India (Shylesha *et al*. 2018; Gupta *et al*. 2019; and Sharanabasappa *et al*. 2019). In the present study the authors provide the identification details of the parasitic wasp *Coccygidium transcaspicum* (Kokujev) (Hymenoptera: Braconidae: Agathidinae) which was found parasitizing larvae of *S. frugiperda.*

Materials and methods

Larvae of *Spodoptera frugiperda* were collected from the maize fields in Telangana during September, 2019. The field collected larvae were reared on maize leaves in the laboratory at 25±10°C and 60–70% humidity by the second author. Parasitoids were collected from the infested larvae and preserved in 70% alcohol. Morphological studies were conducted at the ICAR- National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru. The specimens of the present study are deposited in the National Insect Museum of ICAR-NBAIR.

Results

The parasitoids were identified as *Coccygidium transcaspicum* (Kokujev). Up to now this species is known mainly from southeastern West Palaearctic and southwestern East Palaearctic regions (Yu *et al*. 2016). The diagnostic details are mentioned below.

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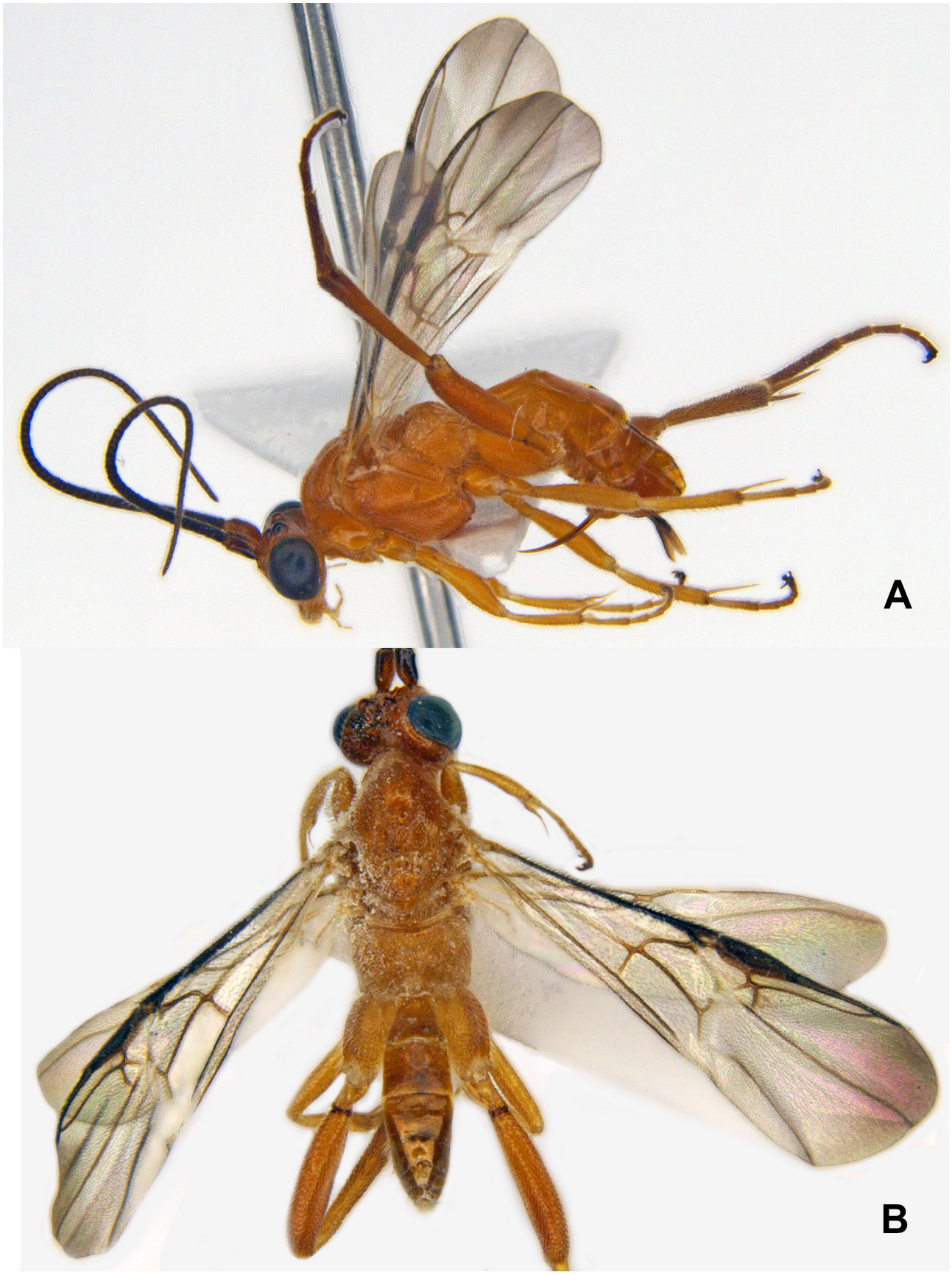

FIGURE 1. *Coccygidium transcaspicum* (Kokujev), India. A. female, lateral habitus; B. male, dorsal habitus.

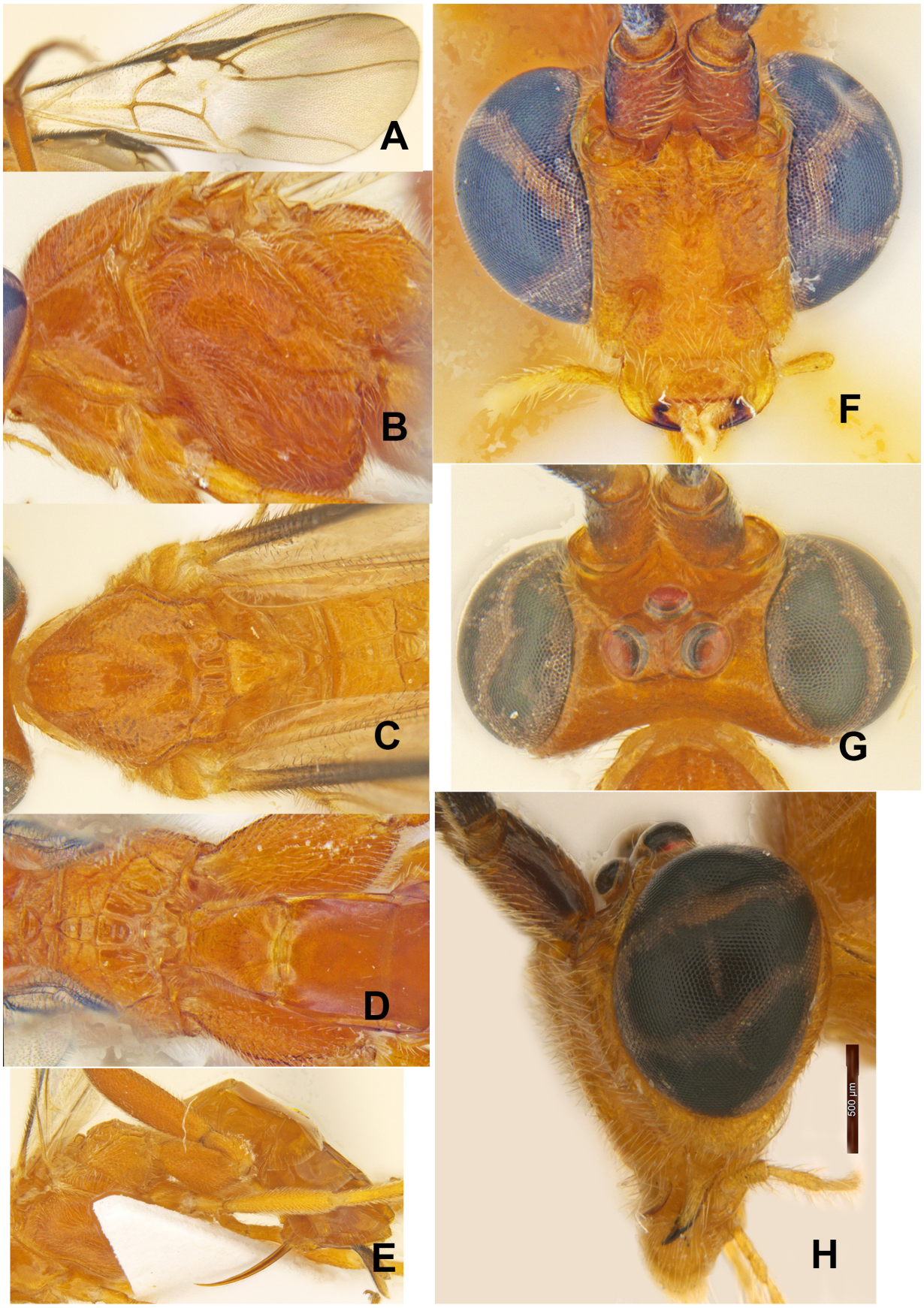

FIGURE 2. *Coccygidium transcaspicum* (Kokujev), female, India. A. Fore wing; B. Mesopleuron, lateral aspect; C. Mesosoma, dorsal aspect; D. Propodeum and anterior part of metasoma, dorsal aspect; E. Metasoma, lateral aspect; F. Head, anterior aspect; G. Vertex, dorsal aspect; H. Head, lateral aspect.

***Coccygidium transcaspicum* (Kokujev, 1902) (Figs 1 & 2)**

Phanerotoma transcaspica Kokujev, 1902

Zelemorpha transcaspica (Kokujev, 1902); = *Z. opaca* (Shestakov, 1928): van Achterberg & Maetô 1990.

Material examined: 3 ♀, 3 ♂, INDIA: Telangana: Hyderabad, 18.ix.2019, 17.325429”N 78.397010”E, ex larva of *Spodoptera frugiperda* (J. E. Smith), coll. P. Lakshmi Soujanya, specimen code: ICAR/ NBAIR/Brac/Microg/Coccy/18919.

Female. Body length 8.6 mm, fore wing length 7.3 mm.

Colour. Body yellowish brown; antenna dark brown, scape yellowish brown, darker on the margins and dorsally; hind leg largely brown, darker than fore and mid leg; hind femur entirely yellowish brown; apex of hind tibia rather brown but not well differentiated from remainder of tibia.

Head. Frons punctate, smooth medially. Vertex smooth and shiny with very shallow punctations, stemmaticum medially brownish. Mandible with inner tooth minute, much shorter that outer tooth. OOL 0.8–0.9 × diameter of posterior ocellus and POL 1.0–1.3 × diameter of posterior ocellus; vein 1-M of fore wing gradually bent; height of eye 3.9–6.7 × as long as malar space in lateral view; malar space 0.9–1.1 × basal width of the mandible; basal cell near vein 1-M of fore wing sparsely setose; widened submedially and ca. 4.0 × as long as maximum width.

Mesosoma. mesoscutum punctate and shiny, notauli coarsely crenulate. Hind femur ca. 3.4 × longer than its maximum width; hind tibia comparatively robust and distinctly widened apically, l.1 × longer than hind femur. Fore and mid tibial spur 1.1 × longer than respective basitarsus. Hind basitarsus 1.4 × longer than inner tibial spur. Propodeum with median areola divided into three parts by two transverse tergites.

Metasoma. Oval, tergites smooth and shiny. First tergite widening apically. Second tergite as long as wide or slightly longer. Ovipositor protruding, exerted part 1.4 mm.

Male. Similar to female except for few variations. Body length 7.3 mm in habitus (lateral view), length of fore wing 5.9 mm. OOL 1.2 × diameter of posterior ocellus and POL 1.4 × diameter of posterior ocellus. Hind femur 3.5 × longer than its maximum width, hind tibia l.2 × longer than hind femur. Hind basitarsus 1.4 × longer than inner tibial spur.

Comments: *Coccygidium transcaspicum* can be easily confused with *C. melleum* (Roman, 1910); the latter is known from the Afrotropical region (incl. Yemen), UAE, and possibly Israel. *Coccygidium melleum* differs in the following characters of *C. transcaspicum*: malar space ca. 0.8 × basal width of mandible; POL of ♀ 0.4–0.8 × (OOL of ♀ 0.4–0.7 times) diameter of posterior ocellus (of ♂ about 0.9 ×); hind femur parallel-sided and ca. 4.6× as long as maximum width.

Conclusion

Based on the examination of the reared specimens from India we conclude that *Coccygidium transcaspicum* is infesting *Spodoptera frugiperda* in the NW Oriental region of India. Sharanabasappa *et al*. (2019) reported *C. melleum* (Roman) from the same host in South India (Karnataka and Tamil Nadu). Re-examination of the latter specimens is needed to reveal the identity of the specimens.

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