

**AN ANALYSIS ON *CANTHARIS LIVIDA* LINNAEUS, 1758 AND  
*RHAGONYCHA FULVALIENA* SVIHLA, 1995 (COLEOPTERA:  
CANTHARIDAE) COLLECTED BY DIFFERENT METHODS  
IN ORGANIC SWEET CHERRY ORCHARDS FROM  
WESTERN TURKEY**

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**ABSTRACT:** In this paper, information is presented on different collection methods for two species of soldier beetle [*Cantharis livida* Linnaeus, 1758 and *Rhagonycha fulvaliena* Svihla, 1995] (Coleoptera: Cantharidae) have been given in organic sweet cherry orchards (*Cerasus avium* (L.)) located in Ören (İzmir-Kemalpaşa), Armutlu (İzmir-Kemalpaşa) and Muradiye (Manisa-Central province), western Turkey.

**KEY WORDS:** *Cantharis livida*, *Rhagonycha fulvaliena*, Cantharidae, Collection methods, Sampling methods, Organic sweet cherry, Turkey

Some data on the Cantharidae fauna of Turkey has been given by Sahlberg (1912-1913); Wittmer (1967-1968, 1971, 1972, 1975); Gül-Zümreoğlu (1972); Tuatay et al. (1972); Švihla (1993, 1994, 1995, 1998, 1999, 2002, 2004, 2009); Lodos (1998); Sayan (2010); Ertop & Özpınar (2011); Yıldırım et al. (2011) and Silkin (2012). A total number of 249 species / subspecies of soldier beetles (Cantharidae) have been recorded from Turkey in the literature (Kazantsev & Brancucci, 2007).

So far, five species, namely *Cantharis decipiens* Baudi, 1871 by Ertop & Özpınar (2011); *C. delagrangi* Delkeskamp, 1939, *C. livida* Linnaeus, 1758, *C. prusiensis* Marseul, 1864 and *Rhagonycha fulvaliena* Svihla, 1995 belonging to Cantharidae (Coleoptera) have been reported from sweet cherry orchards in western Turkey (Onaral & Tezcan, 2017).

In this paper, there is an analysis based on the different collection methods in organic sweet cherry orchards for *Cantharis livida* and *Rhagonycha fulvaliena* have been given.

### MATERIAL AND METHODS

Studies were conducted in three organic sweet cherry orchards in Ören (İzmir-Kemalpaşa), Armutlu (İzmir-Kemalpaşa) and Muradiye (Manisa-Central province) of western Turkey. Insects were sampled by insect net (50/orchard), beating tray (50/orchard) and sticky yellow trap (12/orchard) methods at one week intervals. In each orchard a total of three pitfall traps and nine bait traps containing wine, sugar, vinegar and water were used (Tezcan et al., 2007). The traps were cleared at two weeks intervals. All insects were collected by the authors and were identified by the first author.

## RESULTS

During the course of this study, a total of two species, *Cantharis livida* and *Rhagonycha fulvaliena* were sampled. The results obtained by applying five different trapped methods in the orchards of three different regions in two different sequential years can be seen in Tables 1 and 2.

Table 1 shows that samples of *Cantharis livida* were sampled by insect net, beating tray, bait trap and pitfall trap methods. It was noted that this species could not be sampled with sticky yellow traps. At the end of the two-year studies, a total of 214 specimens were caught and 55.61% of them were sampled from Ören, 23.83% from Armutlu and 20.56% from Muradiye. When the distribution of samples according to the collection methods was examined, 94 specimens (43.93%) by beating tray, 58 specimens (27.10%) by insect net, 47 specimens (21.96%) by bait trap, 15 specimens (7, 01%) collected by pitfall traps, respectively. When the samples were evaluated according to years, it was observed that a total of 79 (36.92%) samples were caught in the first year and 135 (63.08%) samples in the second year.

When the results of *Rhagonycha fulvaliena* given in Table 2 were examined, it is seen that this species is trapped by all methods including sticky yellow trap. At the end of the two-year studies, a total of 554 specimens of this species were captured, this value is 2.59 times higher than that of *Cantharis livida*. In this study 47.83% of the captured samples are from Ören, 27.98% from Armutlu, 24.19% from Muradiye were obtained. When the distribution of the collected samples according to the methods was examined, it is understood that 317 specimens (57.22%) by sticky yellow traps, 132 specimens (23.83%) by beating tray, 44 specimens (7.94%) by bait traps, 38 specimens (6.86%) by insect net and 23 specimens (4.15%) by pitfall trap method were collected. When this study is evaluated according to years, it seen that 265 specimens (47,83%) in the first year, 289 specimens (52,17%) were collected in the second year. It has attracted attention that there is no significant difference between the years.

When the results obtained from Tables 1 and 2 were evaluated as a whole, it was observed that both *Cantharis livida* and *Rhagonycha fulvaliena* were caught by insect net, beating tray, bait trap and pitfall trap methods. Although *Cantharis livida* could not be caught with the sticky yellow trap method, about 57% of the specimens of *Rhagonycha fulvaliena* were caught by this method and sticky yellow trap has come forward the most effective method.

The studies were carried out in organic sweet cherry orchards in three different regions and the number of specimens caught in the orchard in Ören was higher than the other orchards in both years.

Samples of *Cantharis livida* were found in nature since the beginning of April and reached the highest level in the period covering the end of April to mid-May and decreased at the end of May, and insects could not be caught in June (Table 1).

*Rhagonycha fulvaliena* was not sampled in April, but generally increased from mid-May and decreased from mid-June (Table 2). In late may-early june period, when this species was common in nature, corresponds to the harvest period of the varieties of Kemalpaşa Napolyon and 0900 Ziraat (Salihli) widely grown in this area. This species was caught by the yellow sticky traps because of their orientation hanging in the garden for the European cherry fruit fly (*Rhagoletis cerasi*).

Feeding of the *Rhagonycha fulvaliena* in ripening cherry fruits may decrease the market value of fruits. Observations on this subject have previously been

reported by Onaral and Tezcan (2017). In addition to the European cherry fruit fly (*Rhagoletis cerasi*), especially in the orchards containing late maturing varieties, the yellow sticky traps to be hung may also be effective in reducing the population of *Rhagoletis fulvaliensis*.

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Table 1. Results of different collection methods of *Cantharis livida* in two years at organic sweet cherry orchards at three different localities in western Turkey.

Localities	Months	Weeks	Insect net		Beating tray		Bait trap		Pitfall trap		Sticky yellow trap		Total	
			1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year
Ören	April	14	0	0	0	4	-	-	-	-	0	0	0	4
	April	15	0	2	0	11	4	6	0	0	0	0	4	19
	April	16	1	5	1	16	-	-	-	-	0	0	2	21
	April	17	4	16	4	5	8	4	1	1	0	0	17	26
	May	18	3	2	1	3	-	-	-	-	0	0	4	5
	May	19	1	1	2	1	3	3	1	1	0	0	7	6
	May	20	1	1	0	1	-	-	-	-	0	0	1	2
	May	21	0	1	0	0	0	0	0	0	0	0	0	1
	June	22	0	0	0	0	-	-	-	-	0	0	0	0
	Total			10	28	8	41	15	13	2	2	0	0	35
Rate (%)			38	28	49	41,18	28	23,53	4	3,36	0	0,00	119	55,61
Armutlu	April	14	0	0	0	0	-	-	-	-	0	0	0	0
	April	15	0	0	0	0	0	0	0	0	0	0	0	0
	April	16	0	2	0	1	-	-	-	-	0	0	0	3
	April	17	1	1	2	2	1	1	1	1	0	0	5	5
	May	18	2	1	5	7	-	-	-	-	0	0	7	8
	May	19	1	1	2	3	2	3	1	1	0	0	6	8
	May	20	1	0	2	2	-	-	-	-	0	0	3	2
	May	21	0	0	1	1	1	1	0	0	0	0	2	2
	June	22	0	0	0	0	-	-	-	-	0	0	0	0
	Total			5	5	12	16	4	5	2	2	0	0	23
Rate (%)			10	5	28	38,64	9	12,73	4	5,56	0	0,00	51	23,83
Manisa	April	14	0	0	0	0	0	0	0	0	0	0	0	0
	April	15	0	1	0	1	0	0	0	1	0	0	0	3
	April	16	0	0	1	2	-	-	-	-	0	0	1	2
	April	17	1	1	2	2	2	1	2	2	0	0	7	6
	May	18	1	1	2	1	-	-	-	-	0	0	3	2
	May	19	2	0	1	2	2	3	1	1	0	0	6	6
	May	20	1	1	1	1	-	-	-	-	0	0	2	2
	May	21	0	1	1	0	1	1	0	0	0	0	2	2
	June	22	0	0	0	0	-	-	-	-	0	0	0	0
	Total			5	5	8	9	5	5	3	4	0	0	21
Rate (%)			10	5	17	17,73	10	11,11	7	8,89	0	0,00	44	20,56

Table 2. Results of different collection methods of *Rhagonycha fulvaliena* in two years at organic sweet cherry orchards at three different localities in western Turkey

Localities	Months	Weeks	Insect net		Beating tray		Bait trap		Pitfall trap		Sticky yellow trap		Total		
			1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	1st year	2nd year	
Ören	May	18	0	0	0	0	0	0	0	0	0	0	0	0	
	May	19	0	0	1	1	0	0	0	0	0	0	1	1	
	May	20	0	1	1	2	-	-	-	-	1	1	2	4	
	May	21	1	4	7	9	2	4	2	3	17	18	29	38	
	June	22	3	4	19	18	-	-	-	-	40	43	62	65	
	June	23	1	1	11	6	3	3	2	1	13	15	30	26	
	June	24	1	1	1	1	-	-	-	-	2	1	4	3	
	June	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Total			6	11	40	37	5	7	4	4	73	78	128	137
	Rate (%)			17		77		12		8		151		265	
			6,42		29,06		4,53		3,02		56,98		47,83		
Armuthu	May	18	0	0	0	0	-	-	-	-	0	0	0	0	
	May	19	0	0	1	0	0	0	0	0	0	0	1	0	
	May	20	0	1	2	1	-	-	-	-	1	2	3	4	
	May	21	1	2	1	2	3	3	2	2	13	17	20	26	
	June	22	2	1	7	5	-	-	-	-	21	28	30	34	
	June	23	2	1	4	3	4	5	2	2	4	5	16	16	
	June	24	1	0	1	1	-	-	-	-	1	1	3	2	
	June	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Total			6	5	16	12	7	8	4	4	40	53	73	82
	Rate (%)			11		28		15		8		93		155	
			7,10		18,06		9,68		5,16		60,00		27,98		
Manisa	April	17	0	0	0	0	0	0	0	0	0	0	0	0	
	May	18	0	0	0	1	-	-	-	-	0	0	0	1	
	May	19	0	0	1	1	0	0	0	0	0	0	1	1	
	May	20	0	1	1	3	-	-	-	-	1	1	2	5	
	May	21	1	1	3	5	4	5	2	2	11	8	21	21	
	June	22	2	1	5	2	-	-	-	-	15	21	22	24	
	June	23	2	1	2	1	4	4	1	2	6	7	15	15	
	June	24	1	0	1	1	-	-	-	-	1	2	3	3	
	June	25	0	0	0	0	0	0	0	0	0	0	0	0	
	Total			6	4	13	14	8	9	3	4	34	39	64	70
Rate (%)			10		27		17		7		73		134		
			7,46		20,15		12,69		5,22		54,48		24,19		