Quest Journals
Journal of Research in Agriculture and Animal Science
Volume 9 ~ Issue 11 (2022) pp: 10-16
ISSN(Online) : 2321-9459
www.questjournals.org

Research Paper

Determination of Sunn Pest (*Eurygaster* spp.) (Heteroptera: Scutelleridae) Species and Prevalence in Wheat Fields of Adiyaman Province

Mahmut Islamoglu[1]
[1](*Faculty of Agriculture. Department of Plant Protection, Adiyaman University, Turkey)*
Corresponding Author: furberk@hotmail.com

ABSTRACT : *Wheat, which is the most used crop plant in the world for human nutrition, has many pests. The most important pest of wheat in our country is Sunn pest Eurygaster integriceps Put. (Hemiptera: Scutelleridae). By absorbing the Sunn pest wheat, it spoils the bread and pasta properties of the flour. In this study, Sunn pest species rates in wheat fields in Adıyaman province were tried to be determined in 2020 and 2021. Accordingly, it was determined that 3 Sunn pest species were found in the survey studies carried out in Adıyaman province and its districts. These Sunn pest species are E. integriceps, Eurygaster maura (L). and Eurygaster austriaca (Schrk.). It has been determined that the most common and most active species in Adıyaman is E. integriceps and this species is found in all districts. It was determined that E. integriceps was followed by E. maura with a much less prevalence rate. E. austriaca, on the other hand, has been found to exist in some regions, although the prevalence rate is quite low.*

KEYWORDS: *Wheat, Eurygaster integriceps, Eurygaster maura, Eurygaster austriaca, Adıyaman*

R*eceived 06 Nov., 2022;* ***R****evised 18 Nov., 2022;* ***A****ccepted 20 Nov., 2022 © The author(s) 2022.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

Wheat is the most cultivated crop plant in the world and in our country, and it is one of the indispensable crops for human nutrition. According to the data of 2017 in our country, wheat cultivation area; The production was realized as 76,688,785 da and 21,500,000 tons [1].

Sunn pest (*Eurygaster integriceps* Put.) (Heteroptera: Scutelleridae) is the most important pest of wheat in Turkey. Sunn pest made the first outbreak in Turkey in 1927 in the southern region of Turkey. The epidemic, which only took place in Adana province, spread to other provinces in a very short time and caused serious economic losses. During this period, Sunn pest collected by hand and sweep net were purchased by the state from farmers and destroyed. In the 1950s, with the development of organic phosphorus drugs, aerial spraying was started and at the same time, overwinter plants were burned to fight. Sunn pest, which was controlled in this way until the 1980s, had an epidemic in all of South and Southeast Anatolia on this date. In the 1980s, ULV spraying was carried out, and in the 1990s, in 75% of the areas where Sunn pest wheat was grown began to cause economic damage. In the 2000s, aerial spraying was banned and biological control studies were emphasized in Turkey [2].

The most important pest of wheat, which has a very important place in the economy of our country and Adıyaman, is Sunn pest *Eurygaster integriceps* (Hemiptera; Scutelleridae), known as Sunn pest. If Sunn pest, which causes significant economic damage in wheat every year, is not combated, the damage can reach up to one hundred percent [3, 4, 5].

In this study, the species and distribution rates of Sunn pest, which is the most important pest of wheat, in Adıyaman province were investigated.

II. MATERIAL AND METHOD

This study, which was carried out to determine the main pest of Sunn pest of wheat in Adiyaman province, was carried out on overwintered adult Sunn pests collected from the wheat fields of Adiyaman, Besni Kahta and Samsat districts in 2020 and 2021. In order to determine the Sunn pest species, 100 overwintered adult Sunn pest were collected from the wheat fields of Adıyaman, Besni Kahta and Samsat districts in March

and April and brought to the laboratory. Sunn pests brought to the laboratory, male and female individuals were differentiated macroscopically according to some morphological features. It is distinguished by the fact that the genital segment is trapezoidal and consists of a single plate for males, and for females the genital segment consists of the third double plate and the opening of the egg laying canal in its middle part [3, 4].

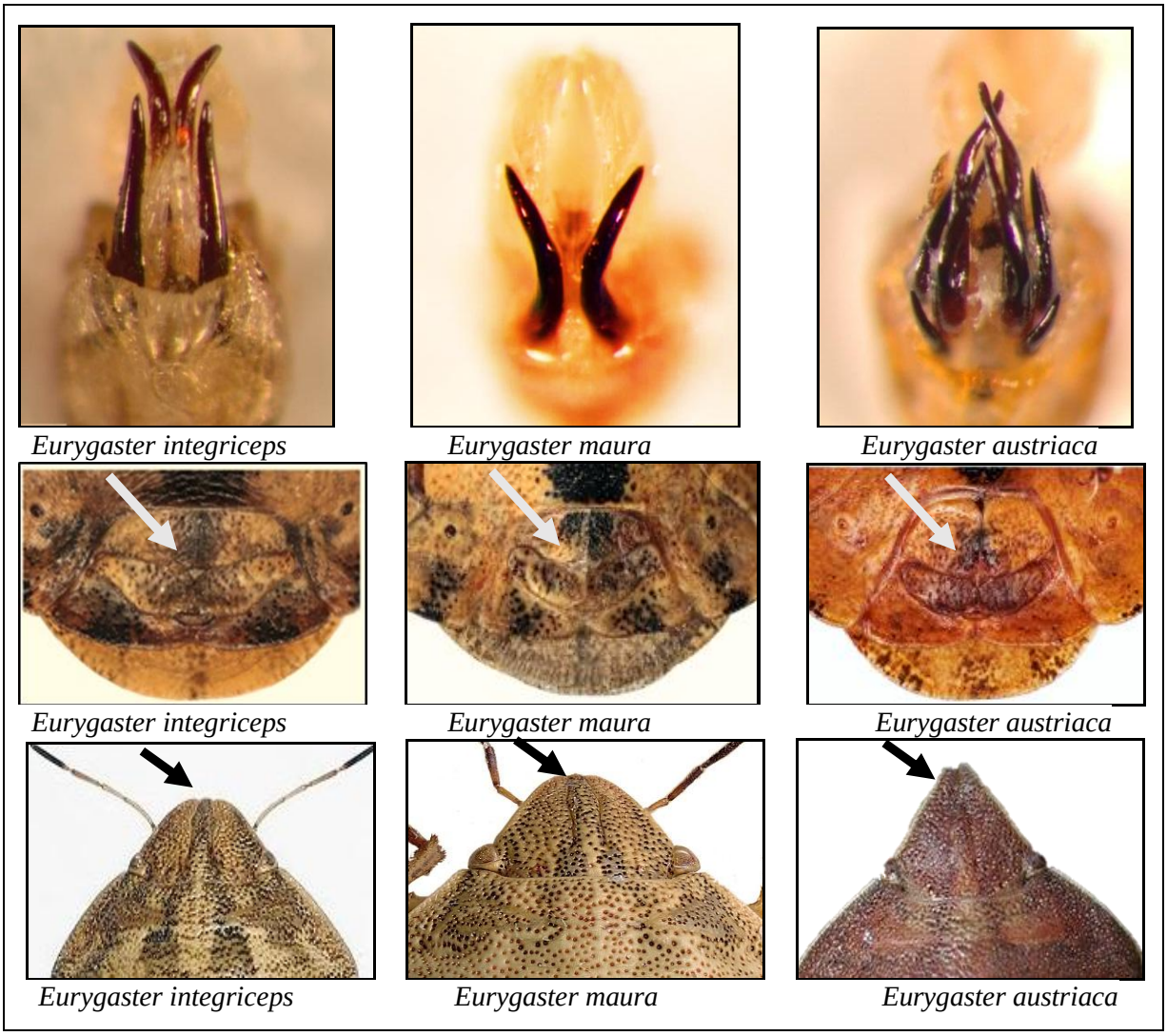

Figure 1: Some morphological features and diagnostic characters of E. integriceps, E. maura and E. austriaca

Sunn pest is distinguished from other Scutelleridae and Pentotamidae individuals with some morphological features. Among these features, some features such as the hexagonal pronotum of Sunn pest, the scutellum not covering the abdomen completely, and the abdomen consisting of 6 segments can be counted. These morphological features of Sunn pest, which are generally listed in this way, differ according to the species, and species identification can be made by using these features. These characteristics of Sunn pest species can be listed as follows [3, 6, 7,8].

It was determined that the body length of *E. integriceps*, which is the most common and most abundant in our city, is approximately 10-12.5 mm. In males, the aedegeus consisted of four spines, in females, the plates of the genital segment were laterally wider and broader than the other two species. When looking at the top view of the head, it was determined that the crests of the mandibular plates did not converge and the space between them was relatively narrow compared to *E. maura* [3, 6, 7,8].

It has been determined that *E. maura* has a wider body structure and can be distinguished by the pointed posterior lateral edge of the pronotum. With a body length of approximately 9-11 mm, it was found to be smaller than *E. integriceps* but larger than *E. austriaca*. It was determined that the aedegeus consists of 2 spines in male individuals, the plates of the genital segment in females are narrower laterally and less broad than the other two species. When the top view of the head is examined, it has been determined that the crests of the

mandibular plates do not converge and the space between them is relatively narrow compared to *E. integriceps* [3, 6, 7,8].

It has been reported that E. austriaca is distinguished from the previous two species by its flatter and larger body. Body length was determined to be between 11-14 mm. It has been reported that in male individuals, the aedegeus consists of 8 spines with the branching of four spines, and the plates of the genital segment in female individuals are narrower laterally and considerably broader than the other two species. When looking at the top view of the head, it was determined that the crests of the mandibular plates did not converge and the space between them formed a spine [3, 6, 7,8].

III. RESEARCH RESULTS AND DISCUSSION

From their villages in Adiyaman (Lokman, Vartana and Bağpınar) 124 Sunn pest adults in 2020 and 98 in 2021 were collected and their species and presence rates according to the number of spines in macroscopic and aedegeus are given in Figure 1.

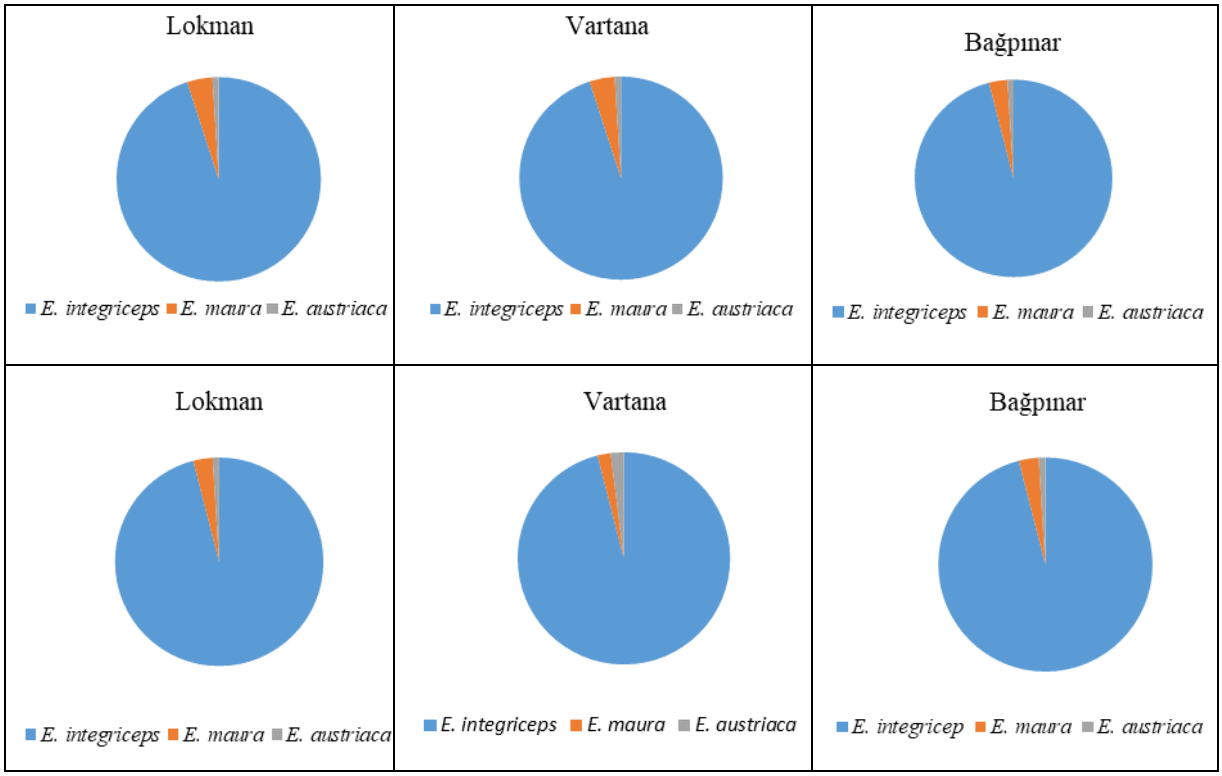

Figure 1. Sunn pest species collected in the villages of Lokman, Vatana and Bağınar, the villages of Adıyaman, in 2020 – 2021 and their prevalence

When Figure 1 is examined; During the studies carried out in Adiyaman Merkez Lokman and Vartana villages in 2020, 3 different Sunn pest species were identified. The most common species was found to be *E. integriceps* with 95%. *E. maura* with 4% and *E. austriaca* with 1% were detected. In the studies conducted in Bağpınar village, it was determined that the percentage distribution of Sunn pest parasitoid species was similar to Lokman and Vartana village. Accordingly, *E integriceps* had the highest rate in Bağpınar village, followed by *E. maura*. Presence rates of *E. integriceps*, *E. maura* and *E. austriaca* were determined as 96%, 3%, 1%, respectively. The prevalence of Sunn pests collected from Bağpınar village was found to be 95% for *E. integriceps*, 4% for *E. maura*, and 1% for *E. austriaca* (Figure 1).

In the studies carried out in the villages of Lokman, Vartana and Bağpınar in Adiyaman in 2021, results similar to those of 2020 were obtained. It was determined that *E. integriceps* species had the highest prevalence with 96% in all three villages, followed by *E. maura*. *E. maura* was found to be *E. integriceps* in Lokman and Bağpınar villages, 3%, and 2% in Vartana village. The prevalence of *E. austriaca* in Lokman, Vartana and Bağpınar villages was determined as 1%, 2%, and 1%, respectively (Figure 1).

The species and rates of Sunn pest collected in the villages of Arılı, Duty and Ortanca in the Kahta district of Adıyaman are given in Figure 2.

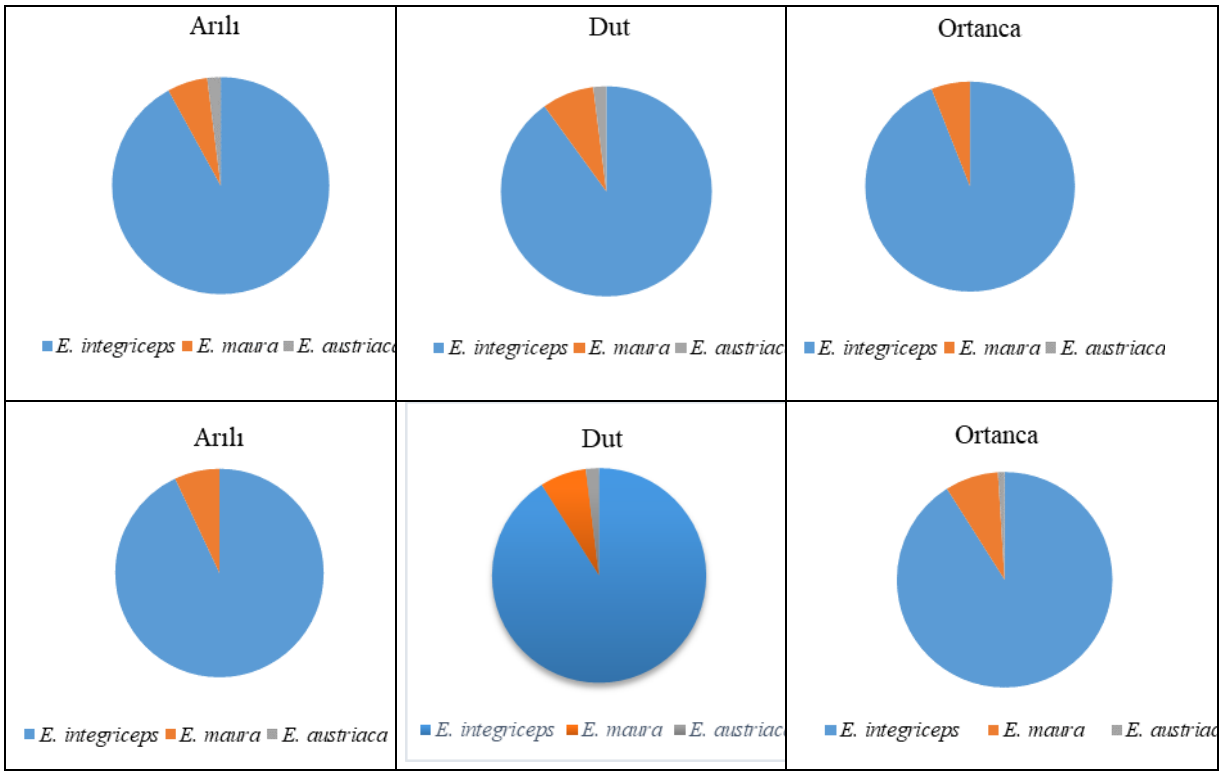

Figure 2. Species and prevalence of Sun pest collected in Arılı, Dut and Ortanca villages of Adıyaman Kahta district in 2020 – 2021

In the studies carried out in Arılı village of Kahta district in 2020, 3 different Sunn pest species were identified. The most common type was found to be *E. integriceps* with 95%. It was determined that it was *E. maura* with 6% and *E. austriaca* with 2%. In studies conducted in Dut village, it was determined that *E. integriceps*, *E. maura* and *E. austriaca* and their presence rates were 90%, 8% and 2%, respectively. Two Sunn pest species, *E. integriceps* and *E. maura*, were determined in Ortanca village. The prevalence rates of these species were found to be 94% and 6%, respectively (Figure 2).

In the studies conducted in Arılı, Dut and Ortanca villages of Kahta district, results similar to 2021 were obtained. It was determined that the highest prevalence rate was *E. integriceps*, as in 2020, followed by *E. maura*. It was determined that the prevalence of *E. integriceps E. maura* in Arılı village was 93% and 7%, respectively, and there was no *E. austriaca* in this village. The prevalence rates of *E. integriceps*, *E. maura* and *E. austriaca* in Dut village were determined as 91%, 7%, and 2%, respectively. Three Sunn pest species, *E. integriceps*, *E. maura* and *E. austriaca*, were determined in Ortanca village and their prevalence rates were determined as 91%, 8%, and 1%, respectively. (Figure 2).

Sunn pest species and their ratios obtained from the studies carried out in the village of Şambayat in Adıyaman Besni district between 2020 and 2021 are given in Figure 3.

When Figure 3 is examined; During the studies carried out every two years in the village of Şambayat, 3 different types of Sunn pest were identified. The most common species was determined to be *E. integriceps* with 92%. This was followed by *E. maura* with a rate of 6%. *E. austriaca*, on the other hand, was found to have a population of 2% (Figure 3). In the studies of 2020 and 2021 in Köseceli village of Adıyaman Besni district, 3 Sunn pest species were identified. The most common species was found to be *E. integriceps* with 90%. The prevalence of *E. maura* was 8% and *E. austriaca* was 2%. In the studies carried out in Üçgöz village of Adıyaman Besni district, it was determined that the rate of presence of *E. integriceps* in both years was 94%. While the prevalence of *E. maura* was 6% in 2020, it was determined to be 5% in 2021. While *E. austriaca* could not be detected in 2020, it was found to be 1% in 2021 (Figure 3).

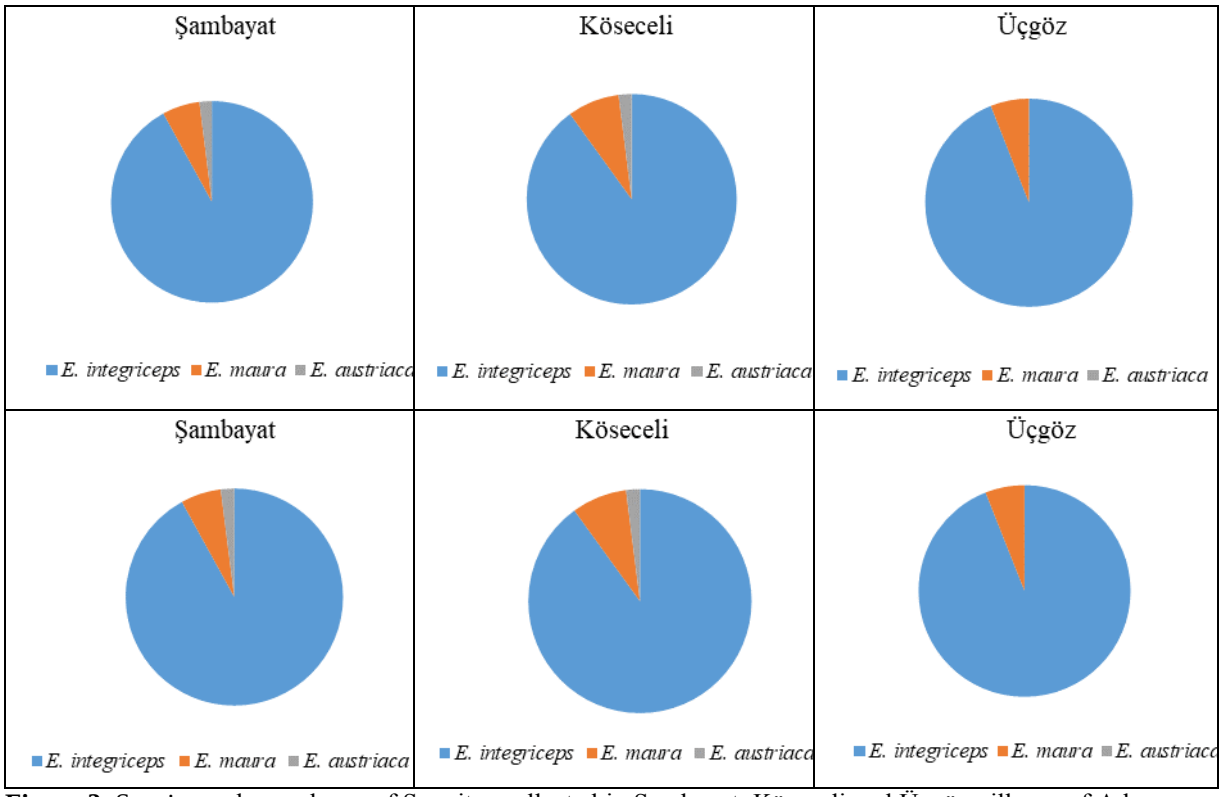

Figure 3. Species and prevalence of Sunnites collected in Şambayat, Köseceli and Üçgöz villages of Adıyaman Besni district in 2020 – 2021

Sunn pest species and their ratios obtained from the studies carried out in Adıyaman Samsat district between 2020 and 2021 are given in Figure 4.

When Figure 4 is examined; In the studies carried out in Taşkuyu village of Samsat district in 2020, 3 different species of Sunn pest were detected. The most common species was found to be *E. integriceps* with 94%. It was determined that it was *E. maura* with 4% and *E. austriaca* with 2%. In the studies conducted in Bağarası village, the prevalence rates of *E. integriceps*, *E. maura* and *E. austriaca* were determined to be 96%, 3% and 1%, respectively. The prevalence of *E. integriceps E. maura* and *E. austriaca* in Çiçek village was 96%, 3% and 1%, respectively (Figure 4).

E. integriceps was found to be the most common species with a rate of 95%, followed by *E. maura* with a rate of 3%. The prevalence of *E. austriaca* was found to be 2%. In the studies conducted in Bağarası village, the prevalence of *E. integriceps* was determined as 97% and the rate of *E. maura* as 3%, while *E. austriaca* could not be detected. Similarly, in the studies carried out in Çiçek village, 3 Sunn pest species were identified. Accordingly, the most common type was found to be *E. integriceps* with 94%. It was determined that it was *E. maura* with 4% and *E. austriaca* with 2%.

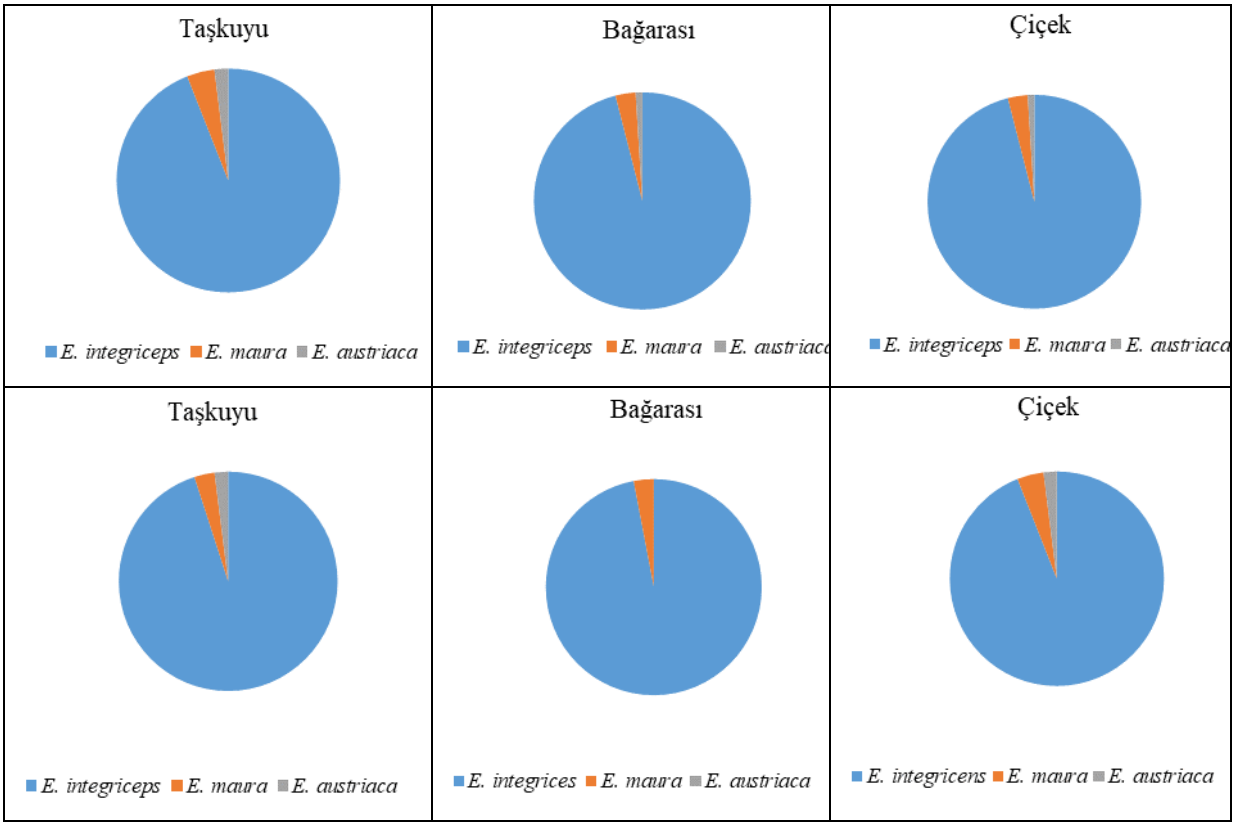

Figure 4. Species and prevalence of Sunns collected in Taşkuyu, Bağarası and Çiçek villages of Adıyaman Samsat district in 2020 – 2021

IV. CONCLUSION

In the evaluation of the data obtained in the two-year studies conducted in Adıyaman; It was determined that 3 Sunn pest species, *E. integriceps*, *E. maura* and *E. austriaca*, were found in wheat fields. It was determined that *E. integriceps* is the most common species in Adıyaman province and this species is common in all districts where surveys were made in both years. *E. maura*, which was seen in some parts of the surveyed districts, was determined as the second common species. It was determined that E. austriaca was the least common of the Sunn pest species in terms of prevalence. In addition, it has been determined that *E. austriaca* is not very common, although it is found in Adıyaman province. However, in the study conducted throughout our country, *E. integriceps*, one of the Sunn pest species that cause economic damage in the grain fields of our country, Southeastern Anatolia ([9, 3, 6, 10, 11, 4] Aegean ([12] and Thrace [13, 14, 15] and there are three Sunn pest species, these species are *E. integriceps*, *E. maura* and *E. austriaca*. has been reported. In another study conducted in 2004 and 2005, four species were determined in the provinces of Bilecik, Bursa, Kocaeli, Sakarya and Yalova. These species were 71.9% and 14.1% for *E. integriceps*, *E. maura*, *E. austriaca* and *E. hottentota*, respectively [16]. Mohaghegh (2004) reports that E. maura has a lower reproductive potential than *E. integriceps* [17]. Popov et al. (1980), stated that *E. intrgriceps* constitutes 79.4% of the Sunn pest species found in Romania, and that they do not reach economic importance where *E. maura* and *E. austriaca* are fond [18].

As a result; It was determined that the most common species in Adıyaman province, as in our country and Southeastern Anatolian region, is by far *E. integriceps*, followed by *E. maura* with a much less prevalence rate. *E. austriaca*, on the other hand, has been found to exist in some regions, although the prevalence rate is quite low.

REFERENCES

[1]. Tüik, 2018 Türkiye İstatistik Kurumu Bitkisel Üretim İstatistikleri, http://www.tuik.gov.tr/UstMenu.do?metod=temelist.
[2]. İslamoğlu M. 2011. Mass Rearing and Release of the Egg Parasitoid, *Trissolcus semistriatus* Nees. (Hymenoptera: Scelionidae), a Biological Control Agent of the Sunn pest, *Eurygaster integriceps* Put. (Heteroptera: Scutelleridae) in Turkey. Egyptian Journal of Biological Pest Control, 21(2), 131-136
[3]. Lodos, N., 1961. Türkiye, Irak, İran ve Suriye'de Süne (*Erygaster integriceps* Put.) Problemi Üzerine Araştırmalar. Ege Üni. Ziraat Fakültesi Yayınları, Ege Üni. Matbası, No: 51,115 s.
[4]. Lodos, N., 1986. Türkiye Entomolojisi -II-. Genel Uygulamalı ve Faunistik. Ege Üniversitesi Bitki Koruma Bölümü, Ege Üni. Matbaası, İzmir, 580 s.

[5]. Anonymous, 1995. Zirai Mücadele Teknik Talimatları, Koruma ve Kontrol Genel Müdürlüğü, Ankara, Cilt 1, 291 s.
[6]. Brown, E. S. and M. Eralp. 1962. The Distribution of the Species of *Eurygaster* spp. (Hemiptera, Scutelleridae) in Middle East Countries. Ann. Mag. Nat. Hist., 13 (5): 65- 81.
[7]. Abbas, H. 1990. Türkiye'deki *Eurygaster* Lap. (Heteroptera: Scutelleridae) Türleri Üzerinde Sistematik Araştırmalar. Yüksek Lisans Tezi (Basılmamış). Ege Üni. Fen Bilimleri Enst. Bitki Koruma Anabilim Dalı, Bornova, İzmir, 95s.
[8]. Anonymous, 2002. Food and Agriculture Organization of Usa. Faostat, 2002. Statistics Database Agriculture Database, Crops Primery
[9]. Wagner, E. 1959. Beitrag zur Heteropteren fauna Anatoliens. Z. Ang. Ent., 44 (1): 102-113.
[10]. Yüksel, M. 1968. Güney ve Güneydoğu Anadolu'da Süne *Eurygaster integriceps* Put.'un Yayılışı, Biyolojisi, Ekoloji, Epidemiyolojisi ve Zararı üzerinde Araştırmalar. Zir. Müc. Zir. Kar. Gn. Md. Yay., No:46, Ankara, 255s.
[11]. Dörtbudak Y. ve N. Koyuncu. 1979. Orta Anadolu'da Süne (*Eurygaster* spp.) Türleri ve Yoğunlukları Üzerinde Ön Çalışmalar. Zir. Müc. Araşt. Yıllığı, 2-3.
[12]. Derin, A., Kavut, H., 1992 Ege Bölgesinde Süne Çalışmaları. Entegre Süne Mücadelesi I. Workshop Raporu Zirai Mücadele Merkez Araştırma Enstitüsü 6-9 Ocak 1998. 165s.
[13]. Lodos N., F. Önder, E. Pehlivan ve R. Atalay. 1978. Ege ve Marmara Bölgesinin Zararlı Böcek Faunasının Tespiti Üzerinde Çalışmalar. Zir. Müc. Zir. Kar. Gn. Md. Yay., Ankara, 301s.
[14]. Kılıç, A. U., N. Adıgüzel, H. Kavut, N. Şimşek ve K. Melan. 1988. Trakya Koşullarında Süne (*Eurygaster integriceps* Put., *Eurygaster austriaca* Schrk.) Mücadelesinde Kullanılan Bazı İlaçların Trakya Koşullarında Etkinliklerinin Araştırılması, Nihai Rapor, Zir. Müc. Araşt. Enst. Ankara, 7s.
[15]. Öncüer, C. ve M. Kıvan. 1995. Tekirdağ ve Çevresinde *Eurygaster* (Heteroptera: Scutelleridae) Türleri, Tanımları, Yayılışları ve Bunlardan *Eurygaster integriceps* Put.'İn Biyolojisi ve Doğal Düşmanları Üzerinde Araştırmalar. Türk Tarım ve Ormancılık Dergisi, 19 (4): 223-230.
[16]. Koçak, E. ve N. Babaroğlu. 2005. Orta Anadolu Bölgesi Kışlaklarındaki *Eurygaster* (Heteroptera: Scutelleridae) Türleri. Türk. entomol. derg., 29 (4): 301-307.
[17]. Mohaghegh, J. 2004. Life History and Reproductive Table of *Eurygaster maura* L. (Het.: Scutelleridae) in the Laboratory. 22. Proceedings of the Second International Conference on Sunn Pest, July 19-22, 2004, Aleppo-Syria.
[18]. Popov, C., A. Barbulescu, I. Vonica and I. Rosca. 1998. New Approaches Regarding Integrated Sunn Pest (*Eurygaster integriceps* Put.) Management. Proceedings of International Symposium on Integrated Protection of Filed Crops, 137-145, Vrnjaka Banja, Yugoslavia, on 25th September 1998.