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RESEARCH ARTICLE

OBSERVATIONS ON SOME ADULT PARAZITOIDS (DIPTERA; TACHINIDAE) OF SUNN PEST (*EURYGASTER INTEGRICEPS* PUT.) (HETEROPTERA; SCUTELLERIDAE) ON OVERWINTERING AREA OF ADIYAMAN NEMRUT MOUNTAIN

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ABSTRACT

In this study, parasitization rate of adult parasitoids (Diptera, Tachinidae) on Sunn pest (*Eurygaster integriceps* (Put.) (Heteroptera, Scutelleridae) and parasitoid species were determined in the overwintering area in Adiyaman Mountain, Turkey. According to the results, Four Tachinid parasitoid species were determined from Nemrut Mountain Overwintering area in Adiyaman. These, *Heliozeta helluo* (F.), *Phasia subcoleoprata* (L.), *Ectophasia oblonga* (R.D), *Elomyia lateralis* (Meig) were determined.

Keywords:

Sunn pest, Adult parasitoids, Tachinidae, Overwintering, Mountain.

INTRODUCTION

Wheat (*Triticum aestivum* L.), the most common produced crop, has the advantages of being raised in different climatic and geographical ecosystems owing to its adaptation ability. It is the most important nutrient for the human beings, constituting approximately 20% of the calories obtained from the food all over the world (Akkaya 1994). *T. aestivum* is the Turkey's most important cereal crop in terms of both the area cultivated (8.9 million ha) and the amount of grain produced (18.8 million t) (Anonymous, 2011). The Sunn pest, *Eurygaster integriceps* Put. (Hemiptera: Scutelleridae), is a very damaging insect pest of wheat and barley in Turkey (Lodos 1982). Overwintered adults of the sunn pest attack the leaves and stems of young, succulent wheat and barley plants, causing them to wither and die before spike formation. They also suck the base of the spike during the early growing period, resulting in whitish spikes without kernels, producing white spikes. Yield losses are estimated at 50% to 90% in wheat and 20% to 30% in barley. Apart from the direct yield reduction, the insect injects digestive enzymes during feeding that reduce the baking quality of the dough. If as little as 2% to 3% of the grain has been fed on, the entire grain lot may be rendered unacceptable for baking purposes because of poor-quality flour (Lodos 1982). The sunn pest is univoltine. Adults rest under bushes and litter at high elevations around cereal fields during the hot and dry months of late summer and autumn. They hibernate during the cold and often severe winter months on hillsides of the mountains. In spring, when soil surface temperature reaches 15°C at overwintering sites, adults migrate to cereal fields.

Migration typically continues for 7 to 10 d. Overwintered adults appear in the fields during a 1 to 4 week period. After feeding, females lay eggs on leaves, stems, and spikes. After five nymphal instars, new-generation adults are seen. These new-generation adults feed and return to higher elevations after barley and wheat harvest (Lodos 1986). Various natural enemies attack Sunn pest in overwintering area Turkey. It was found that natural enemies have the greatest effect among the factors restraining Sunn pest population (Lodos, 1961; 1986 and Rosca *et al.*, 1996). Tachinid individuals have been found to be the most important family of Diptera due to their parasitoid effects on insect populations (Swan, 1964). It is reported that these family species are parasitoids of Lepidoptera, Coleoptera, Heteroptera and Orthoptera and about 750 to 800 species in Europe (Greiner ve Lijesthröm, 1992, İslamoğlu and Kornosor 2003). The Phasiinae subspecies parasiting only Heteroptera species, sterilize adult insects and to suppress their populations (Belyaeva, 1975; 1977; Tchorsing ve Herting, 1994; Kivan, 1996, İslamoğlu and Kornosor 2004). The overwintering area of Adiyaman Nemrut Mountain is one of the highest overwintering area in Southern Anatolia. The mountain approximately 2,300 meters in height and Sunn pest generally overwintering in part of southern. The dominant flora of the mountain are *Astragalus diphterites* Fenzl., *Noea spinosissim* Moq., *Acantholimon* sp. and *Astragalus* sp. In this study, Tachinidae adult parasitoids were determined in the overwintering area where the Sunn pest live 9 months passively. The results obtained are thought to be important in the integrated struggle of the Sunn pest.

MATERIALS AND METHODS

Studies were carried out on plants of *Astragalus diphterites* Fenzl., *Noea spinosissim* Moq., *Acantholimon* sp. and

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Astragalus sp., at altitudes of 1800–2000 m and the South, facing slopes on Adıyaman Nemrut Mountain. Nemrut Mountain is one of the most important overwinter area of Sunn pest in Turkey (Yüksel, 1968). Studies were initiated after the completion of wheat harvest and Sunn pest withdrawal to overwintering sites (late June–early July). To determine the rate of adult parazitions 20 plants from various locations were harvested and the number of adult parazitoit pupae recorded. There were five repetitions for each character. The plants were harvested by cutting them near the soil surface. Each harvested plant was shaken over polyethylene sheets to dislodge the insect’s pupae, and the pupae remaining between branches and leaves were removed manually and counted. In addition, 4–5 cm of loose soil beneath the crown of each plant were searched for adult parazitoit pupae and all counted. These counts were repeated for each plant. The parasitoid pupae that found in Nemrut Mountain brought to laboratory of Adana Plant Protection Research Institute. Each pupa was cultured separately in petri dishes. Soaked cotton was placed to provide moisture to the cultures. Cultures were incubated at 26 °C until the adults emerged.

RESULTS AND DISCUSSION

Tachinidae pupae collected from the overwintering area under the *Astragalus diphtherites* plants were emerged as adult parasitoids 12 - 15 days after. The obtained values are given in Figure 1.

When examined in Figure 1, fourteen parasitoids were obtained from Tachinidae pupae collected from the under of the *A. diphtherites*. Of these, *E. oblonga* was found to be the highest with 42%. It was followed by *E. lateralis* with 28%. *H. Helluo* and *P. subcoleoprata* were found to be equal amounts. Their value was found to be 15% (Figure 1). Figure 2 presents the adults obtained from the tachinidae pupae collected from the bottom of *N. spinosissim*. In Tachinidae pupae collected from *N. spinosissim* was *P. subcoleoprata* not available. Six parasitoids were obtained from Tachinidae pupae collected from the under of the *N. spinosissim*. It was determined that 3 of them were *E. oblonga*, 2 were *E. lateralis*, and 1 of them was *H. Helluo*. Parasitoid rates were 50%, 34% and 16%, respectively (Figure 2). Parasitoid species obtained from pupae collected from *Acantholimon* sp. are given in Figure 3. When examined in Figure 3, fifteen parasitoids were obtained from Tachinidae pupae collected from the bottom of the *Acantholimon* sp. Of these, *E. lateralis* was found to be the highest with 40%. It was followed by *E. oblonga* with 27%. *P. subcoleoprata* were found to be 20 % and lowest value with 13% *H. helluo* is also determined (Figure 3). In Figure 4, the adults obtained from the tachinidae pupae collected from the under of *Astragalus* sp., were given. When examined in Figure 4, In Tachinidae pupae collected from *Astragalus* sp was *P. subcoleoprata* not available. Twelve parasitoids were obtained from Tachinidae pupae collected from the under of the *Astragalus* sp. Of these, *E. lateralis* was found to be the highest with 58%. It was followed by *H. helluo* with 25%. *E. oblonga* were found to be 17% (Figure 4).

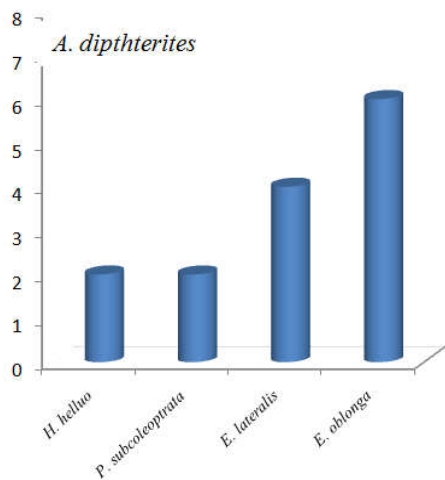


Figure 1. Parasitoid species obtained from pupae collected from *A. diphtherites*

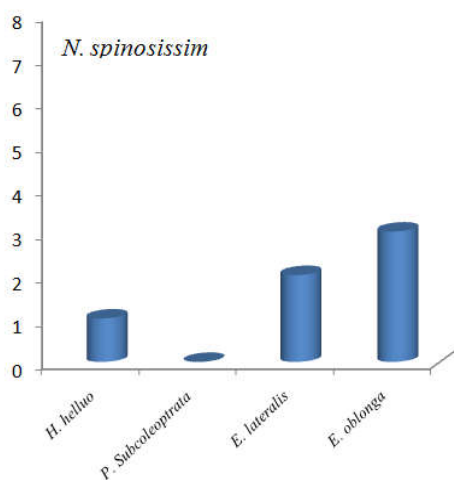


Figure 2. Parasitoid species obtained from pupae collected from *N. spinosissim*

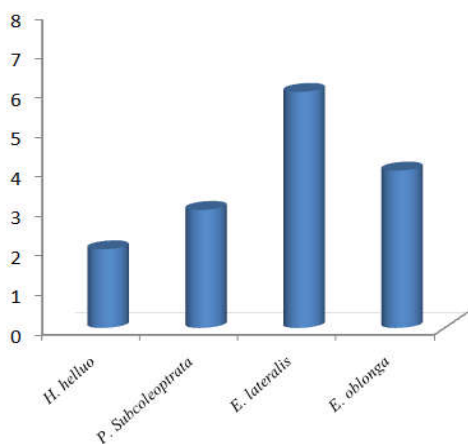


Figure 3. Parasitoid species obtained from pupae collected from *Acantholimon* sp

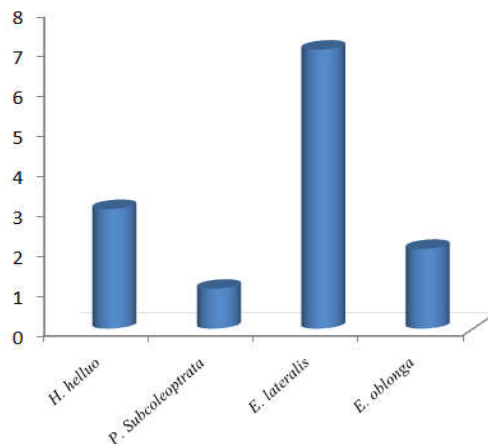


Figure 4. Parasitoid species obtained from pupae collected from *Astragalus* sp

Four Tachinid parasitoid species were determined from Nemrut Mountain Overwintering area in Adiyaman. Similar results were obtained in the studies conducted in our country and in other countries. In the Adana region, where *P. crassipennis* was found (Zwölfer, 1942), *H. helluo*, *P. subcoleoprata* in the Karacadağ overwintering area were found to have species (Lodos, 1961). Racz (1972) described that *H. lateralis*, *Phasia subcoleoprata* and *E. crassipennis* in Hungary as endoparasitic of the Sunn pest. Perepelitsa (1975) stated that *C. helluo* is the first and *P. subcoleoprata* is second important in the Krasnor region of Russia. *H. Helluo* as a parasitoid in the central Anatolian region were identified (Memişoğlu et al., 1994), *H. helluo*, *P. subcoleoprata*, *E. lateralis* and *E. oblonga* species were determined in the overwintering area of Tekirdağ (Kıvan, 1996). In the Bulgarian winters, *H. helluo*, *P. subcoleoprata*, *E. lateralis* and *E. oblonga* species were found and the most important of these was *H.helluo* (Kaitazov, 1971).

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