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Coleoptera fauna of poultry litter in Izmir province of Turkey (Coleoptera)

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Abstract

This study was carried out to determine the species of Coleoptera existing in poultry litter of Izmir province of western Turkey during July-December 2013. At the end of this study, five different species belonging to three families of Coleoptera were determined. The species reported from Izmir for the first time were *Carcinops pumilio* (ERICHSON 1834), *Saprinus caerulescens* (HOFFMANN 1803) (Histeridae) and *Harpalus fuscicornis* MÉNÉTRIÉS (Carabidae).

Zusammenfassung

In dieser Studie werden die Käferarten untersucht, die in einer Geflügelfarm in der Izmir-Provinz (West-Türkei) zwischen Juli und Dezember 2013 gefunden wurden. Abschließend konnten fünf verschiedene Arten aus drei Familien der Coleoptera determiniert werden. Für die Provinz Izmir werden zum ersten Mal die Arten *Carcinops*

pumilio (ERICHSON 1834), *Saprinus caerulescens* (HOFFMANN 1803) (Histeridae) und *Harpalus fuscicornis* MÉNÉTRIÉS (Carabidae) gemeldet.

Introduction

Poultry husbandry occupy an important place in the growing Turkish economy. Chicken's meal production has been reported about 1.6 million tons in Turkey (GHANIZADEH 2014). Being an important sector in the country's economy, it has been widely practiced in all provinces of Turkey. However production from Izmir province has a significant contribution to the overall production of Turkey (AKBAY 1990). A huge studies have been documented by many researchers regarding pests and the beneficial species occurring in poultry litter and poultry houses in many countries across the world (PFEIFFER & AXTELL 1980, STAFFORD et al. 1988, HALD et al. 1998, PINTO et al. 2009). However, no study on the insect fauna of poultry litter in Turkey has been conducted so far. Therefore, the present study was executed with aim of monitoring the presence of Coleoptera fauna in poultry litter of Izmir province of western Turkey.

Material and Methods

The study on Coleoptera fauna of poultry litter in Izmir province of Turkey was conducted in 120 poultry houses with area ranging between $1182.6 \pm 68.2 \text{ m}^2$ (1114.4-1250.8) (n=120) of 17 different districts (Aliaga, Bayindir, Bergama, Buca, Cesme, Dikili, Foca, Guzelbahce, Kemalpasa, Kınık, Menderes, Menemen, Odemis, Seferihisar, Tire, Torbali, Urla) of Izmir, Turkey. The samples were collected from different poultry litter and brought to the laboratory during the months of July-December 2013. At three points, an area of about 0.1 m^2 was chosen randomly in each poultry house and litter samples were picked up carefully by hand trowel. It is important to mention that to avoid contamination risk and to ensure health safety, each time sterile gloves and mask were used for sample collection. The samples were carefully examined in the laboratory and insect specimens were collected from the samples litter. The collected specimens were killed in 70% ethyl-alcohol, mounted and identified using identification keys. The districts and the number of poultry houses which were sampled were given in Table 1 and 2.

Result and Discussion

The results of the present study revealed a total of five species belonging to three families of Coleoptera. These species were *Alphitobius diaperinus* (PANZER 1797), *Tribolium castaneum* (HERBST 1797) (Tenebrionidae), *Carcinops pumilio* (ERICHSON 1834), *Saprinus caerulescens* (HOFFMANN 1803) (Histeridae) and *Harpalus fuscicornis* MÉNÉTRIÉS 1832 (Carabidae).

Among these, *Alphitobius diaperinus* was found the most abundant one which was sampled from the 93.33% of the poultry houses in Izmir province (Table 1). It was followed by *Carcinops pumilio* (29 specimens), *Tribolium castaneum* (3 specimens), *Saprinus caerulescens* (1 specimen) and *Harpalus fuscicornis* (1 specimen) (Table 2).

The *Alphitobius diaperinus* is a polyphagous species that has also been found very common in poultry litter in many countries (ROWLAND et al., 2007). The main mode of damage of this pest is to bring destruction to the poultry structures as reported by ROWLAND et al. (2007). The same has also been reported to play important role in transmission of many poultry diseases as a vector and to reduce weight gain of chicks (CALIBEO 2002; CRIPPEN et al. 2012).

Among other pests, *Tribolium castaneum* is also a pest of stored products (OZER 1957; JBILOU et al. 2006; BAKHTAWAR et al. 2013; MAGDA et al. 2014).

Carcinops pumilio is an effective predator of *Musca domestica* LINNAEUS 1758 (GEDEN & AXTELL 1988; FLETCHER et al. 1991; ANONYMOUS 2007) whereas *Saprinus caerulescens* feeds on carcasses of animals (OZDEMIR & SERT 2008; KARAPAZARLIOĞLU & OZMAN-SULLIVAN 2011).

Harpalus fuscicornis is known to exhibit an omnivorous feeding behavior (KOCATEPE & MERGEN 2004).

In the present study, three species *Carcinops pumilio*, *Saprinus caerulescens* and *Harpalus fuscicornis* were reported for the first time from Izmir province which is one of the main findings of this research work. However, further similar studies in the other parts of Turkey will be very fruitful to increase the sources of information in this field.

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Table 1: Related information about *Alphitobius diaperinus* in poultry houses of different districts of Izmir province in 2013.

Districts	Total number of sampled poultry	Number of poultry houses occurring	Rate of infection (%)	Total number			Total	Rate (%)
				Adult	Larvae	Pupae		
Aliağa	5	5	100	50	848	1	899	1.60
Bayındır	1	1	100	23	290	0	313	0.56
Bergama	5	2	40	0	13	0	13	0.02
Buca	1	1	100	242	466	15	723	1.30
Çeşme	3	3	100	63	5849	14	6126	10.92
Dikili	3	3	100	86	157	0	243	0.43
Foça	7	7	100	425	3541	4	3970	7.07
Güzelbahçe	1	1	100	26	428	7	461	0.82
Kemalpaşa	35	35	100	2388	12535	142	15065	26.86
Kınık	7	7	100	244	1011	3	1258	2.24
Menderes	1	1	100	80	1448	28	1556	2.77
Menemen	2	2	100	40	1307	41	1388	2.48
Ödemiş	9	9	100	142	35	0	177	0.31
Seferihisar	1	1	100	140	1333	5	1478	2.64
Tire	10	5	50	59	127	0	186	0.33
Torbalı	28	28	100	4791	17316	111	22218	39.60
Urla	1	1	100	0	4	0	4	0.01
TOTAL	120	112		8999	46708	371	56078	100.00
Rate (%)				16.04	83.29	0.60		

Table 2: Related information about other species in poultry houses of different districts of Izmir province in 2013.

Districts	Total number of sampled poultry houses	<i>Tribolium castaneum</i>		<i>Carcinops pumilio</i>		<i>Saprinus caerulescens</i>		<i>Harpalus fuscicornis</i>	
		Number of poultry houses occurring insect specimens	Number of adults	Number of poultry houses occurring insect specimens	Number of adults	Number of poultry houses occurring insect specimens	Number of adults	Number of poultry houses occurring insect specimens	Number of adults
Aliağa	5	0	0	0	0	0	0	0	0
Bayındır	1	0	0	0	0	0	0	0	0
Bergama	5	0	0	0	0	0	0	0	0
Buca	1	0	0	1	1	0	0	0	0
Çeşme	3	0	0	0	0	0	0	0	0
Dikili	3	0	0	0	0	0	0	0	0
Foça	7	0	0	0	0	0	0	0	0
Güzelbahçe	1	0	0	0	0	0	0	1	1
Kemalpaşa	35	2	2	2	4	1	1	0	0
Kınık	7	0	0	0	0	0	0	0	0
Menderes	1	0	0	0	0	0	0	0	0
Menemen	2	0	0	0	0	0	0	0	0
Ödemiş	9	0	0	0	0	0	0	0	0
Seferihisar	1	0	0	1	23	0	0	0	0
Tire	10	0	0	0	0	0	0	0	0
Torbalı	28	1	1	1	1	0	0	0	0
Urla	1	0	0	1	0	0	0	0	0
TOTAL	120	3	3	5	29	1	1	1	1

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