



Research Note

Occurrence of *Aphelinus asychis* Walker (Aphelinidae, Hymenoptera) parasitizing *Myzus persicae* (Sulzer) under protected cultivation

GAVKARE OMKAR* and KUMAR SURJEET

Department of Entomology, CSK HPKV, Palampur 176 062, Himachal Pradesh, India

*Corresponding author: E-mail: omkargavkare@yahoo.com

ABSTRACT: *Aphelinus asychis* Walker (Aphelinidae: Hymenoptera), a solitary endoparasitoid was recorded from *Myzus persicae* (Sulzer) infesting bell pepper *Capsicum annuum* L. under protected cultivation in India during December 2011. The per cent parasitisation ranged from 35 to 40% of population of *M. persicae*.

KEY WORDS: *Aphelinus asychis*, *Myzus persicae*, endoparasitoid, protected cultivation

(Article chronicle: Received: 31-5-2012 Revised: 23-8-2012 Accepted: 10-9-2012)

Aphelinus asychis Walker (Hymenoptera: Aphelinidae) is a solitary endoparasitoid of aphids and native to Old World (Europe, Asia and Africa). It was introduced into the United States from Asia, Europe and Africa for classical biological control of the Russian wheat aphid, *Diuraphis noxia* Mordvilko and the species is cosmopolitan now as a result of previous introductions (Hayat 1998; Elliott *et al.*, 1999). This species parasitizes different hosts at different geographical locations. At least 42 species of aphids have been recorded from different parts of the world as hosts of *A. asychis* (Kalina and Stary 1976; Takada 2002). In addition to ovipositing in aphids, *A. asychis* females immobilize aphids by stinging them and feed on their haemolymph and other tissues, a common trait called host-feeding.

The parasitoid was recorded to parasitize *Myzus persicae* (Sulzer) infesting bell pepper, *Capsicum annuum* L. grown in the polyhouses of the Department of Entomology, Himachal Pradesh Agricultural University, Palampur, Himachal Pradesh, India (altitude +1290 MSL; 32.11°N latitude and 76.23° E longitude) in December, 2011. Black coloured mummified aphids were collected from the lower surfaces of *C. annuum* leaves and kept in Petri plates under laboratory conditions for the emergence of the adults. The parasitic adult that emerged from the mummified aphid by making a characteristic circular exit hole was identified as *Aphelinus asychis* Walker (Hymenoptera: Aphelinidae) using standard key and morphological characteristics given in the literature (George and Ismail, 2009). For

morphological studies, the parasitoids were mounted in DPX and permanent slides were prepared which were observed under stereozoom microscope (SMZ 16, Olympus, Japan) equipped with a photo-micrograph camera. Morphometric observations of the parasitoid were also carried out using an ocular micrometer calibrated with a stage micrometer. The adult parasitoid was a tiny black wasp with an average length and breadth of 1.50 mm and 0.54 mm respectively. The wings of parasitoid were brachypterous and length of fore wings was 1.02 mm. The gaster was reddish-yellow, legs reddish and extensively infuscated.

The extent of parasitism by the parasitoid was worked out by collecting samples of aphid infested leaves of *C. annuum* from different polyhouses in the locality and counting the total number of aphids and the number of mummified aphids in the laboratory. *M. persicae* was dissected under a binocular stereomicroscope and the number of aphids containing at least one parasitoid larva was counted as parasitized. From these counts per cent parasitism by *A. asychis* on *M. persicae* population in the polyhouses was worked out as 35 to 40 per cent.

Earlier, there was meager information available on *A. asychis* from India. It was first recorded during a survey of natural enemies of aphids in India (Rameshiah and Dharmadhikari, 1969) and later additional information on the taxonomic aspects of the parasitoid was provided (Hayat, 1980). This is the first report of parasitism of

A. asychis on *M. persicae* under protected cultivation in India. This report assumes significance in view of the fact that *M. persicae* is an economically important pest with over 400 host plants in many parts of the world (van Emden *et al.* 1969; Blackman and Eastop, 2000) and, also an important pest of many vegetable crops including bell pepper grown under protected cultivation in India (Singh *et al.*, 2004). It is also capable of transmitting more than hundred virus diseases in different hosts particularly in solanaceous vegetables (Blackman and Eastop, 2007). *A. asychis* can be a promising candidate for the biological control of *M. persicae* under protected cultivation in India. *A. asychis* has been reported to control several aphids including *M. persicae* effectively in the greenhouse in Canada (Richardson and Westdal, 1965) and *A. gossypii* in Germany (Schirmer *et al.*, 2008). It was commercially applied as a biological control agent against *M. persicae* in Europe (van Lenteren *et al.*, 1997). Tatsumi and Takada (2005) also assessed the potential of the parasitoid as a biological control agent against three aphid species, *A. gossypii*, *M. persicae* and *Macrosiphum euphorbia* in Japan and concluded that *M. persicae* is a suitable host for *A. asychis*. The protocols for the mass rearing, release techniques including the effective dosage, method of release and frequency of releases need to be developed for effective utilization of *A. asychis* for the management of *M. persicae* under protected cultivation.

ACKNOWLEDGMENT

The authors are thankful to Dr. J. Poorani, National Bureau of Agriculturally Important Insects, Bangalore, India, Dr. John Heraty, Department of Entomology University of California, Riverside and Dr. Mohammad Hayat, Department of Zoology, Aligarh Muslim University, Aligarh (U.P.), India for their help in the identification of the parasitoid.

REFERENCES

- Blackman RL, Eastop VF. 2000. *Aphids on the world's crops: An Identification and Information Guide*. 2nd ed., Wiley, Chichester, 1–466.
- Blackman RL, Eastop VF. 2007. Taxonomic issues, In: pp. 1–22. van Emden H. F. and Harrington, R. (Eds.), *Aphids as Crop Pests*, CABI, U.K.
- Elliott NC, Lee JH, Kindler SD. 1999. Parasitism of several aphid species by *Aphelinus asychis* (Walker) and *Aphelinus albipodus* Hayat and Fatima. *Southwest Entomol.* **24**: 5–12.
- George J, Ismail K. 2009. A Review of the species of *Aphelinus* Dalman, 1820 (Hymenoptera: Aphelinidae) from Georgia. *J Ent Res Soc.* **11**: 41–52.
- Hayat M. 1980. Taxonomic notes on some oriental Aphelinidae with some new records (Hym.: Chalcidoidea). *Oriental Insects* **14**: 461–4752.
- Hayat M. 1998. Aphelinidae of India (Hymenoptera: Chalcidoidea): a taxonomic revision. *Mem Ent Int.* **13**: 1–416.
- Kalina V, Stary P. 1976. A review of the Aphelinidae (Hym.: Chalcidoidea), their distribution and host range in Europe. *Studia Entomol Forest.* **2**: 143–170.
- Rameseshiah G, Dharmadhikari PR. 1969. *Aphelinid parasites of aphids in India*. Tech. Bulletin. Commonwealth Institute of Biological Control. **11**: 157–164.
- Richardson HP, Westdal PH. 1965. Use of *Aphelinus semiflavus* Howard for control of aphids in greenhouse. *Canadian Ent.* **97**: 110–111.
- Schirmer S, Sengonca C, Blaese RP. 2008. Influence of abiotic factors on some biological and ecological characteristics of the aphid parasitoid *Aphelinus asychis* (Hymenoptera: Aphelinidae) parasitizing *Aphis gossypii* (Sternorrhyncha: Aphididae), *European J Ent.* **105**, 121–129.
- Singh D, Kaur S, Dhillon TS, Singh P, Hundal JS, Singh GH. 2004. Protected cultivation of sweet pepper hybrids under net-house in Indian conditions. *Acta Hort.* **659**: 515–521.
- Takada H. 2002. Parasitoids (Hymenoptera: Braconidae, Aphidiinae; Aphelinidae) of four principal pest aphids (Homoptera: Aphididae) on greenhouse vegetable crops in Japan. *Appl Ent Zool.* **37**: 237–249.
- Tatsumi E, Takada H. 2005. Evaluation of *Aphelinus asychis* and *A. albipodus* (Hymenoptera: Aphelinidae) as biological control agents against three pest aphids. *Applied Ent Zool.* **40**: 379–385.
- van Lenteren JC, Drost YC, van Roermund HJW, Posthuma- Doodemam CJAM. 1997. Aphelinid parasitoid as sustainable biological control agent in greenhouse. *J Appl Ent.* **121**: 473–485.
- van Emden, Eastop VF, Hughes RD, Way MJ. 1969. The ecology of *Myzus persicae*. *Ann Rev Ent.* **14**: 197–270.