

On a new species of *Amitus* Haldeman (Hymenoptera: Platygasteridae) parasitizing whitefly *Zaphanera* sp. (Aleyrodidae) on *Vigna trilobata* from India

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Abstract

Amitus vignus sp. n., (Hymenoptera: Platygasteridae: Sceliotrachelinae) reared from the whitefly *Zaphanera* sp. (Hemiptera: Aleyrodidae) is described from India. This is the first report of a Platygasterid parasitoid from *Zaphanera* Corbett, earlier only Encyrtidae and Aphelinidae were known attacking this whitefly genus. A key to species of *Amitus* spp. from India is also provided.

Keywords: *Platygasteridae*, *Amitus*, new species, *Zaphanera*, key, parasitoid, India

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Introduction

Members of genus *Amitus* (Hymenoptera: Platygasteridae) are of great economic significance as they attack the immature stages of whiteflies (Masner and Huggert, 1989). *Amitus* Haldeman 1850, *Aleyroctonus* Masner and Huggert, 1989 (Hymenoptera: Platygasteridae: Sceliotrachelinae) and *Isostasius* Förster, 1856 (Hymenoptera: Platygasteridae: Platygasterinae) have been reported as parasitoids of Aleyrodidae (Hulden, 1986; Vlugg, 1995). This is the first report of a platygasterid parasitoid from *Zaphanera* Corbett 1926 (Homoptera: Aleyrodidae), earlier only Encyrtidae and Aphelinidae were known attacking this whitefly genus (Evans, 2007). Twenty two species of *Amitus* are known worldwide (Cora and Johnson, 2015). But from the Oriental region as well as from India, *Amitus* is represented by only three species (Veenakumari *et al.*, 2014). The first described species of *Amitus* from India is *A. aleurolobi* Mani, reared from *Aleurolobus barodensis* (Maskell) on *Saccharum officinarum* L. (Vlugg, 1995). Recently, Veenakumari *et al.* (2014) described two more species from India. Here we document the fourth species, *Amitus vignus* sp.n.

parasitizing the whitefly *Zaphanera* sp. on *Vigna trilobata* Walp.

Whiteflies are a great threat to agriculturists throughout the world. They are primarily the pest of vegetables, crops, Citrus, Cotton, Sugarcane, Teak, Guava, Papaya, Banana etc. Both nymphs and adults cause damage to plants by sucking their sap; adult flies are vectors of many plant viral diseases (Begum *et al.*, 2011). Intense attack by *Zaphanera* Corbett has resulted even in the death of one of its host trees, the western myall tree, *Acacia papyrocarpa* (Bailey *et al.*, 2001).

Materials and Methods

Standard morphological terminology and abbreviations are after Masner & Huggert (1989) and Miko *et al.* (2007). Description and imaging were carried out employing Leica M 205A microscope with automated multiple image capture at preset focal levels using an Leica DFC 500 camera, and image combination using the Leica Application Suite image processing system. Composite images were edited using Adobe Photoshop CS8 to remove artifacts from stack processing and standardize

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background colour. Holotype and paratypes are deposited at the Zoological Survey of India, Calicut. Abbreviations: OOL= oculo ocellar line; LOL= lateral ocellar line; OD= ocellar diameter; POL= posterior ocellar line; A1-A10= antennal segments 1-10; IOS= interorbital space; T1-T6= metasomal tergites 1-6. Specimens were card mounted and were air dried.

Amitus Haldeman, 1850

Diagnosis (Modified after Masner and Huggert, 1989):

Body black, short (usually less than 1.5 mm), dorsoventrally flattened; antennal formula 8-10; female antenna with abrupt, compact ovoid clava resulting from the fusion of A8-A10; male antenna with specialized paddle-shaped area on A4; propodeum partly covered with foamy structures; forewings without distinct veins; metasoma short, sessile; T2 usually with a fan of striae anterolaterally.

Key to Indian species of *Amitus* Haldeman, 1850 (Based on females)

1. Clava 2.5× as long as wide*A. kiefferi*
Veenakumari and Buhl
 - Clava as long as or more than 3.4× as long as wide2
2. Forewing length more than 3.5× width; head 1.78× as wide as high.....*A. aleurolobi* **Mani**
 - Forewing length less than 3× as width; head less than 1.6× as wide as high.....3
3. A1 5.86× as long as wide; POL greater than 2.5× LOL; POL at least 2.29× OOL.....*A. sikkimensis*
Veenakumari and Buhl
 - A1 4.75× as long as wide; POL less than 2.25× LOL; POL only 1.8× OOL.....*A. vagnus* sp. n.

Treatment of species

Amitus vagnus Anjana et al. sp. n. (Figs. 1- 11)

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Diagnosis: Body length 0.81-0.87 mm (n=12); scape 4.75× as long as wide; A4 1.67× as long

as wide; forewing 2.78× as long as wide; T2 1.5× as wide as long.

Description: *Female:* Length 0.82 mm (holotype) (Fig. 1); Body black; A1-A2 yellow, clava brown; rest of the segments yellowish brown; legs except tarsi brown; tarsi yellowish brown.

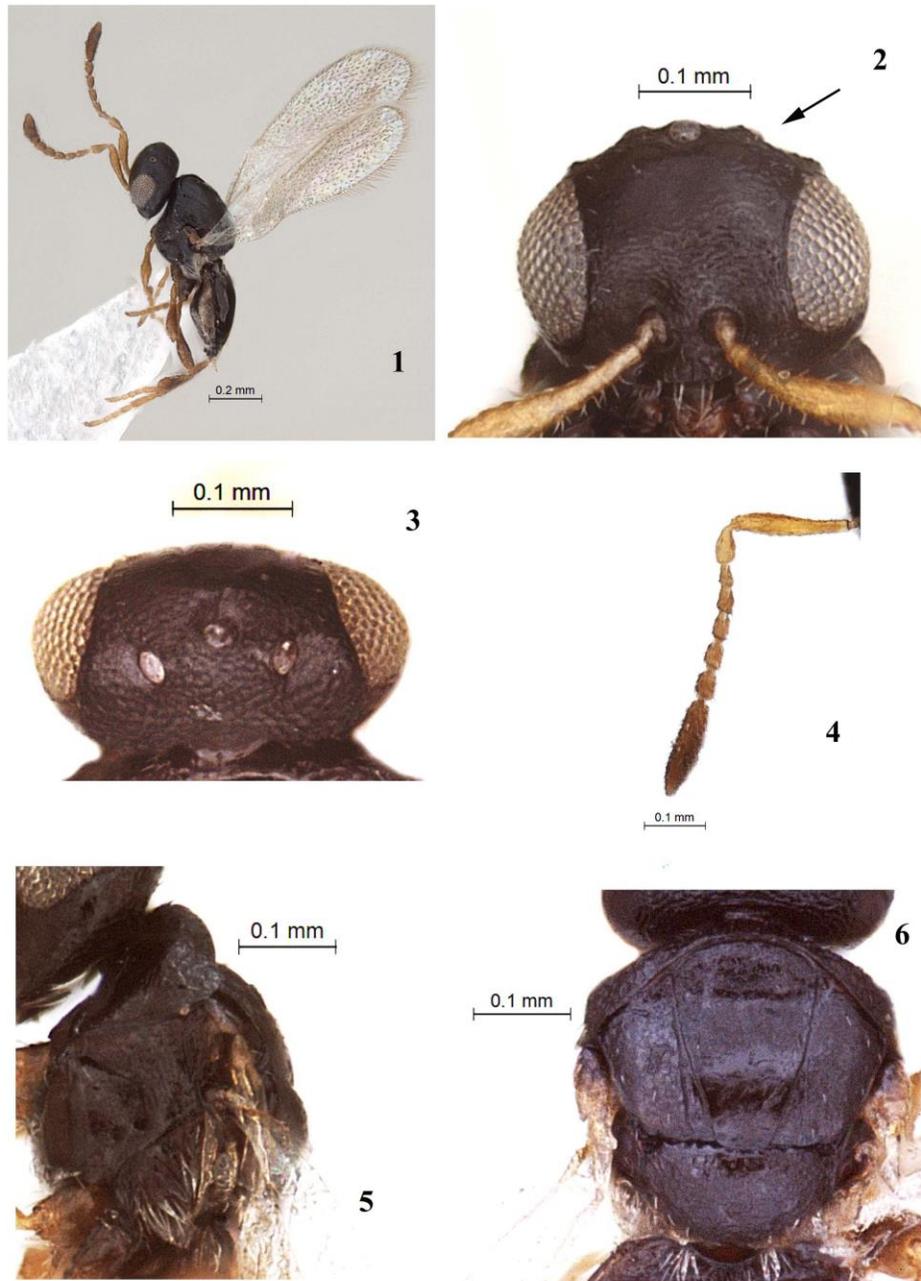
Head: Head from above 1.76× as wide as long (Fig. 3), hyperoccipital carina absent; vertex and occiput coarsely reticulated; eyes bare; frons not smooth, coriaceous; OOL 2.5× OD; OOL 1.25× LOL; POL 2.25× LOL; IOS 1.36× eye height and 0.6× width of head; eye height (in dorsal) 0.1× temples; head in front view with undulations (marked in Fig. 2), 1.24× as wide as high; scape 4.75× as wide as long, clava 3.4× as wide as long, A5 and A6 subequal, ratio of length and width of antennal segments A1-A7 and clava being: 0.19: 0.04; 0.07: 0.04; 0.04: 0.02; 0.05: 0.03; 0.05: 0.03; 0.05: 0.03; 0.05: 0.04, 0.17: 0.05 respectively (Fig. 5).

Mesosoma: 1.03× as long as wide; mesoscutum reticulate with sparse setae laterally, 1.26× as long as wide; notauli complete, broader apically, than basally; upper lateral pronotal area coriaceous; mesopleura with several longitudinal lines below tegula; mesopleural depression with a deep sulcus; metapleura bare anteriorly, posteriorly with very few white setae; scutellum 1.8× as wide as long; (Fig. 4). Forewing 1.2× as long as body and 2.78× as long as wide, with fine and dense microtrichia; marginal cilia 0.22× forewing width (Fig. 8).

Metasoma: 1.33× as long as wide; T2 with submedial pits with fan of striae anterolaterally; 1.5× as wide as long; T3- T6 without any distinct sculpture; single setae present laterally on T3- T6; length and width of T1-T6 being: 0.06: 0.26; 0.21: 0.32; 0.03: 0.29; 0.02: 0.22; 0.02: 0.13; 0.02: 0.06 respectively (Fig. 7).

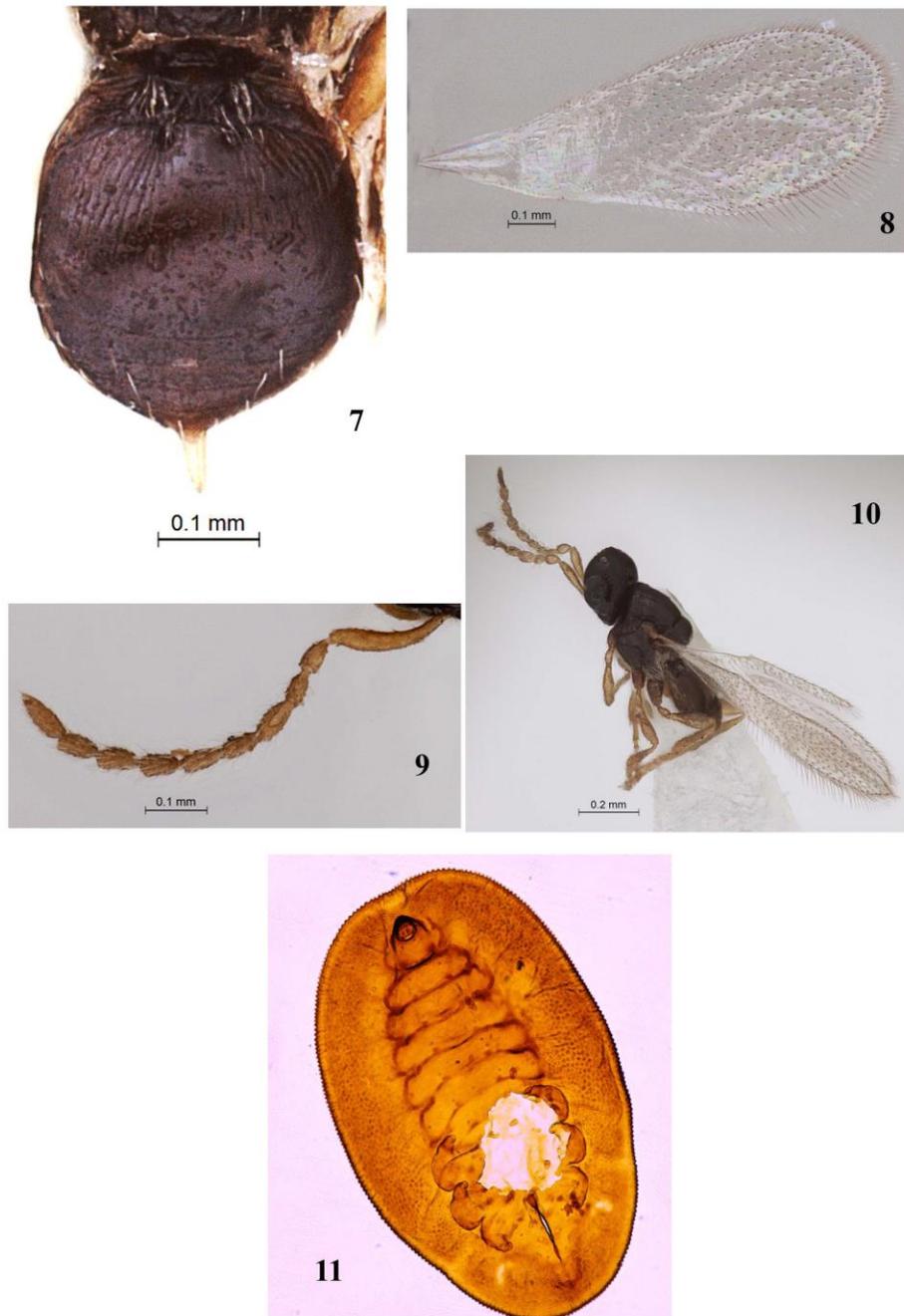
Male: Similar to female except in the following characters. Body length: 0.70- 0.72 mm (n=2) (Fig. 9); the ratio of the antennal segments being: 0.18: 0.04; 0.06: 0.03; 0.05: 0.03; 0.07: 0.04; 0.07: 0.03; 0.07: 0.03; 0.07: 0.04; 0.07: 0.04; 0.07: 0.07; 0.1: 0.04 respectively (Fig. 10).

Variations: The females have a body size ranging from 0.81-0.87 mm and male from 0.70-0.72 mm. Though very slight variations



Figures 1-6: *Amitus vignus* sp. n. Female: 1. Habitus; 2. Head front (undulations marked by an arrow); 3. Head dorsal; 4. Antenna; 5. Mesosoma lateral view; 6. Mesosoma dorsal

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Figures 7-11: 7. Metasoma dorsal; 8. Fore wing; 9-10. *Amitus vignus* Male: 9. Antenna; 10. Habitus; 11. IV instar of puparium from which parasitoid emerged.

from the holotype were observed in the paratypes with regard to the size and proportions of antennal segments, they were rather insignificant.

Host. *Amitus vignus* sp. n. was reared from the parasitised puparium of *Zaphanera* sp. on *Vigna trilobata* collected on 06-ix-2012 from Bhiwandi, Mumbai (19.296664°N 73.063121°E; elevation 79ft). Two, five, four and three parasitoids emerged from the IV instar of the puparium (Fig. 11) on the dates 09-09-2012, 10-09-2012, 11-09-2012 and 12-09-2012 respectively.

Etymology: The species name 'vignus' is after the generic name of the host plant.

Material examined: Holotype, 'INDIA: Maharashtra: Bhiwandi: Mumbai (19.296664°N 73.063121°E; elevation 79ft), 09-ix-2012, Coll. Vimala D, on card, Reg. No. ZSI/WGRS/IR. INV.4982, Paratypes, 1 ♀; same data except date; 09-ix-2012; on card; Reg. No.ZSI/WGRS/IR.INV.4983; 1 ♂; same data except Reg. No.ZSI/WGRS/IR.INV.5171; 1 ♀; same data except Reg. No.ZSI/WGRS/IR. INV.5172; 1 ♀; same data except date; 10-ix-2012; Reg. No.ZSI/WGRS/IR.INV.5173; 2 ♀; same data except Reg. No.s. ZSI/WGRS/IR. INV.5174- 5175; 4 ♀; same data except Reg. No.s. ZSI/WGRS/IR.INV.5176-5179; 2 ♀; same data except Reg. No.s. ZSI/WGRS/IR. INV.5180-5181; 1 ♂; same data except Reg. No.s. ZSI/WGRS/IR.INV.5182.

Comments: Most of the species of genus *Amitus* were erected based on the quantitative characters like antennal measurements and POL, OOL, LOL ratios, rather than qualitative ones. The Indian species *A. kiefferi*, *A. sikkimensis* and *A. aleurolobi* were separated mainly by the difference in the antennal measurements and dimensions of the head (Veenakumari *et al.*, 2014). The Oriental species, *A. hesperidium* Silvestri, 1927 is having head more than 2× as long as wide whereas, it is only 1.76× as wide as long in *Amitus vignus* sp. n. Viggiani and Mazzone in 1982, gave a key to species present in Italy and Hulden, in 1986 provided a key to species of *Amitus* in Finland. *Amitus vignus* sp.

n. when compared with the descriptions of the species outside Oriental region comes nearest to Palearctic species *A. vesuvianus* Viggiani and Mazzone (1982), but can be differentiated in the following characters: occiput and vertex is very weakly reticulate in *A. vesuvianus* whereas, it is coarsely reticulated in the new species; also A3 is elongate, 3× as long as wide and forewing is only 2.53× as wide in *A. vesuvianus*, whereas A3 is only 2× as long as wide and forewing is 2.78× as long as wide in *A. vignus* sp. n.

The holotype of *A. sikkimensis* was studied by the first author. *A. vignus* sp. n. resembles *A. sikkimensis* Veenakumari and Buhl. The length to width ratio of mesosoma is same in both species and also has several transverse rugae on mesopleuron. However, both differ notably in the characters given in the key, in the measurement of the clava (clava is 3.4× as long as wide in *A. vignus* sp. n. whereas it is 3.75× as long as wide in *A. sikkimensis*) and shape of the head (head evenly round in *A. sikkimensis* without undulations as in Fig. 10 (Veenakumari *et al.*, 2014), whereas with distinct undulations in *Amitus vignus* sp. n.). The POL is 2.96× LOL and OOL is 1.29× LOL in *A. sikkimensis* whereas POL is only 2.25× LOL and OOL 1.25× LOL in *A. vignus* sp. n., *A. aleurolobi* Mani and *A. kiefferi* Veenakumari and Buhl can be differentiated by the characters given in the key.

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