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NEW RECORD OF SYRPHID, *CHRYSOTOXUM BAPHYRUM* WALKER (DIPTERA: SYRPHIDAE) ON THE SUGARCANE ROOT APHID, *TETRANEURA JAVENSIS* (VAN DER GOOT) IN PENINSULAR INDIA

R. R. Patil, Kumar Ghorpade, P. S. Tippannavar and M. K. Chandaragi

Department of Agricultural Entomology, University of Agricultural Sciences, Dharwad-580 005, India

e-mail: patilrr6@gmail.com

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ABSTRACT – Another new aphid prey for the syrphid, *Chrysotoxum baphyrum* Walker has been recorded on sugarcane root aphid, *Tetraneura javensis* (Van Der Goot) from northern Karnataka, peninsular India. This is the sixth aphid prey record for any species of syrphid genus *Chrysotoxum* and the very first from a tropical country for a separate species, *baphyrum*, other than those aphids given for *Chrysotoxum arcuatum* (L.), *Chrysotoxum intermedium* Walker and *Chrysotoxum shirakii* Matsumura from Scotland, Italy and Japan, respectively. In the present study, sugarcane root aphid, *T. javensis* is also being reported for the first time from Karnataka State.

Key words **:** Syrphid aphid prey, *Chrysotoxum baphyrum,* sugarcane root aphid, India

INTRODUCTION

So far, no prey has been recorded for any species of the genus *Chrysotoxum* Meigen (more than 70 species) anywhere in the world where its species fly, *i.e.,* in the Holarctic, Afrotropical, or Oriental regions. Inouye (1958) listed *Cinara todocola* (Inouye) on *Abies sachalinensis* (F. Schmidt) Mast. and *Picea jezoensis* (Sieb. et Zucc.) in Japan as aphid prey of *Chrysotoxum shirakii* Matsumura. Also Luciano *et al* (1989) recorded the aphid, *Pemphigus bursarius* (L.) on *Cichorium endivia* L. in Italy as prey of *Chrysotoxum intermedium* Meigen. Observations made so far have indicated that larvae of these species of wasp-mimicking flies are ground dwellers near ant colonies and perhaps feed on root aphids and on ant brood. Rotheray *et al* (1996) gave a detailed account of known myrmecophilous Syrphini feeding on root aphids and cited *C. arcuatum* larvae feeding on *Geoica* sp. aphids infesting *Arrhenatherum elatius* (L.) with a *Formica lemani* Bondroit ant colony. They also found this syrphid feeding on *Forda* sp. aphids (without ant colony nearby) on *Dactylis glomerata* L. in Scotland.

MATERIALS AND METHODS

Recent field observations near Shirguppi village (Athani taluk, Belgaum District, Karnataka State, India) during March 2012 revealed the presence of an aphid, *Tetraneura javensis* (Van der Goot) on sugarcane varieties *viz*., Co-86032 and Co-671. One foot length of sugarcane root was infested with as many as 200 aphids. The root aphid affected plants exhibited slow growth, stunting mosaic symptom and tip drying resulting in reduced root vigour. Further, close observations on aphid infested sugarcane plants revealed the presence of syrphid larvae. The predator and prey were brought and reared in the Laboratory at the Department of Entomology, University of Agricultural Sciences, Dharwad. The fly maggot fed on *T. javensis* aphids, within a week's time pupation took place and five days later adult female fly emerged. This was identified as *Chrysotoxum baphyrum* Walker, which is another new aphid prey record for the syrphid on sugarcane root aphid, *T. javensis* from northern Karnataka, peninsular India. Incidentally, root aphid, *T. javensis* is also being reported on sugarcane for the first time from Karnataka State.

RESULTS AND DISCUSSION

Root Aphids

The sugarcane root aphid, *T. javensis* is being reported for the first time from Karnataka State (Plate 1). The aphid genus, *Tetraneura* Hartig 1841 was erected in the Tribe Eriosomatini of the Family Aphididae (Hemiptera), composed of insects which have more or less developed the habit of gall formation and possess wax glands, and the antennae of the alate forms are usually armed with annular sensoria. The type species is *Tetraneura ulmifoliae* Baker, 1920 [= *Aphis ulmi* Linnaeus, of Hartig] (Baker, 1920). Currently placed in the subfamily Pemphiginae (Agarwala and Ghosh, 1984) which has 19 genera and 48 species in the Indian subregion, there are nine Indian *Tetraneura* species. Raychaudhuri (1983) reported *Sorghum* [as *Andropogon*] *vulgare* (Jowar), *Capillipedium* sp., *Eleusine coracana* (Ragi or Finger Millet), *Oryza sativa* (Paddy), *Panicum colonum, P. javanicum, P. miliaceum* (Common Millet), *Setaria*

Plate 1 : Predatory syrphid maggot, *Chrysotoxum baphyrum* and root aphids, *Tetraneura javensis.*

Plate 2 : Adult syrphid fly, *Chrysotoxum baphyrum.*

italica (Italian Millet) and some indeterminate grasses as other host plants of *T. javensis.*

George (1929) recorded the *T. javansis* on sugarcane from Coimbatore. Nirmala and Ananthanarayana (1975) recorded another species of root aphid, *Forda orientalis* George on sugarcane varieties *viz*., Co-419 and Co-A 71-1 from Coimbatore

Musthak Ali and Sharatchandra (1986) worked on *Forda orientalis* (George) of root aphids which necessarily required presence of ants as symbionts in order to establish their colonies. They opined that, these aphids are confined to the root zone; their presence is rarely noticed until the plants show symptoms of wilting, excess tillering, stunted growth and early maturity.

Musthak Ali and Sharatchandra (1985) reported another root aphid-feeding hover-fly, *Paragus auritus* Stuckenberg and stated that this syrphid predator is always found associated with *F. orientalis*, both during summer and *kharif* seasons. There is a potential to use *P. auritus* as a biological control agent.

Finally, Ghorpade *et al* (2011) gave notes on *Paragus* species and reported that *P. auritus* larvae prey especially on root aphids of paddy, ragi, jowar, sweet potato and cotton. Earlier, Thompson and Ghorpade (1992), in a revision of Oriental *Paragus* species, had given *Tetraneura nigriabdominalis* (Sasaki) and other undetermined root aphids on sorghum, paddy, cotton, and finger millet, as well as *F. orientalis* as prey of *P. auritus.*

Ghorpade (1981) listed *T. nigriabdominalis* as prey of *Paragus serratus* (Fabricius) quoting Vadivelu *et al.* (1976) who found them in the Coimbatore area (Tamil Nadu). This syrphid (larvae) was also recorded feeding on aphids on ragi and sorghum roots at Coimbatore (Fletcher, 1916; Bhatia and Shaffi, 1933; Cherian, 1934). Rahman (1940) and Butani (1958) recorded it feeding on undetermined sugarcane aphids in India.

Aphid preys of the genus *Chrysotoxum*

Another new aphid prey for the syrphid, *C. baphyrum* has been recorded on sugarcane root aphid, *T. javensis* (Plates 1 & 2) from northern Karnataka, peninsular India. The recorded aphid preys of *Chrysotoxum* species are limited to three species mentioned above from Scotland, Italy and Japan. Coe (1953) mentioned that, the feeding habits of the larvae of *Chrysotoxum* are apparently unknown. Beling (1882), who described larva and puparium of *Chrysotoxum bicinctum* (Linnaeus), found the larva in a compost heap. Greene (1923) described the larva and puparium of *Chrysotoxum pubescens* Loew, a North American species; he found the larva under a stone in a moist situation, and from his descriptions and figures it appears to confirm to be aphidiphagous type. Dusek and Laska (1962) found larva of *Chrysotoxum elegans* Loew under a stone in Czechoslovakia. Speight (1976) found puparium of *Chrysotoxum festivum* (Linnaeus) and larvae of *Chrysotoxum fasciatum* (Müller) in a *Lasius* ant nest in Ireland. Dixon (1960) found larva of *Chrysotoxum verralli* Collin in *Lasius* ant nest in Britain. Greene (1923) found larva of C. *pubescens* under a stone in U.S.A. Larvae and puparia seem to be associated with ant nests where they possibly feed on root aphids (Speight, 1976).

Ghorpade (1994) gave a key to nine *Chrysotoxum*

species found in the Indian subcontinent, including *C. baphyrum*, which was recorded from India (Himachal, Uttarakhand, West Bengal, Karnataka and Tamil Nadu), Burma, Sri Lanka, and Nepal. Again, in his brief summary of the prey of predacious Syrphidae (Ghorpade, 2007) he did not mention any of *Chrysotoxum*, but placed this genus in a group with *Doros* Meigen, *Xanthogramma* Schiner, *Dideoides* Brunetti, *Dasysyrphus* Enderlein, and *Notosyrphus* Vockeroth.

In their summary of Palaearctic Syrphidae, Thompson and Rotheray (1998) mentioned about the feeding of *Chrysotoxum* on ground-layer aphids with no specific details of any prey species of this syrphid genus.

The current record seems to be the very first for a tropical species of *Chrysotoxum* and adds to the only three other records, from Scotland, Italy and Japan, in temperate areas. *C. baphyrum* is a widespread species of this genus in the Indian subcontinent and is a supplementary root aphid predator to the other specialist syrphid, *Paragus auritus* so far known from such microhabitats on root aphids. It was known as *C.* "*baphyrus*" in literature but Ghorpade (2012) corrects the gender of the species name as *baphyrum* (q.v.). More research needs to be done to uncover more species of *Chrysotoxum* and their prey in the Indian sub region and other parts of the Oriental region and elsewhere, where this fly genus occurs (vide supra).

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