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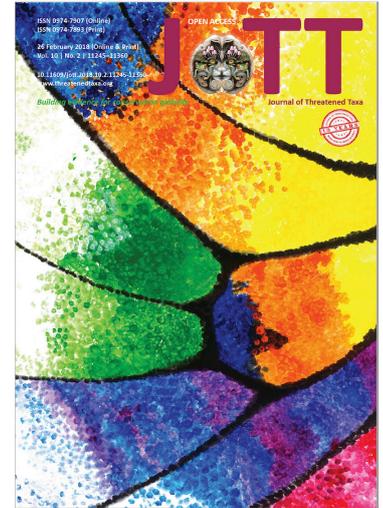
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SHORT COMMUNICATION

TWO NEW REPORTS OF THRIPS (THYSANOPTERA: THRIPIDAE) FROM INDIA

R.R. Rachana & R. Varatharajan

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TWO NEW REPORTS OF THRIPS (THYSANOPTERA: THIRIPIDAE) FROM INDIA

R.R. Rachana¹ & R. Varatharajan²

¹Division of Insect Systematics, ICAR-National Bureau of Agricultural Insect Resources, Bengaluru, Karnataka 560024, India

²Centre of Advanced Study in Life Sciences, Manipur University, Imphal, Manipur 795003, India
¹vavarachana@gmail.com (corresponding author), ²rvrajanramya@gmail.com

Abstract: *Caliothrips punctipennis* (Hood) and the male of Western Flower Thrips *Frankliniella occidentalis* (Pergande) have been recorded for the first time from India. *F. occidentalis* was collected on the leaves of *Erythrina indica* from Ooty in the Nilgiris, the Western Ghats, southern India, whereas *C. punctipennis* was collected from yellow pan traps laid at Great Nicobar, India. Considering the quarantine importance of the pest *F. occidentalis*, the report of the male for the first time in India needs attention and concern. Males are also known to be more effective vectors of tospoviruses than females. *Xerochrysum bracteatum*, the Common Golden Everlasting Daisy, is often taken out of Ooty by tourists to other parts of the country. This along with other planting materials carried by tourists and farmers could aid in the dispersal of *F. occidentalis* to the temperate regions of northern and southern India, where it is likely to thrive in the congenial climatic conditions prevalent there. Under these circumstances, it is imperative that quarantine mechanisms within the country are activated and strengthened, to prevent the spread of this notorious pest to the rest of India from the pockets of its occurrence in southern India - particularly the Nilgiris. The diagnostic characters of both species are discussed.

Keywords: *Caliothrips punctipennis*, *Frankliniella occidentalis*, new record, Thysanoptera, Western Flower Thrips.

Described originally from western USA, the Western Flower Thrips (WFT), *Frankliniella occidentalis* (Pergande) is a major pest and tospoviruses vector

that is now found worldwide (Kirk & Terry 2003). It causes direct feeding damage to a wide variety of agricultural and horticultural crops and is an important vector of tospoviruses (family Tospoviridae, genus Orthotospovirus), causing heavy economic loss across the globe (Jones et al. 2010; Adams et al. 2017). So far, 14 species of thrips have been reported as vectors for tospoviruses. Out of these, *F. occidentalis* is responsible for the transmission of as many as five species of tospoviruses (Chrysanthemum Stem Necrosis Virus, Groundnut Ring Spot Virus, Impatiens Necrotic Spot Virus, Tomato Chlorotic Spot Virus, Tomato Spotted Wilt Virus / Groundnut Bud Necrosis Virus) (Riley et al. 2011).

The genus *Frankliniella* was erected by Karny (1910) in the form of a footnote, and the type species, *Thrips intonsa* Trybom, was subsequently designated by Hood (1914). Sakimura & O'Neill (1979) redefined the genus *Frankliniella* Karny based on the pattern of abdominal ctenidia and associated setae. The species has not been reported from India, until Tyagi & Kumar (2015) collected four females in 2014 from Bengaluru, Karnataka, without any males in their collection. Studies on recent

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collections from Ooty, Tamil Nadu has revealed the presence of a single male specimen, the first record of the male of *F. occidentalis* from India, which is reported below.

The genus *Caliothrips*, erected by Daniel in 1904, comprises 25 described species worldwide (Thripswiki - referred on 7 December 2017), with five species known from India (Rachana & Varatharajan 2017). Hood in 1912 described the species *punctipennis* under the genus *Heliiothrips*. *Caliothrips* is closely related to many Panchaetothripinae genera, but can be recognized by the following characters: parallel cheeks, one segmented tarsi, antennal segments III and IV with forked sense cones, absence of a complete comb of microtrichia on hind margin of tergite VIII (Wilson 1975). In addition, members of the genus *Caliothrips* are recognisable by the form of sculpture on head and pronotum, with prominent markings within the reticulations and the presence of a coiled apodeme within each hind coxa. This apodeme may be one of the various adaptations amongst adults of thrips that are associated with the ability to jump suddenly (Mound et al. 2011).

The objective of this paper is to report the occurrence of *Caliothrips punctipennis* and the male of *F. occidentalis* for the first time in India. In the order Thysanoptera, males are always less numerous than females and sometimes hardly noticed (Ananthakrishnan 1984). Considering the quarantine importance of the pest, the report of the male needs attention and concern.

MATERIALS AND METHODS

Random taxonomic surveys were conducted from 16–20 February 2016 and 15–24 March 2016 at Ooty, Tamil Nadu and the Andaman & Nicobar islands, India, respectively, for collection of thrips. Specimens were collected by the standard beating method and were preserved in thrips collecting media (nine parts 10% alcohol + 1 part glacial acetic acid + 1 ml Triton X-100 in 1000 ml of the mixture). Specimens were mounted in Canada balsam for permanent preservation (Ananthakrishnan & Sen 1980). The specimens were collected at random, subsequently sorted out and identified using appropriate keys (Wilson 1975; Cavalleri & Mound 2012).

RESULTS

Caliothrips punctipennis (Hood)

Material examined: Two females (ICAR/NBAIR/THYS/91–92), 21.iii.2016, India, Nicobar islands, Yellow pan trap collection, coll. Prashanth Mohanraj. All the specimens have been deposited at ICAR - National



Image 1. Female *Caliothrips punctipennis*

Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru, Karnataka, India.

Diagnosis

Female macroptera (Image 1): Body dark brown. Antennal segments I, II and VI–VIII brown; III–V yellowish with brown at apex. Legs yellow with femora and tibia brown medially. Fore wings whitish-yellow with a small brown patch at fork of veins and brown at apex. Lateral third of abdominal tergites covered by hexagonal reticulations bearing wrinkles; reticulations transversing anterior third of each tergite. These reticules are arranged in vertical rows of three or four with wrinkles laterally.

Distribution: India (Nicobar island) (new record); Mexico (Hood 1912); USA (Georgia, Florida) (Diffie et al. 2008).

Frankliniella occidentalis (Pergande)

Material examined: One male (ICAR/NBAIR/THYS/70), nine females (ICAR/NBAIR/THYS/71–79), 18.ii.2016, India, Ooty, host - *Erythrina indica* (Fabaceae), coll. R.R. Rachana. All the specimens have been deposited at ICAR - National Bureau of Agricultural Insect Resources (ICAR-NBAIR), Bengaluru, Karnataka, India.

Diagnosis

Male macroptera (Image 2): Body pale yellow with small faintly shaded patches on abdominal tergites, legs yellow, antennal segments I yellow, II light brown, III–IV yellow with light brown infused at apex, V yellow basally and brown apically, VI–VIII brown. Forewings pale with dark venal setae. Head wider than long;



Image 2. Male *Frankliniella occidentalis*

three pairs of ocellar setae present, pair III longer than the distance between external margins of hind ocelli, arising on anterior margins of ocellar triangle; postocular setae pair I present, pair IV longer than the distance between hind ocelli. Pronotum with five pairs of major setae; anteromarginal setae slightly shorter than anteroangulars, one pair of minor setae present medially between posteromarginal submedian setae. Metanotum with two pairs of setae at anterior margin, campaniform sensilla present. Forewing with two complete rows of veinal setae. Tergite VIII without marginal comb; IX with median pair of dorsal setae stout and shorter than lateral pair.

DISCUSSION

From the view point of faunistic wealth of the country, the present record on the occurrence of the two terebrantian thrips, *C. punctipennis* and *F. occidentalis* in India adds a new dimension. The first record of male individuals of *F. occidentalis*, however, is more significant in the present context by virtue of its effectiveness in disseminating the tospovirus. Although existence of female individuals of *F. occidentalis* has already been known from Bangalore (Tyagi & Kumar 2015), it was earlier thought that they were just stray individuals and not part of a thriving viable population. But, with the collection of both male and female in the present survey, it became unambiguous that they represent a true population with the dominance of females. Nevertheless, the presence of a male provokes more worry to the applied entomologists because males are known to be more effective vectors of tospoviruses than

females (Riley et al. 2011).

Literature has unequivocally reflected that *F. occidentalis*, the WFT is responsible for transmission of as many as five species/strains of tospovirus including Groundnut Bud Necrosis Virus (GBNV), the most important virus affecting peanut, potato, tomato and soybean in parts of China, India, Iran, Nepal, Sri Lanka and Thailand. The annual loss due to GBNV was estimated to be over US \$ 89 million in Asia (Reddy et al. 1995). It was reported that the Tomato Spotted Wilt Virus (TSWV), transmitted by WFT caused the World wide economic loss amounting to over US \$ 1 billion during 1900s (Rugman Jones et al. 2010). Similarly, Watermelon Bud Necrosis Virus (WBNV) has resulted in severe yield loss on various cucurbitaceous hosts in India (Jain et al. 2007).

It is feasible that the WFT might have established themselves in the hilly terrains of Ooty as the climatic conditions appear to be congenial to maintain both the sexes in the same spot. If that habitat serves as a reservoir, then it is possible for WFT to disperse to other parts of the country along with the ornamentals, vegetables and fruits grown in and around Ooty. There could be a possibility of posing threat to the potato cultivation in the Nilgiris by the GBNV vector, WFT. Moreover, the tourists from other parts of the country take seedlings and other planting materials from the Nilgiris for further propagation which would inadvertently result in the dispersal of *F. occidentalis* to other temperate regions of northern and southern India. Under such circumstances, it is imperative for the country to have an effective quarantine mechanism to prevent the spread of this notorious pest from the high mountain ranges of the Nilgiris.

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Communications

Observations of occurrence and daily activity patterns of ungulates in the Endau Rompin Landscape, peninsular Malaysia

-- Win Sim Tan, Norazmi bin Amir Hamzah, Salman Saaban, Nurul Aida Zawakhir, Yugees Rao, Norolhuda Jamaluddin, Francis Cheong, Norhidayati binti Khalid, Nur Iadiah Mohd Saat, Eka Nadia binti Zaidee Ee, Azwan bin Hamdan, Mei Mei Chow, Chee Pheng Low, Mufeng Voon, Song Horng Liang, Martin Tyson & Melvin Gumal, Pp. 11245–11253

Records of the Indian Pangolin (Mammalia: Pholidota: Manidae: *Manis crassicaudata*) from Mansehra District, Pakistan

-- Tariq Mahmood, Konish Kanwal & Iftikhar-Uz- Zaman, Pp. 11254–11261

Rapid assessment of sacred groves: a biodiversity assessment tool for ground level practitioners

-- Shivam Trivedi, Erach Bharucha & Rahul Mungikar, Pp. 11262–11270

Vascular plant assemblage of cliffs in northern Western Ghats, India

-- Mandar N. Datar & Aparna V. Watve, Pp. 11271–11284

Short Communications

Hunted species and hunting equipment used by rainforest poachers in Ghana

-- Edward Debrah Wiafe, Pp. 11285–11289

Status and conservation issues of wetland birds in Komaranahalli Lake, Davanagere District, Karnataka, India

-- M.N. Harisha & B.B. Hosetti, Pp. 11290–11294

An annotated checklist of the herpetofauna of the Rashtrapati Bhawan Estates, New Delhi, India

-- Vishal Kumar Prasad, Anjali Verma & Ghazala Shahabuddin, Pp. 11295–11302

Records of new larval host plants of some common butterflies of Bangladesh

-- Tahsinur Rahman Shihan, Pp. 11303–11311

Two new reports of thrips (Thysanoptera: Thripidae) from India

-- R.R. Rachana & R. Varatharajan, Pp. 11312–11315

A preliminary study on the dung beetles of the northern Western Ghats, Maharashtra, India

-- Aparna Sureshchandra Kalawate, Pp. 11316–11331

A taxonomic study on trachypenaeid prawns with special reference to Indian records

-- Angsuman Chanda, Pp. 11332–11338

Pollination ecology of *Merremia tridentata* (L.) Hallier f. (Convolvulaceae)

-- G. Lakshminarayana & A.J. Solomon Raju, Pp. 11339–11347

Notes

A record of Blue Posy *Drupadia scaeva cyara* (Hewitson, 1878) (Lycaenidae: Theclinae: Theclini) from Dibang Valley, Arunachal Pradesh, India

-- Gaurab Nandi Das, Subrata Gayen & Rohit Kumar Jaiswal, Pp. 11348–11350

Conserving the newly recorded Hill Arecanut Palm *Bentinckia condapanna* Berry ex Roxb (Arecaceae) population outside the natural forest as wildlife corridor

-- M. Divin Murukesh & Ajith Ashokan, Pp. 11351–11353

First report of rust fungi *Puccinia duthiae* on *Dichanthium foveolatum* from India

-- S.D. Pawar, S.V. Thite, A.S. Kadam & B.A. Kore, Pp. 11354–11355

Response & Reply

Non-Inverse J - shaped population distribution: Peculiarity of Red Sanders forests

-- S. Suresh Ramanan & T.K. Kunhamu, Pp. 11356–11357

Reply to Response: Non-Inverse J - shaped population distribution

-- Chenchu Ankalaiah, Thondaladinne Mastan & Mullangi Sridhar Reddy, Pp. 11357–11358

Book Review

Addition to the Documentation of Lepidoptera Fauna of Himalaya

-

A Book review of "Butterflies of Uttarakhand"

-- K.A. Subramanian, Pp. 11359–11360

Miscellaneous

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