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## WEED SPECIES AND THEIR MANAGEMENT IN ORGANIC SWEET CHERRY PRODUCTION IN ISPARTA (EGIRDİR) PROVINCE

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### Abstract

This study was conducted in 2003, 2004 and 2005 in Isparta (Egirdir) province in Turkey. Organic agriculture and IPM (Integrated Pest Management) implementations were applied in sweet cherry orchards were determined main weed species and density of annual and perennial weeds. Control methods were applied against weeds. The studies on IPM orchard were carried out for compare with organic orchard. Based on the results of surveys, *Sorghum halepense*, *Cuscuta campestris*, *Lactuca serriola*, *Trifolium* sp., *Polygonum convolvulus*, *Cynanchum acutum*, *Cirsium arvense* and *Veronica hederifolia*. *Sorghum halepense*, *Cuscuta campestris*, *Lactuca serriola* and *Trifolium* sp. were the most frequently observed weeds species in organic orchard. *Cynodon dactylon*, *Convolvulus arvensis*, and *Cynanchum acutum* were the most frequently determined weed species in IPM orchard.

In organic and IPM orchard was found perennial weeds that they were hard to control. For the control of perennial weeds were applied deep tillage and their roots removed from soil. Annual weeds were controlled by hand picking and tillage. Although in organic orchard were applied tillage to control perennial weeds this application were not sufficient and were also applied mowing twice and digging in some years. These were enough to control weeds in organic cherry orchard. Same cultural implementations were done to control weeds in IPM orchard. Any herbicide was not applied for control of weed in IPM orchard, because sweet cherry trees were under 4 years.

**Keywords:** Egirdir, sweet cherry, weed, organic, control

### Introduction

Cherry [(*Prunus avium*) (Rosales: Rosaceae)] is one of the important fruit crops of Turkey. It has an important position in the Turkish economy so that it matures in early seasons and its production for domestic market and especially as an export product. According to 2012 statistics there are 24.170.000 cherry trees in Turkey and Turkey is the first of the world by producing 470.887 tonnes cherry (Anonymous, 2012).

Turkey has been producing organic agricultural products since the mid 1980s. Organic agricultural applications are daily in Turkey and in the world as a solution for the diminishing of environmental pollution and human health problems caused by conventional agriculture. Cherry orchards have various diseases insects and weeds. Weeds may be also infested with a variety of annual and perennial weeds, each competing with the trees for water and nutrients. Competition for these resources is of greater concern with newly planted trees because weeds can reduce their growth, vigor, and delay production. Cherry orchards have various diseases insects and weeds. Weeds may be also infested with a variety of annual and perennial weeds, each competing with the trees for water and nutrients. Competition for these resources is of greater concern with newly planted trees because weeds can reduce their growth, vigor, and delay production.

### Materials and methods

Main material in the research is the weeds of organic and IPM sweet cherry orchards. Aiding materials were a orchard with early, mid season and late cherry varieties. This study was conducted to determine density of weeds species in Organic and Integrated Pest Management (IPM) orchard of cherry in Isparta (Egirdir) province. Varieties of cherries in the orchard that were used Early Burlat, Napoleon and Ziraat 0900 varieties. Survey was carried out in april and july in 2003-2004 and 2005. The random sampling was made according to representing at least 2% of the orchards of cherry . 1/4 m<sup>2</sup> were taken in a sampling area at least 20 times. The weeds within the frame were counted and density of weeds were determinated. The identification of weeds was made according to the references of Davis (1965–1988), Baytop (1989), Ulu et al. (1993), Güner et al. (2000).

### Results and discussion

Fifty-eight weed species and Fifty-one genus belong to twenty- three families were identified in the organic and IPM orchard of cherry surveyed. The density of the weed species in organic and IPM orchard of cherry in Isparta (E irdir) province are given in Table 1 and Table 2.

Table 1. Weed species and weed density in organic cherry orchards in Isparta (E irdir) province in 2003, 2004 and 2005.

Date	Weed Species	Weed Density Plants/m <sup>2</sup>
27.4.2003	<i>Urtica urens</i> L.	1.4
	<i>Melilotus officinalis</i> (L.)Desr.	1.2
	<i>Convolvulus arvensis</i> L.	3.9
	<i>Geranium pusillum</i> Burn.	0.7
	<i>Mentha longifolia</i> (L) Huds.	0.8
	<i>Galium aparine</i> L.	0.7
	<i>Plantago lanceolata</i> L.	1.2
	<i>Artemisia</i> sp.	0.9
	<i>Euphorbia stricta</i> L.	1.3
	<i>Stachys</i> sp.	4.7
	<i>Daucus carota</i> L.	0.6
	<i>Cynanchum acutum</i> L.	4.6
	<i>Plantago major</i> L.	1.7
	<i>Sorghum halepense</i> (L.) Pers.	4.7
<i>Anthemis cotula</i> L.	0.6	
29.4.2004	<i>Alopecurus myosuroides</i> Hudson	4.7
	<i>Artemisia vulgaris</i> L.	0.8
	<i>Capsella bursa-pastoris</i> (L.) Medik.	0.5
	<i>Cerastium dichotomum</i> L.	1.7
	<i>Chenopodium album</i> L.	1.7
	<i>Cirsium arvense</i> (L.)Scop	6.2
	<i>Convolvulus arvensis</i> L.	4.0

	<i>Cynodon dactylon</i> (L.) Pers.	0.5
	<i>Cynanchum acutum</i> L.	4.5
	<i>Lactuca serriola</i> L.	2.8
	<i>Plantago lanceolata</i> L.	1.1
	<i>Plantago major</i> L.	0.5
	<i>Ranunculus arvensis</i> L.	1.1
	<i>Raphanus raphanistrum</i> L.	6.2
	<i>Senecio vernalis</i> Waldst.&Kit.	1.1
	<i>Sonchus asper</i> (L.) Hill	0.5
	<i>Veronica hederifolia</i> L.	6.8
	<i>Xanthium strumarium</i> L.	4.5
12.7.2004	<i>Acroptilon repens</i> (L.) DC.	0.8
	<i>Amaranthus retroflexus</i> L.	0.4
	<i>Chenopodium album</i> L.	4.0
	<i>Chondrilla juncea</i> L.	0.4
	<i>Cirsium arvense</i> (L.) Scop	7.6
	<i>Convolvulus arvensis</i> L.	6.2
	<i>Cynanchum acutum</i> L.	8.0
	<i>Cynodon dactylon</i> (L.) Pers.	4.0
	<i>Lactuca serriola</i> L.	0.8
	<i>Polygonum convolvulus</i> L.	1.2
	<i>Raphanus raphanistrum</i> L.	0.4
	<i>Sorghum halepense</i> (L.) Pers.	4.8
	<i>Xanthium strumarium</i> L.	0.4
18.07.2005	<i>Acroptilon repens</i> (L.) DC.	0.8
	<i>Amaranthus retroflexus</i> L.	0.4
	<i>Artemisia vulgaris</i> L.	6.2
	<i>Bromus</i> sp.	1.1
	<i>Chenopodium album</i> L.	4.0
	<i>Cirsium arvense</i> (L.) Scop	0.4
	<i>Convolvulus arvensis</i> L.	1,6
	<i>Cuscuta campestris</i> Yuncker	9.6
	<i>Cynanchum acutum</i> L.	2.0
	<i>Cynodon dactylon</i> (L.) Pers.	7.3
	<i>Lactuca serriola</i> L.	9.3
	<i>Lolium temulentum</i> L.	0.6
	<i>Plantago major</i> L.	0.9
	<i>Polygonum convolvulus</i> L.	8.0
	<i>Sorghum halepense</i> (L.) Pers.	9.8
	<i>Trifolium</i> sp.	9.1
	<i>Xanthium strumarium</i> L.	1.3

Table 2. Weed species and weed density in IPM cherry orchards in Isparta (E irdir) province in 2003, 2004 and 2005.

Date	Weed Species	Weed Density Plants/m <sup>2</sup>
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27.04.2003	<i>Urtica urens</i> L.	1.4
	<i>Melilotus officinalis</i> (L.)Desr.	1.2
	<i>Convolvulus arvensis</i> L.	3.9
	<i>Geranium pusillum</i> Burn.	0.7
	<i>Mentha longifolia</i> (L) Huds.	0.8
	<i>Galium aparine</i> L.	0.7
	<i>Plantago lanceolata</i> L.	1.2
	<i>Artemisia</i> sp.	0.9
	<i>Euphorbia stricta</i> L.	1.3
	<i>Stachys</i> sp.	4.7
	<i>Daucus carota</i> L.	0.6
	<i>Cynanchum acutum</i> L.	4.6
	<i>Plantago major</i> L.	1.7
	<i>Sorghum halepense</i> (L.) Pers.	4.7
	<i>Anthemis cotula</i> L.	0.6
29.4.2004	<i>Alopecurus myosuroides</i> Hudson	4.5
	<i>Acroptilon repens</i> (L.) DC.	2.2
	<i>Adonis flammea</i> Jacq.	1.1
	<i>Bromus sterilis</i> L.	0.5
	<i>Cardaria draba</i> (L.) Desv.	1.7
	<i>Chenopodium album</i> L.	5.1
	<i>Cirsium arvense</i> (L.) Scop.	1.7
	<i>Convolvulus arvensis</i> L.	9.8
	<i>Cynanchum acutum</i> L.	9.7
	<i>Cynodon dactylon</i> (L.) Pers.	9.2
	<i>Geranium</i> sp.	0.5
	<i>Lamium amplexicaule</i> L.	3.5
	<i>Lactuca serriola</i> L.	2.2
	<i>Malva neglecta</i> Wallr.	0.5
	<i>Polygonum convolvulus</i> L.	0.5
	<i>Ranunculus arvensis</i> L.	1.7
	<i>Rumex crispus</i> L.	0.5
	<i>Sinapis arvensis</i> L.	2.2
	<i>Veronica hederifolia</i> L.	2.2
<i>Veronica triphyllos</i> L.	1.1	
12.7.2004	<i>Amaranthus retroflexus</i> L.	5.6
	<i>Artemisia vulgaris</i> L.	0.4
	<i>Chenopodium album</i> L.	2.4
	<i>Cirsium arvense</i> (L.) Scop.	1.6
	<i>Convolvulus arvensis</i> L.	9.9
	<i>Crepis foetida</i> L.	0.8
	<i>Cynodon dactylon</i> (L.) Pers.	13.2
	<i>Cynanchum acutum</i> L.	7.6
	<i>Datura stramonium</i> L.	0.4
	<i>Heliotropium europaeum</i> L.	0.4
	<i>Hyoscyamus niger</i> L.	1.6

	<i>Lactuca serriola</i> L.	1.6
	<i>Plantago major</i> L.	0.4
	<i>Polygonum convolvulus</i> L.	0.8
	<i>Raphanus raphanistrum</i> L.	0.4
	<i>Setaria glauca</i> (L.) P. Beauv.	0.4
	<i>Sorghum halepense</i> (L.) Pers.	4.4
	<i>Xanthium strumarium</i> L.	5.2
18.07.2005	<i>Acroptilon repens</i> (L.) DC.	1.1
	<i>Amaranthus retroflexus</i> L.	3.4
	<i>Anthemis</i> sp.	0.6
	<i>Chenopodium album</i> L.	2.4
	<i>Cirsium arvense</i> (L.) Scop.	1.9
	<i>Convolvulus arvensis</i> L.	10.1
	<i>Cynodon dactylon</i> (L.) Pers.	12.4
	<i>Cynanchum acutum</i> L.	6.5
	<i>Galium</i> sp.	0.4
	<i>Heliotropium europaeum</i> L.	0.5
	<i>Hyoscyamus niger</i> L.	1.2
	<i>Lactuca serriola</i> L.	2.3
	<i>Plantago major</i> L.	0.3
	<i>Polygonum convolvulus</i> L.	0.7
	<i>Raphanus raphanistrum</i> L.	0.2
	<i>Rumex</i> sp.	1.1
	<i>Sorghum halepense</i> (L.) Pers.	5.1
	<i>Xanthium strumarium</i> L.	3.7
	<i>Vicia</i> sp.	0.4

Based on the results of surveys (Table 1), *Sorghum halepense*, *Cuscuta campestris*, *Lactuca serriola* and *Trifolium* sp. were the most common observed weeds species in organic orchard. *Cynodon dactylon*, *Convolvulus arvensis*, and *Cynanchum acutum* were the most frequently determined weed species in IPM orchard (Table 2).

### Conclusion

In organic and IPM orchard was found perennial weeds that they were hard to control. For the control of perennial weeds were applied deep tillage and their roots removed from soil. Annual weeds were controlled by hand picking and tillage. Although in organic orchard were applied tillage to control perennial weeds this application were not sufficient and were also applied mowing twice and digging in some years. These were enough to control weeds in organic cherry orchard. Same cultural implementations were done to control weeds in IPM orchard. Any herbicide was not applied for control of weed in IPM orchard, because sweet cherry trees were under 4 years.

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