EUROPEAN ACADEMIC RESEARCH
Vol. III, Issue 10/ January 2016

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Preliminary Studies on Egg Parasitoids of Cotton Jassid *Amrasca Biguttula Biguttula* (Ishida)

RIAZ MAHMOOD
ASHFAQUE AHMED NAHIYOON[1]
HAKIM ALI SAHITO
IRFAN-UL HAQ
CABI Central & West Asia
Rawalpindi-Pakistan

Abstract:

Survey was initiated first time in Pakistan for natural enemies of jassids on cotton in Sindh and Punjab. Two parasitoids Arescon enocki (Subba Rao & Kaur) and Anagrus sp were recorded from jassid eggs both on cotton and okra. No parasitoid was recorded from nymphs and adults. The generalists including Cheilomenes sexmaculatus (Fabricius) and Chrysoperla carnea (Stephens) were seen occasionally feeding on nymphs and adults of the jassids. The parasitoid Areson enocki was dominant and had significant role in controlling jassid population on cotton on pesticides free farms, however, it was rare on pesticides treated farms. Mean number of jassid eggs was 13 per leaf on unsprayed fields and 6 in sprayed fields. Though the numbers of jassid eggs were higher in the pesticides free farm but at the same time the parasitism in eggs was also high and the pesticides were not needed to control them. In sprayed farms the parasitism was extremely low and pesticides spraying had to be repeated to keep jassids under control. Jassids burning on cotton leaves was common in sprayed farms whereas it was rare in unsprayed farms. This study led to the conclusion that our agro ecosystem is rich in beneficial insects and there is need to work out strategies that

[1] Corresponding author: a.ahmed@cabi.org

encourage the predators and parasites especially for jassids who are difficult to be controlled by the pesticides because of their hidden eggs in plant tissue. The egg parasitoids seem good candidate to be considered for augmentation and conservation for controlling jassids.

Key words: Cotton, *Amrasca biguttula biguttula, Arescon enocki, Anagrus* sp.

INTRODUCTION:

Currently *Amrasca biguttula biguttula* (Ishida) has gained prime importance among sucking pests complex on cotton in Pakistan. This species is present throughout South and South East Asia and Mariana Islands (Schreiner, 2000). In Pakistan it is a serious pest of cotton, okra and eggplant (Habib & Mohyuddin, 1981; Mohyuddin 1981; Ahmed, 1999). The jassid attacks cotton crop from germination till harvest (Tomar and Rana, 1994). In Pakistan mainly insecticides are recommended to control the jassids (Ahmed *et al.*1981; Safdar, *et al.*1987) and no alternate options have been looked for controlling this group of insects. Actually very little information is available on natural control of this group of insects. From India six species of parasitoids on jassid eggs (Suba Rao, 1983; Singh, *et al*. 1993; Subba Rao and Kaur, 1959).) and some generalists such as *Cheilomenes sexmaculatus* (Fabricius) and *Chrysoperla carnea* (Stephens) have been reported feeding on jassids (Yadev, 2009). Rote *et al*. (1985) recommended spraying of insecticides in cotton crop when crinkling, curling and yellowing is noticed on the lower leaves of the plant. Ahmed *et al* (1981) recommended spraying the crop when jassid nymphs population reached 5.2/leaf. Presently farmers rely only on schedule spraying of pesticides in the crop. This has led to increase in frequency of pesticides spraying overtime (Safdar, *et al.*1987). On sprayed fields mealy bug upsurge was commonly

seen because of disruption in natural control of pests. In view of this alternate options are being looked for controlling jassids and other sucking pests on cotton. Basic studies were initiated on identification and status of natural enemies associated with jassids on cotton and okra. This information has been collected first time in Pakistan and future studies can be formulated on the basis of these findings for management of this group of pests. The results of these preliminary studies on pesticides free and sprayed farms are reported here.

MATERIALS AND METHODS

Survey for natural enemies of jassids was conducted at Mirpurkhas in Sindh and at Bahawalpur in Punjab both on pesticides sprayed and unsprayed fields of cotton and okra. For population dynamics studies of jassid and their parasitoids fortnightly samples of leaves were taken from twenty plants at random from marked fields. From each plant three leaves one each from top, middle and base was taken. Thus a sample comprised of 60 leaves. The mid ribs of leaves containing jassid eggs were kept in glass vials measuring 5x12cm with the open end closed tightly with cotton swab at 25 ± in the laboratory. The parasitoids reared were counted and percentage parasitism calculated, Sampling was done May to September on cotton and from June to September on okra at Mirpurkhas whereas on cotton only from July to September at Bahawalpur.

RESULTS

PEST

Amrasca biguttula biguttula (Ishida)

Population trends

At Mirpurkhas (Sindh) where observations on cotton were started from 1st week of May 2010, the pest was seen breeding

and its eggs in leaves were recorded in small numbers. On the unsprayed fields the numbers of the jassid continued increasing until first week of June, decreased slightly in the third week of June, and again increased in first week of July when it was at its peak (13.4 eggs/leaf), decreased in August and this trend continued through September (Fig. 1).

On the sprayed fields where insecticides were sprayed on the cotton crop for six times during the period from May to September the jassid population was lesser compared with the unsprayed fields. Its population was largely affected by pesticides sprays made in the crop. The numbers of the jassid eggs per leaf were almost the same as in unsprayed field in 1st week of May. Their numbers increased in 3rd week, of May, decreased in June, slightly increased in 1st week of July, and then continued decreasing through September with slight increase in the first week of September (Fig. 1).

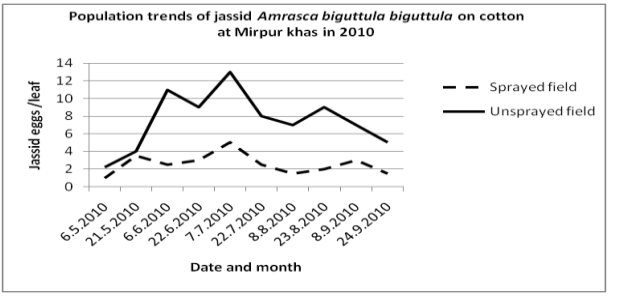

Fig. 1- Population trends of *Amrasca biguttulla biguttulla* on unsprayed and sprayed cotton at Mirpurkhas in 2010

At Bahawalpur where observations were started from July 1st week, the numbers of jassid eggs per leaf were almost the same both in sprayed and unsprayed cotton. In unsprayed cotton the numbers of the jassid eggs continued increasing until 1st week of August and then continued decreasing through September (Fig. 2). In sprayed cotton the numbers of jassid eggs per leaf remained at low level throughout in July and onwards (Fig. 2).

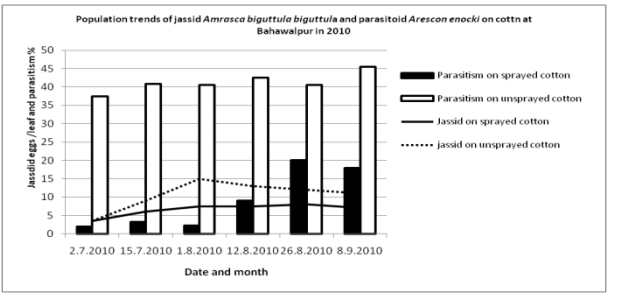

Fig. 2- Population trends of *Amrasca biguttula biguttula* and parasitoid *Arescon enock*i on cotton on unsprayed field at Bahawalpur in 2010

At Mirpurkhas on okra the numbers of jassid eggs per leaf remained low throughout in June until 1st week of July, increased in 3rd week of July, decreased in August and again slightly increased in September (Fig3). On okra at Mirpurkhas highest parasitism was recorded in June 1st week and continued decreasing until 1st week of July, increased along with the host in 3rd week of July and then continued decreasing through September (Fig. 3).

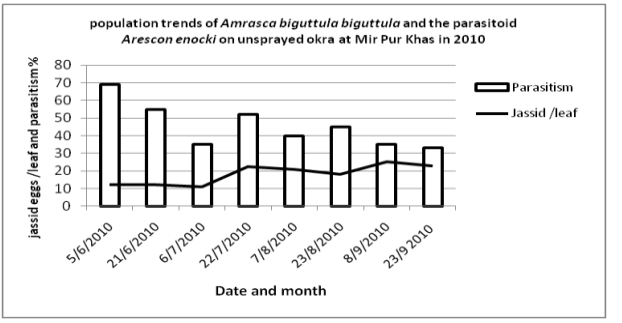

Fig. 3- Population trends of jassid *Amrasca biguttula biguttula* and parasitoid *Arescon enock*i on unsprayed okra at Mirpurkhas in 2010

Parasitoids

1. *Arescon enocki* (Subba Rao & Kaur)

This parasitoid described from India from jassids eggs was recorded most dominant parasitoid of *Amrasca biguttula biguttula* in present survey on cotton. At Mirpurkhas in unsprayed cotton it was recorded parasitizing jassid eggs in May when observations were started. Its incidence continued increasing through June, slightly decreased in July and again increased in August when it was at its peak (Fig. 4). Incidence decreased in September with decrease in host population. In unsprayed cotton fields its parasitism was higher and parasitism ranged between 25—77.7%. In sprayed cotton the parasitoid was not recorded throughout in May and 1st week of June. It was first time recorded in 3rd week of June. Its incidence remained low throughout in June and July and was relatively higher in August and September (see figure 4). At Bahawalpur almost similar were the population trends of the parasitoid in the sprayed and unsprayed cotton as at Mirpurkhas. Highest parasitism (45.5 %) was recorded in the unsprayed farms whereas it was below 20% in the sprayed farms (see figure 4).

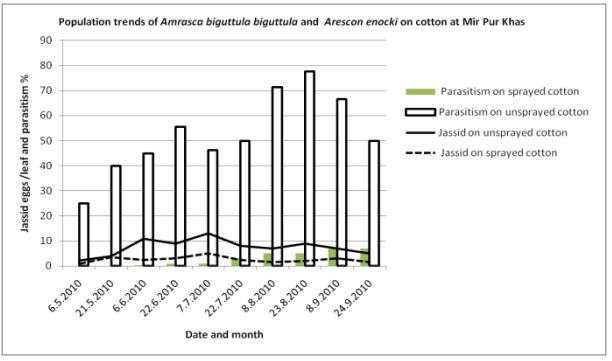

Fig. 4- Population trends of *Amrasca biguttula biguttula* and the parasitoid *Arescon enock*i on cotton at Mirpurkhas in 2010

1.Arescon enocki

***2.* Anagrus Sp.**

2. *Anagrus* sp was recorded once in September from eggs of the jassid on cotton

Predators

Cheilomenes sexmaculatus and *Chrysoperla carnea* larvae were recorded feeding on jassid nymphs and adults on cotton and okra in September.

DISCUSSION AND CONCLUSIONS

The information on natural enemies (parasitoids and predators) associated with Jassid *Amrasca biguttula biguttula* has been reported here first time from Pakistan. The information collected out of this survey conducted in Pakistan is very preliminary. Only two parasitoids on eggs were recorded and two generalists were seen feeding on nymphs and adults. There may be many more natural enemies associated with jassid and this preliminary information provides strong foundation to further move on for conducting intensive survey of the natural enemies associated with jassid and study their hosts and host plants relationships for developing sustainable management of the pest.

Jassid *Amrasca biguttula biguttula* deposits its eggs inside veins of the leaves and pesticides can hardly reach there

whereas the parasitoids are able to locate their target and they seem promising in controlling jassids. The pesticides sprays made in the crop may impact on jassids nymphs and adults of the insect hence lesser number of jassid eggs per leaf were recorded on sprayed crop than on unsprayed crop, however, the disadvantage was that parasitoids could hardly survive in pesticides environment and natural enemies were severely negating their role in regulating jassid population and pesticides applications had to be repeated for protection of the crop. On the other hand in unsprayed crop the natural enemies were abundant and pesticides were not needed for controlling jassids.

The present study indicated that *Arescon enocki* is a dominant parasitoid and is effective in regulating the jassid population. In unsprayed cotton not only that jassid was under control, others pests whose resurgences were seen common in sprayed cotton, was under complete control in unsprayed crop.

Brief description of individual contribution of the Author

Riaz Mahmood

Supervised the studies conducted on the population dynamics of jassid and its natural enemies in the field conditions on the cotton crop, rearing of parasitoids on cotton leaves in the laboratory condition at Bahawalpur and Mirpur Khas and contributed in writing of the research paper manuscript.

Ashfaque Ahmed Nahiyoon

Conducted the survey and recorded the population dynamics of jassid and its natural enemies in the field condition on the cotton crop, rearing of parasitoids on the cotton leaves in the

laboratory at Mirpur khas, Sindh. Author contributed in the preparation of research paper.

Hakim Ali Sahito
Conducted the survey and recorded the population dynamics of jassid and its natural enemies in the field condition on the okra, rearing of parasitoids on the okra leaves in the laboratory at Mirpur khas, Sindh. Author contributed in the preparation of research paper.

Irfan-ul-Haq
Conducted studies on population dynamics of jassid and its natural enemies in the field condition on the cotton crop, rearing of parasitoids on the cotton leaves in the laboratory at Bahawalpur.

ACKNOWLEDGEMENTS

The financial assistance from Ministry of Food and Agriculture, Federal Government of Pakistan for conducting studies on biology and ecology of cotton pests and their natural enemies is gratefully acknowledged. We thank Mr. Hidayatullah Chhajro, Director General, Agriculture Research Sindh, Dr. Atta Hussain Soomro, Director, Sindh Horticulture Research Institute, Mirpurkhas and Dr. Muhammad Usman Shar, Entomologist, ARI, Tando Jam for providing space at SHRI, Mirpurkhas and assist in conducting these studies. We specially thank Dr. Rana M. Shafique, Regional Director, CABI Central & West Asia, Rawalpindi, Dr. M. Ashraf Poswal Global Director, Plant Clinic Implementation, CABI Central & West Asia Rawalpindi and Dr. Ibad Badar Siddiqi, Project Director, Biological control of major cotton pests in Pakistan, for their consistent encouragement and support during the studies.

REFERENCES

Ahmed Z. 1991. Pest problems of cotton-A regional perspective. Proc. ICAC workshop on regional consultation on insecticide resistance management in cotton, 25-28 February1991, Karachi pp 5-20.

Habib R.and Mohyuddin AI. 1981. Possibilities of biological control of some pests of cotton in Pakistan Biologia ,27: 107-113

Mohyuddin AI.1981. A review of biological control in Pakistan. Proc. 2nd Pakistan congress of Zoology pp31-79

Rote NB; Patel BK; Mehta NP; Shah AH and Raja KRV. 1985. Threshold level of *Amrasca biguttula biguttula* (Ishida) causing economic injury to cotton. Indian Jr. of Agri. Sci. 55(7): 491-492.

Safdar O.; Munshi GH; Akhlas A; Ansari AH and Wasim-us-Sami. 1987. Insecticidal trial against cotton jassid *Amrasca devastans* (Dist.) Gomal Univ. Jr. of Res. 7(1-2): 15-17.

Singh SP; Rao NS; Henneberry TJ. 1993. Leafhoppers and their natural enemies. *Technical Bulletin. Project Directorate of Biological Control, ICAR.* No **6**:1-65

Subba Rao BR and Kaur RB. 1959. Studies on Indian Mymaridae - part I. Proceedings of the Indian Academy of Sciences (B). 49: 227-238.

Schreiner I. 2000. Agricultural Pests of the Pacific: Okra leaf hopper (*Amrasca biguttulla biguttulla* Ishida). Agricultural Development in the American Pacific (ADAP) 2000-11.

Tomar SK and Rana OS. 1994. Incidence of jassid in relation to variety and time of sowing in cotton (Gossypium species). Indian Jr. of Agri. Sci. 64(1): 70-71.

Yadav JB; Singh RS; Singh HP; and Singh AK. 2009. Effect of abiotic and biotic factors on jassid and fruit and shoot

borer in kharif okra crop. International Journal of Plant Protection 2(1): 119-122.