

Sunn Pest (Hemiptera: Scutelleridae) Oviposition and Egg Parasitism in Syria

¹M. El Bouhssini, ²M. Abdulhai and ³A. Babi

¹International Center for Agricultural Research in the Dry Areas, Aleppo, Syria

²General Commission for Scientific Agricultural Research,
Center for Scientific Agricultural Research, Aleppo, Syria

³College of Agriculture, University of Aleppo, Aleppo, Syria

Abstract: Sunn Pest (*Eurygaster integriceps* Puton.) is the most important insect pest of wheat in Syria. Hymenopteran egg parasitoids are among the natural enemies that contribute to the reduction of Sunn Pest populations. Our surveys from 1997-1999 revealed six egg parasitoid species: Scelionidae: *Trissolcus grandis* (Thomson), *T. simoni* (Mayr), *T. vassilievi* (Mayr) and *Gryon fasciatus* (Priener) and Encyrtidae: *Ooencyrtus fecundus* (Ferrière and Voegelé) and *O. telenomicida* (Vassiliev). They were active in the spring, about 2 weeks after Sunn Pest migrated to cereal fields from its overwintering sites. The level of parasitism varied from year to year, in 1998-1999 and 1999-2000 seasons it reached 100% at Azaz, Syria at the end of the seasons. These natural enemies seem to be playing an important role in regulating Sunn pest population and thus should be conserved.

Key words: Encyrtidae, *Eurygaster integriceps*, parasitoids, scelionidae, wheat

INTRODUCTION

Sunn Pest (*Eurygaster integriceps* Puton) is a very damaging pest of wheat in West and Central Asia and Eastern Europe^[1]. Nymphs and adults cause damage to plants and reduce yields by feeding on leaves, stems and grains. Apart from the direct reduction in yield, the insects also inject chemicals that greatly reduce the baking quality of the dough. If as little as 2 to 5% of the grain has been fed upon, the entire grain lot may be rendered unacceptable for baking purposes because of poor quality flour^[2,3].

Throughout the wheat-growing areas Sunn Pest infestations occur on about 15 million ha. If control measures are not taken, 100% yield loss can result. Annual costs for chemical control against Sunn Pest are estimated at 40 million \$ US^[1]. In addition to the high cost of chemical control, insecticides are hazardous to human health, natural enemies and the environment as a whole. The present insecticide-based strategy must be replaced with an integrated pest management approach comprising biological control, host plant resistance and cultural practices. The most important natural enemies of Sunn Pest are entomopathogenic fungi that are often found in the overwintering sites^[4] and egg parasitoids in cereal fields^[5].

Previous studies in Syria have shown that four parasitoid species belonging to two families in the order

of Hymenoptera attack Sunn Pest eggs. The three species of the family Scelionidae were *Trissolcus grandis* (Thomson), *T. simoni reticulatus* (Deluc) and *T. vassilievi* (Mayr). The fourth species was *Ooencyrtus telenomicidus* (Nasil) (Encyrtidae)^[6,7].

We hypothesized that additional egg parasitoids were active in Syria because we had observed significant reductions of Sunn Pest eggs in previous seasons.

Therefore, the objectives of this study were to:

1. Identify additional egg parasitoid species of Sunn Pest and
2. Estimate their level of parasitism in northern areas of Syria.

MATERIALS AND METHODS

Egg parasitoid species in Syria: Field collections of parasitized eggs of Sunn pest were made during April of 1997, 1998 and 1999 in wheat fields in Hassaka, Ghab, Azaz and Aleppo (Fig. 1). Each parasitized egg mass found was put in a plastic tube (1.5 cm dia x 12 cm high) with a drop of honey on the side of the tube for the emerging adults to feed on. Tubes were placed in a rearing room at 23±2°C, 70% R.H. and 16:8 LD. Adults were preserved in 70% alcohol with glycerin and sent to The National Institute of Agricultural Research, INRA, Lyon (France), for identification. Voucher specimens are stored at the Entomology Laboratory, ICARDA, Aleppo, Syria.

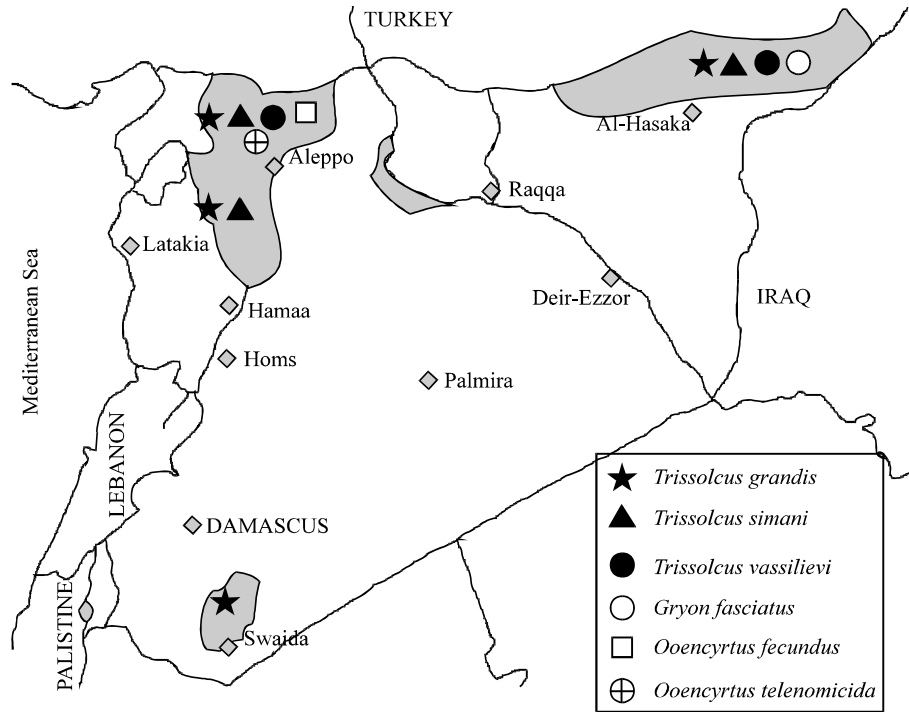


Fig. 1: Distribution of Sunn Pest egg parasitoids in Syria

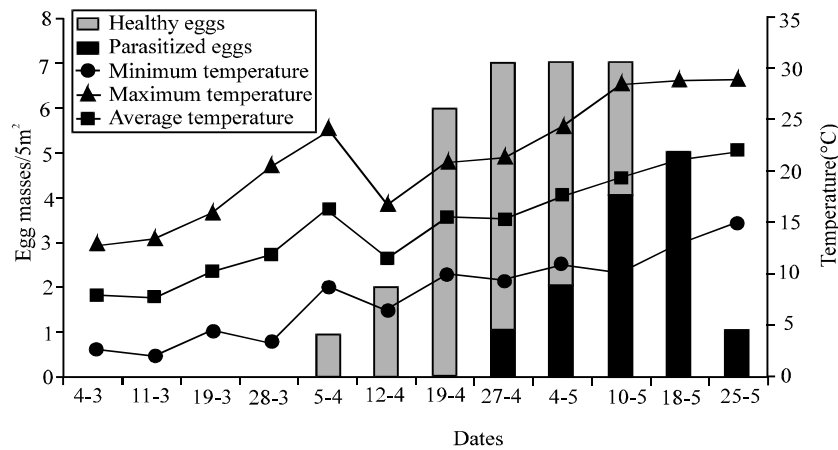


Fig. 2: Sunn Pest oviposition and percent egg parasitism at Azaz in 1999

Sunn pest oviposition and egg parasitism: This study assessed the progression of Sunn Pest egg-laying and development of parasitism in 1 ha wheat field at Azaz during the 1999 and 2000 growing seasons. The field was sampled once per week from the first week of March to the end of May by randomly throwing a metal frame (0.25 m²) 20 times and collecting all the eggs masses within at each throw. The number of egg masses, healthy or parasitized was recorded.

RESULTS AND DISCUSSION

From 1997-1999 six parasitoid species belonging to two families in the order Hymenoptera were found attacking Sunn Pest eggs. They were: *Trissolcus grandis* (Thomson), *T. simoni* (Mayr), *T. vassilievi* (Mayr) and *Gryon fasciatus* (Priener) [Scelionidae] and *Ooencyrtus fecundus* (Ferrière and Voegelé) and *O. telenomicida* (Vassiliev) [Encyrtidae]. *O. fecundus*, which was collected

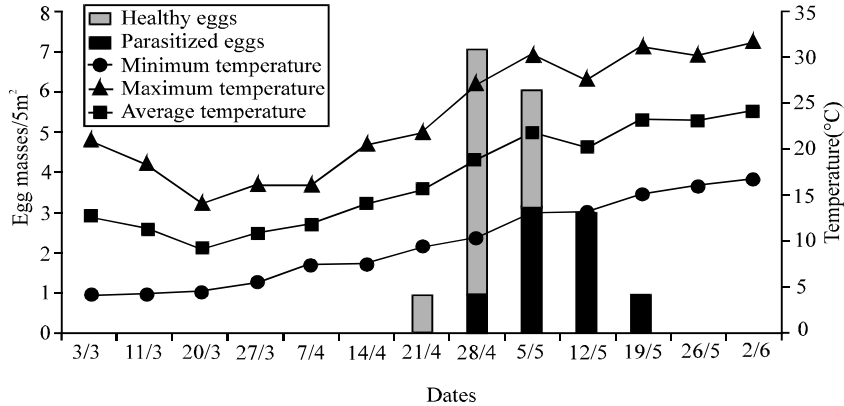


Fig. 3: Sunn Pest oviposition and percent egg parasitism at Azaz in 2000

in the Aleppo region and *G. fasciatus*, found in Hassaka region, are reported as Sunn pest egg parasitoids for the first time in Syria (Fig. 1).

In 1999, the beginning of egg-laying was delayed due to the low temperature in the second half of March; the mean temperature during this period was 9.8°C. The first Sunn Pest egg mass was found on 21 April. The first parasitized eggs were recorded on the 28 April (Fig. 2). The level of egg parasitism was about 50% on 5 May and reached 100% by 12 May.

In the 2000 season, Sunn Pest oviposition started on 5 April, which was two weeks earlier than in 1999. This was most likely due to higher temperatures during the end of March and the beginning of April, with an average of 16.4°C. The first parasitized egg masses were found on 27 April. Parasitism was a little bit over 50% on 10 May and reached 100% on 18 May (Fig. 3).

This study showed that egg parasitoids become active in the spring about 2 weeks after the Sunn Pest migrates to cereal fields from the overwintering sites and starts laying eggs. The level of parasitism varies from year to year and reached 100% in the Azaz region during the second week and third week of May in 1999 and 2000, respectively.

Parasitoids could play an important role in reducing Sunn Pest egg populations provided they are not disturbed by the use of broad-spectrum insecticides for control, usually by aerial spraying covering large and continuous areas. Other practices such as over-grazing in rangelands and elimination of refuges for egg parasites (coarse-barked trees) will also have to be avoided to enhance the role of these parasitoids.

REFERENCES

- Javahery, M., 1995. A technical review of Sunn pest (Heteroptera: Pentatomidae) with special reference to *Eurygaster integriceps* Puton. FAO Regional Office for the Near East.
- El Haremeïn, F.J., P. Williams and Rashwani, 1984. A simple test for the degree of damage caused by Sunn bug (*Eurygaster* spp.) infestation. *Rachis*, 3: 11-12.
- Hariri, G., P.C. Williams and F. Jaby El-Haremeïn, 2000. Influence of pentatomid insects on the physical dough properties and two-layered flat-bread baking quality of Syrian wheat. *J. Cereal Sci.*, 31: 111-118.
- Parker, B.L., M. Skinner, M. Brownbridge and M. El Bouhssini, 2000. Control of insect pests with entomopathogenic fungi. *Arab J. Plant Prot.*, 18: 133-138.
- Simsek, N., T. Yilmaz and N. Yasarakinici, 1994. Studies on population development of Sunn Pest (*Eurygaster integriceps* Put.) and its parasitoids *Trissolcus semistriatus* Nees in south-east Anatolia. *Turkiye III. Biyolojik Mucadele Kongresi Bildirileeri*, 25-28 Ocak, Eg Universitesi Ziraat Fakultesi, Bitki Koruma Bolumu, Izmir (In Turkish).
- Remaudier, G. and R. Skaf, 1963. Analyse du complexe des Hymenopteres parasites oophages d' *Eurygaster itegriceps* Put. (Heteroptera: Pentatomidae) en Syrie. *Revue Pathologique des Végétaux*, 1: 15-25.
- Sheik, K. and M. Al-Rahabi, 1996. The sunn Pest problem in the Syrian Arab Republic. In: *Sunn pests and their control in the Near East* (Eds. R.H. Miller and J.G. Morse). FAO Plant Production and Protection Paper 138: FAO Rome, pp: 121-132.