*J.Biol.Control*, **8** (2), 81-84, 1994

# Impact of the Parasitoids on the Suppression of the Green Peach Aphid, *Myzus persicae* (Sulz.) on Chillies and Sweet Pepper in India

M.MANI and A.KRISHNAMOORTHY

Biological Control Laboratory I, Division of Entomology and Nematology
Indian Institute of Horticultural Research, Bangalore - 560 089, India

ABSTRACT

**The green peach aphid *Myzus persicae* (Sulz.) has become a major pest of chillies and sweet pepper *(Capsicum annuum L.)* in India. It is becoming increasingly difficult to control the aphid with insecticides. The investigations on the impact of the natural enemies revealed that the parasitoid *Aphidius* sp. appeared in large numbers causing upto 93.65% parasitism on *M.persicae* infesting chillies. In sweet pepper fields, both *Aphelinus* sp. and *Aphidius* sp. were recorded on *M. persicae* but the aphelinid was more abundant than the aphidiid. The rate of parasitism by *Aphelinus* sp. alone went upto 96.80% in April '92 in sweet pepper fields. The aphid population was effectively suppressed on chillies and sweet pepper by the parasitoids.**

KEY WORDS : Green peach aphid, *Myzus persicae* parasitoids, *Aphidius* sp., *Aphelinus* sp., chillies, sweet pepper

The green peach aphid *Myzus persicae* (Sulzer) has been known to attack many crops including chillies and sweet pepper (*Capsicum annum* L.) in different countries. Severe losses due to the infestation of *M. persicae* on chillies and sweet pepper were reported from many countries (Burbutis *et al.*, 1972; Basha and Balasubramaniam, 1980; Reddy *et al.*, 1981; McClanahan and Founk, 1983). It is becoming increasingly difficult to control the aphid in recent years mainly due to the development of resistance in *M. persicae* to the insecticides (Wohlmuth, 1978; Linteren *et al.*, 1979; Dhingra and Singh, 1992; Lowery *et al.*, 1993). According to Wholmuth (1978) the control of *M. persicae* by natural enemies was an important factor though their role might vary among different host plant species in different geographic areas. The present study deals with the impact of two local hymenopteran parasitoids, *Aphidius* sp. and *Aphelinus* sp. on the field population of *M. persicae* infesting chillies and sweet pepper.

## MATERIALS AND METHODS

The study on the impact of *Aphidius* sp. was conducted on a local chilli variety (Cv. Gowri Bidanur) in an area of 0.25 ha at Cholanaikanahalli, Bangalore North. The seeds were sown in the nursery beds on 15th October, 1990 and the planting was done in the main field on 30th November with a spacing of 45 x 30 cm.

The second field experiment was carried out on sweet pepper at Indian Institute of Horticultural Research Experiment Farm, Hessaraghatta, Bangalore North. The seeds of sweet pepper cv. California wonder were sown in the nursery bed on 17th November, 1992 and transplanting in the main field of 0.30 ha was done after 35 days of sowing. A spacing of 45 x 30 cm was adopted in the main field. The effect of the two parasitoids *Aphelinus* sp. and *Aphidius* sp. on *M. persicae* was studied in the second field experiment.

Both chillies and sweet pepper were sprayed with dimethoate (0.05%) at 15 days interval upto a month after planting for initial protection against thrips and aphids. However,

Contribution No. 27/94 of I.I.H.R.

**Table 1. Population of *Myzus persicae* and per cent parasitism by *Aphidius* sp. on chillies on 1990-91.**

| Date | No. of aphids/plant* | | Parasitism (%) (Mean ± S.D.) |
|---|---|---|---|
| | Healthy | parasitised | |
| 2.1.1991 | 24.20 | 0.81 | 3.20 ± 0.86 |
| 12.1.1991 | 46.80 | 3.40 | 6.96 ± 1.25 |
| 22.1.1991 | 78.60 | 10.60 | 11.85 ± 2.47 |
| 2.2.1991 | 26.60 | 18.40 | 40.89 ± 10.36 |
| 12.2.1991 | 8.90 | 15.50 | 63.82 ± 14.42 |
| 22.2.1991 | 0.40 | 5.50 | 93.65 ± 5.50 |

S.D. = Standard deviation
* = Three leaves

*M. persicae* started appearing subsequently, Insecticidal sprays were then suspended to study the impact of parasitoids in the natural control of the green peach aphid.

Sampling for aphid and its natural enemies was initiated on 2nd January 1991 and 25th January 1992 on 50-randomly selected plants of chillies and sweet pepper respectively. Three leaves from the top were chosen at 10-15 days interval for counting the number of healthy and parasitised aphids (mummies). Mummified aphids which contained *Aphidius* sp. were golden yellow and in the case of *Aphelinus* sp. they were black. Per cent parasitism on each occasion was estimated using the following equation.

$$\text{Parasitism (\%)} = \frac{\text{No. of mummified aphid}}{\text{No. of healthy aphids + No. of mummified aphids}} \times 100$$

## RESULTS AND DISCUSSION

The data on the number of healthy aphids and per cent parasitism by *Aphidius* sp. on chillies are presented in Table 1. The population of *M. persicae* increased from 24.20 to 78.60% in about 20 days during January 1991. However, the aphid numbers declined to 0.40/plant in the last week of February. Two predators viz., *Cheilomenes sexmaculata* (F.) and *Chrysopa* sp. were recorded in negligible numbers, and hence they were not included in the table. *Aphidius* sp. was the only primary parasitoid observed, and it was found abundant through out the study period. Parasitism was as low as 3.20% initially but reached a peak of 93.65% in the last week of February.

Data on the population of *M. persicae* and parasitism by *Aphelinus* sp. and *Aphidius* sp. indicated that the initial aphid population was 217/sweet pepper plant on 10th February, 1992 (Table 2). After reaching a peak population of 310/plant, the aphid numbers started declining from 26th February onwards. Due to increased rate of parasitism, the population of *M. persicae* crashed to 0.50/plant. During the study period, two hymenopteran parasitoids viz., *Aphelinus* sp. and *Aphidius* sp. were observed. The initial cumulative parasitism by both the parasitoids was as low as 5.30% but reached the peak of 98.80% in April '92. *Aphelinus* sp. was more abundant than *Aphidius* sp. in the study period in sweet pepper field. *Aphelinus* sp. alone contributed to 96.80% parasitism, while a maximum of 2.00% parasitism was caused by *Aphidius* sp. on *M. persicae*.

Several natural enemies were recorded on *M. persicae* but there was little quantitative data on their value in controlling the aphid (Van Embden *et al.*, 1969). In the present study, the steady decline in the aphid population on both chillies and sweet pepper is attributed mainly to the increased rate of parasitism by *Aphidius* sp. and *Aphelinus* sp. A rate of 88-94% parasitism was observed in our experimental fields. There were no marked abnormal changes in the climatic factors during the study periods. The maximum temperature

**Table 2. Population of *M. persicae* and per cent parasitism on sweet pepper at I.I.H.R. Farm in 1992.**

| Date | No. of aphids/plant* | | Per cent parasitism | | |
|---|---|---|---|---|---|
| | Healthy | parasitised | Total | *Aphelinus* sp. | *Aphidius* sp. |
| 25.1.92 | 217.40 | 12.20 | 5.30 | 5.30 | 0.00 |
| 10.2.92 | 310.50 | 43.00 | 12.14 | 11.80 | 0.34 |
| 26.2.92 | 246.70 | 81.90 | 24.92 | 24.50 | 0.42 |
| 12.3.92 | 133.30 | 63.80 | 35.98 | 35.40 | 0.58 |
| 10.4.92 | 26.20 | 57.60 | 68.60 | 67.50 | 1.10 |
| 24.4.92 | 0.50 | 42.50 | 98.80 | 96.80 | 2.00 |

* = Three leaves

varied from 26 to 35°, the minimum temperature from 13 to 20°C and the relative humidity from 63 to 71% in the morning and 39 to 51% in the evening. There were no rains from January to April both in 1991 and 1992.

Of all the aphid parasitoids, *Aphidius* spp. were the most important (Rabasse and Wyatt, 1985; Hagwar and Hofsvang, 1991). As many as 11 species of *Aphidius* were known to attack *M. persicae* (Van Embden *et al.*, 1969), but only a very few attempts were made to study their potential in controlling the aphid. In India, as high as 98% parasitism of *M. persicae* due to *A. absinthii* (Marshall) had been recorded on chillies by Nagalingam (1983). Similarly, *A. platensis* Brethes also gave 94% parasitism of green peach aphid on chillies under glass house conditions (Easwaramoorthy *et al.*, 1976). In the present investigation too, *Aphidius* sp. (determined upto genus level only by IIE) was found to be highly effective in reducing the aphid population by exerting a maximum of 93.6% parasitism. These reports confirm that *Aphidius* spp. hold greater promise in checking *M. persicae*. However, *Aphelinus* sp. was more abundant than *Aphidius* sp. on *M. persicae* infesting sweet pepper. In India alone, five species of *Aphelinus* were reported on *M. persicae* infesting different host plants (Ramaseshia and Dharmadhikari, 1969). About 88% parasitism by *A. kurdjuomi* was observed on *M. persicae* infesting chillies in the plains of Tamil Nadu (Nagalingam, 1983). The present investigations also confirm the efficacy of *Aphelinus* sp. which gave 96.8% parasitism and effectively controlled *M. persicae* on sweet pepper.

## ACKNOWLEDGEMENTS

The authors acknowledge the help rendered by Mr. Srinivasa Rao and Mr. G.L.Pattar. They are also grateful to Director, IIHR for providing facilities for conducting the study. Thanks are due to International Institute of Entomology (IIE), London for identifying the aphid and its natural enemies.

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