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REPORT ON *GYNAIKOTHRIPS UZELI* (ZIMMERMANN) (THYSANOPTERA: PHLAEOTHRIPIDAE) FROM DELHI

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ABSTRACT

This study reports on the new record of thrips *Gynaikothrips uzeli* (Zimmermann, 1900) found at the Indian Agricultural Research Institute (IARI) campus, New Delhi during January 2018 in folded-leaf galls of *Ficus benjamina* L. (Moraceae). Predator, *Chrysoperla* sp. (Neuroptera: Chrysopidae) was also found in the leaf galls feeding on thrips, keeping it under check. Based on nucleotide sequence of partial mitochondrial cytochrome c oxidase subunit 1 (mtCOI) gene DNA barcode was generated for *G. uzeli*.

Key words: *Gynaikothrips uzeli*, leaf galls, *Ficus benjamina*, mtCO1, DNA barcode, predator *Chrysoperla* sp.

The genus *Gynaikothrips* was first described by Zimmermann in 1900 from Java, Indonesia (Southeast Asia) with *Gynaikothrips uzeli* as type species. So far, the genus includes 42 species worldwide (ThripsWiki, 2021), with most diversity in Southeast Asia (Hoddle et al., 2012). The species *G. uzeli* is cosmopolitan in distribution and recently reported in Mexico (Cambero-Campos et al., 2010), Brazil (Cavalleri et al., 2011), Argentina (de Borbón and Agostini, 2011), Galápagos Islands (Hoddle and Mound, 2011), Australia (Tree, 2012) and Syria (Ali, 2014) presumably by trade of ornamental *Ficus* plants. In India, Ramakrishna Ayyar reported *G. uzeli* as early as in 1918 damaging leaves of *Ficus retusa* from Coimbatore, Tamil Nadu (Karny, 1926). Later, the species was reported from Assam, Odisha, West Bengal (Singh and Varatharajan, 2013), Karnataka (Tyagi, 2012) and Maharashtra (Nagrare and Naikwadi, 2016). *G. uzeli* is a cecidogenous thrips species and an important pest of weeping fig, *F. benjamina*. The adults and immature of thrips while feeding on leaves, inject toxins that cause the formation of leaf galls. The leaf galls not only serve as food source to thrips but also provide shelter and protect them from natural enemies. The weeping fig, *F. benjamina* is the commonly grown hedge plant in ICAR-IARI, New Delhi. During January 2018 large number of tubuliferan thrips were observed inside the folded-leaf galls of *F. benjamina* plants. The purpose of present study is to report the first record of cecidogenous thrips, *G. uzeli* from Delhi on *F. benjamina* along with its DNA barcode.

MATERIALS AND METHODS

Thrips specimens were collected from leaf galls of *F. benjamina* in vials containing 10% alcohol with glacial acetic acid and Triton X-100 with a camel hair brush. The specimens were processed and mounted on slide for morphological identification. Thrips as well as chrysopid predator specimens were identified using appropriate keys. Later, identity confirmation was done through molecular characterization. The whole body of thrips and legs of chrysopid predator were used to isolate genomic DNA by using DNeasy Blood and tissue kit (Qiagen, Valencia, CA) with manufacturer's protocol and preserved at -20 °C. PCR amplification of mitochondrial cytochrome c oxidase subunit I (mtCOI) gene was done with primers following Folmer *et al.* (1994) (LCO1490: 5'-GGTCAACAAATCATAAAGATATTGG-3'; HCO2198: 5' TAAACTTCAGGGTGACCAA AAAA TCA-3') with optimized PCR conditions (per 24 µL reaction) by using 16 µL of nuclease-free water (Ambion, USA), 2.5 µL of 10X PCR buffer, 2 µL of 25 mM $MgCl_2$, 0.5 µL of 10 mM dNTPs (Thermo Scientific, Lithuania), 0.5 µL each of forward (LCO1490) and reverse (HCO2198) primers, 0.1 µL Dream Taq DNA polymerase (5U/µL by Thermo Scientific, Lithuania) along with 2 µL of isolated DNA. The PCR (Applied Biosystems® Veriti® 96-Well Thermal Cycler, Singapore used in present study) conditions were as follows: the initial denaturation for 4 minutes at 94 °C followed by 35 cycles of denaturing for 30 seconds at 94 °C, annealing for 1 minute at 47 °C, extension time of 50 seconds at 72 °C with a final extension for 8 minutes at 72 °C. The PCR products were visualized using AlphaImager® HP (AlphaView Version 3.2.2.0) on agarose gel after electrophoresis (SCIE-PLAS HU10

Mini-Plus horizontal). Later PCR products were sent for sequencing at commercial facilities of Xcelris Labs Ltd, Ahmedabad (India). Finally, DNA barcode sequences was submitted to NCBI to generate GenBank accession number.

RESULTS AND DISCUSSION

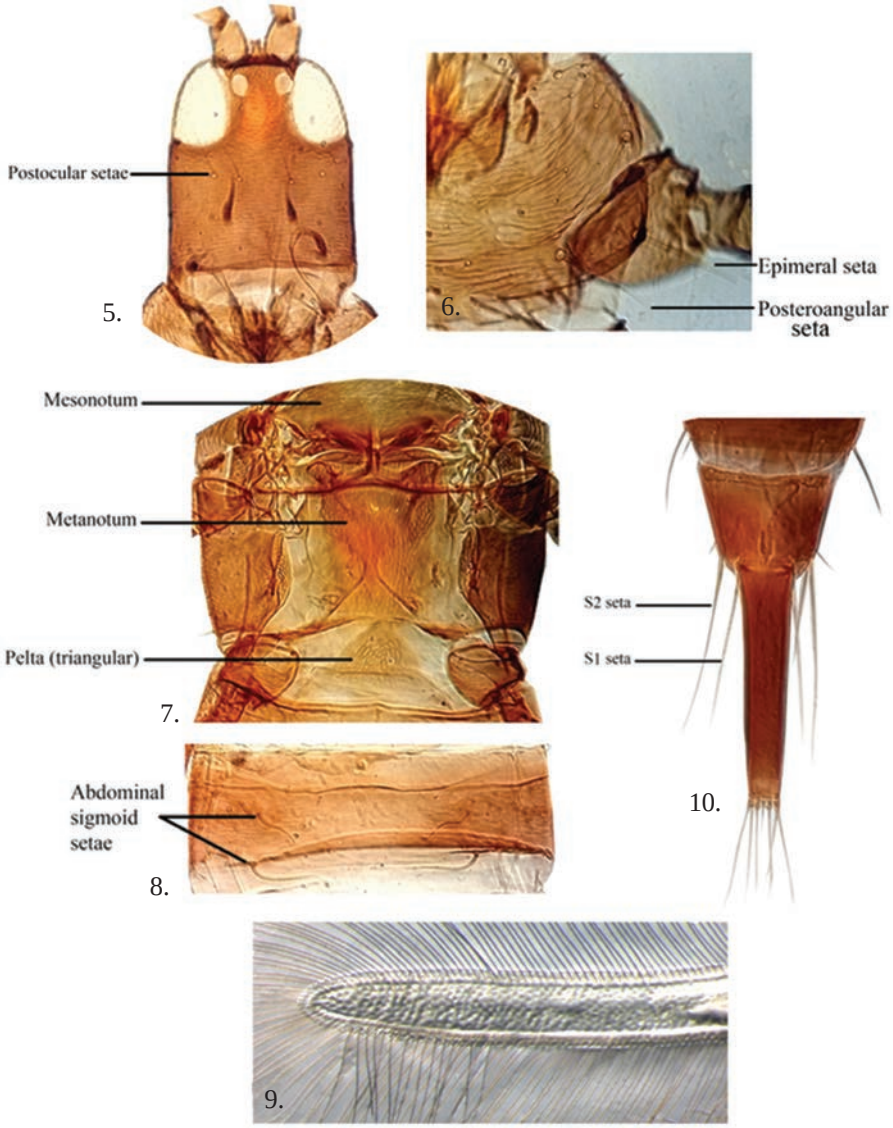
Gynaikothrips uzeli (Zimmermann) (Figs. 1-10)

Mesothrips uzeli, Zimmermann, 1900: 12; *Phloeothrips longitubus*, Bagnall, 1909: 534; *Gynaikothrips garitacambroneroi*, Retana, 2006: 6.

Description (female): Body brown; antennal segments III-VI (segments VII-VIII greyish yellow), fore tibiae, apices of mid and hind tibiae, and tarsi yellow; head longer than broad with two pairs of postocular setae (Fig. 5); antennae 8-segmented; pronotum with well-developed epimeral setae which are longer than posteroangular setae (but posteroangular setae are not very short as reported in closely similar species *G. ficorum*) (Fig. 6); the sculpture of mesonotum and metanotum mostly reticulate transversely and longitudinally, respectively (although some regions are striate) (Fig. 7); pelta (median tergite of abdominal tergum 1) broadly triangular with reticulate sculpture (Fig. 7); wings macropterous, forewing with three sub-basal wing setae and about 15 duplicate cilia, surface pattern of wings not smooth (Fig. 9); abdominal tergum II-VII with two pairs of sigmoid wing retaining setae (Fig. 8); S1 and S2 setae on tergum IX acute at apex and S1 is more than 2/3rd of tube length (Fig. 10). Males are similar to female but smaller and slender. The mtCOI nucleotide sequence (642 bp) of *G. uzeli* was submitted to NCBI with GenBank accession Number: MK900683 and the sequence has shown 99.84% similarity with the *G. uzeli* populations of West Bengal (accession number: KX622229) and Maharashtra (accession number: KU752541). While for the predator mtCOI sequence (506 bp) submitted to NCBI with GenBank accession Number: MT140887 and the sequence has shown about 97% similarity with *Chrysoperla* sp.

Observations on predation by *Chrysoperla* sp.: Large number of dried thrips bodies were observed inside many leaf galls which was due to predation of thrips by *Chrysoperla* sp. Its larvae were observed inside leaf galls and on plants infested with *G. uzeli*. To confirm the predation a few larvae were placed along with weeping fig thrips on petri plate under laboratory conditions. *Chrysoperla* larvae sucked out body fluid of thrips by piercing with their mandibles and in few

Figs.1-4. 1. Leaf gall caused by *G. uzeli*; 2. Thrips inside leaf gall; 3. Adult of *G. uzeli*; 4. *Chrysoperla* sp. larva inside leaf gall



Figs. 5-10. 5. Two pairs of postocular setae on head; 6. Epimeral and posteroangular setae on pronotum; 7. Tergum of mesonotum, metanotum and 1st abdominal segment; 8. Abdominal tergum with two pairs of sigmoid wing retaining setae; 9. Duplicate cilia on forewing; 10. S1 and S2 setae on abdominal tergum IX

days many dried thrips bodies observed in petri plate like natural condition. Similarly, Held et al. (2005) reported larvae of *Chrysoperla* sp. from galls of *G. uzeli* on *F. benjamina* plants in USA. Heavy infestation of *G. uzeli* was observed during winter 2018 on *F. benjamina* in IARI campus although not able to find thrips during successive winter seasons.

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REFERENCES

Ali A Y. 2014. *Gynaikothrips uzeli* (Thysanoptera: Phlaeothripidae), New record from Tartous, Syria. Journal of Insect Science 14(273): 1-2.

Bagnall R S. 1909. On some new and little known exotic Thysanoptera. Transactions of the Natural History Society of Northumberland 3: 524-540.

Cambero-Campos J, Valenzuela-García R, Carvajal-Cazola C, Rios-Velasco C, García-Martínez O. 2010. New records for Mexico: *Gynaikothrips uzeli*, *Androthrips ramachandrai* (Thysanoptera: Phlaeothripidae) and *Montandoniola confusa* (Hemiptera: Anthocoridae). Florida Entomologist 93(3): 470-472.

Cavalleri A, Lima M G A, Melo F S, Mendonça Jr M S. 2011. New records of thrips (Thysanoptera) species in Brazil. Neotropical Entomology 40: 628-630.

de Borbón C M, Agostini J P. 2011. *Gynaikothrips uzeli* (Zimmermann) and

Androthrips ramachandrai Karny (Thysanoptera, Phlaeothripidae), first records for Argentina. Revista De La Facultad De Ciencias Agrarias 43: 253-260.

Folmer O, Black M, Hoeh W, Lutz R, Vrijenhoek R. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. Molecular Marine Biology and Biotechnology 3(5): 294-299.

Hoddle M S, Mound L A. 2011. Thysanoptera of the Galapagos Islands. Pacific Science 65: 507-513.

Hoddle M S, Mound L A, Paris D L. 2012. Thrips of California. Identic Pty Ltd, Queensland. (http://keys.lucidcentral.org/keys/v3/thrips_of_california/identify-thrips/key/california-thysanoptera-2012/Media/Html/browse_species/Gynaikothrips_uzeli.htm).

Karny H. 1926. Studies on Indian Thysanoptera. Memoirs of the Department of Agriculture in India. Entomology Series 9: 187-239.

Nagrare V S, Naikwadi B. 2016. An outbreak of gall inducing thrips *Gynaikothrips uzeli* Zimmermann (Thysanoptera: Phlaeothripidae) on *Ficus benjamina* Linn. in central India. Journal of Entomology and Zoology Studies 4(5): 294-296.

Priesner H. 1939. Zur Kenntnis der Guttung *Gynaikothrips* Zimm. (Thysanoptera). Mitteilungen der Münchner Entomologischen Gesellschaft 29:475-487.

Retana-Salazar A P. 2006. Variacion morfologica del complejo *Gynaikothrips uzeli-ficorum* (Phlaeothripidae: Tubulifera). Metodos en Ecología y Sistematica (MES) 1(1): 1-9.

Singh H C, Varatharajan R. 2013. Thrips (Insecta: Thysanoptera) fauna of Kaziranga National Park, Assam. Current Science 105 (9): 1219-1223.

ThripsWiki (2021). ThripsWiki- providing information on the World's thrips. http://thrips.info/wiki/*Gynaikothrips* accessed on 20 January 2021.

Tree D J. 2012. First record of *Gynaikothrips uzeli* (Zimmermann) (Thysanoptera: Phlaeothripidae) from Australia. Australian Entomologist 39(3): 105-108.

Tyagi K. 2012. New Records of Tubilifera (Thysanoptera: Phlaeothripidae) from the state of Karnataka, India. Journal of Threatened Taxa 4(5): 2596-2602.

Zimmermann A. 1900. Uber einige javanische Thysanoptera. Bulletin de l'Insitut Botanique de Buitenzorg 7: 6-19.

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