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THE RESEARCH WEED SPECIES, DENSITY AND FREQUENCY IN PARK AND GARDEN OF ADANA METROPOLITAN MUNICIPALITY AND DISTRICT

Tamer ÜSTÜNER*

[*1]University of Kahramanmaras Sütcü İmam, Faculty of Agriculture,
Department of Plant Protection, Kahramanmaras, Turkey
[*] *tamerustuner@ksu.edu.tr*

Abstract:*Ornamental plants which are grown as house plants, landscaping plants or for horticultural purposes mostly because of the leaves and the flowers that attract people. The improtance of ornamental plants increased in our urban life today. Because people may expreince a great socialepression due to the fact that they become exposed to many negative factors in the social life of a metropolitan city. By taking this aspect into the account, in the developing understanding of the modern city, mayors and city planners are now planning more livable cities with an increased amount of green fields. For this purpose, we have to allocate more space to the ornamental and landscape plants. However, a number of problems is faced in the cultivation of ornamental plants. In particular, weeds, diseases and pests are important topics in the cultivation of ornamental plants. If we do not fight against the weeds, diseases and pests, we would be unsuccessful in growing ornamental plants. A highly significant amount of damage caused by weeds is concerned in the cultivation of ornamental plants. Especially considering the fact that weeds can consume 3-4 times more water, organic and inorganic nutrients compared to ornamental plants. of 104 species of weeds detected in Adana Region, 1 of them was Pterydophyta, 19 were Monocotyledons, and 84 were Dicotyledon. An avarage of 116.139 number of weeds per metersquare were detected in the region. The highest density (165.390 number/m2) of weed species was found in Adana Metropolitan Municipality center, followed by Cukurova (114.159), Seyhan (113.030), Yüregir (106.164), Kozan (99.896) and Ceyhan (98.199) districts, respectively. The narrow leaved weeds which were found to be in the highest density (weed average>10) in ornamental plants growing areas of Adana region; Cynodon dactylon, Agropyron repens, Setaria viridis, Digitaria sanguinalis. Broad leaf weeds; Taraxacum officinale and Portulaca oleracea..*

Key words*: Ornamental plants, family, weed species and density*

1. Introduction

Ornamental plants which are grown as house plants, landscaping plants or for horticultural purposes mostly because of the leaves and the flowers that attract people. Ornamental plant sector has

an important place in plant production. It is considered as an effective sector that adds values to the economy and provides a great employment. Ornamental plants are produced in more than 50 countries around the globe. Turkey, with its diverse ecological and soil properties, has the potential to become a significant production center for ornamentals. It has been estimated that Turkey's ornamental producing capacity reaches up to 600 million dollars, of which 100 to 150 million dollars are obtained through imports. Ornamental plants are a good alternative in Turkey's agriculture thanks to the country's rich climate, soil, water and microclimatic properties [1]. For exterior space, Adana region is a place where almost all phanerogams, crytogams and fruits can be grown along with some Mediterranean plant varieties at international strandards.

In today's urban life, the importance of ornamental plants increased because people may experience a great social (mental) depression due to the fact that they become exposed to many negative factors (air pollution, noise pollution, work-related stress) in the social life of a metropolitan city. For the solution of sociological and psychological problems resulted from these kinds of problems, the streets, alleys, refuges, intersections and the roadways with landscape designs that calm people's minds by their beautiful and attractive appearances and odors become increasingly important. It has been known that being exposed to the neat and nice appearance of the parks, gardens and plants while starting the day in the morning has a positive impact on peoples psychologies. In the past, gardening and landscaping works in the cities have been largely ignored, but now, considering the recent conditions of the urban life, they began to be taken seriously. Today, stress has been shown to be the reason of many human diseases. Not only do ornamental plants (flowers, trees, shrubs and plants in the form of trees) and grass fields provide the image of the city with an extra beauty, but also the fact that they contribute very positively to human psychology have been continuously expressed by medical experts. By taking this aspect into the account, in the developing understanding of the modern city, mayors and city.

Planners are now planning more livable cities with an increased amount of green fields. We are obliged to provide our people with more beautiful and aesthetic living areas by preparing a 50-year master plan. For this purpose, we have to allocate more space to the ornamental and landscape plants. However, a number of problems is faced in the cultivation of ornamental plants. In particular, weeds, diseases and pests are important topics in the cultivation of ornamental plants. If we do not control against the weeds, diseases and pests, we would be unsuccessful in growing ornamental plants. In the scope of this project, the damages caused by the weeds common among ornamental plants were investigated. A highly significant amount of damage caused by weeds is concerned in the cultivation of ornamental plants. Especially considering the fact that weeds can consume 3-4 times more water, organic and inorganic nutrients compared to ornamental plants. Convolvulus species are especially dangerous not only because they can consume more nutritional elements and water compared to the ornamental but also they grow by clinging to the host's transmission harnesses. Therefore, it causes a great amount of stress on the plant. *Agropyron repens* participates to plants food and water by taking a higher amount of them from the soil. Besides, *Agropyronrepens*, *Cynodon dactylon*, *Sorghum halepense* and *Phragmites australis* cause a disadvantageous effect on the ornamental plant by blocking the growth of the plant root and also showing a allelopathic impact. In addition to the direct negative effects of the weeds on the ornamental, they can harm the plant indirectly by playing a role as a secondary host for certain diseases and pests. Some weed species such as *Malvaneglecta*, *Convolvulus* spp., *Sonchus oleraceus* and *Sorghum halepense* are the intermediate hosts of certain

fungal pathogens such as *Erysiphe* spp. and *Puccinia* spp. Thereby causing them to infect the ornamental plant and to spread. The weed species, *Sonchus oleraceus, Sorghum halepense* and *Phragmites australis* are the secondary hosts of *Aphis* spp., *Empoasca* spp., which help them infect the ornamentals and cause an epidemic [2]. In the fields he investigated to determined 43 weed species and found that, as the chemical intervention the combination of 2,4-D Amin+Dicamba was effective against *Taraxacum officinale, Trifolium* spp., *Plantago* spp. and *Medicago sativa* [3]. The most common weed species seen in Ankara city center was *Trifolium repens,* while *Taraxacum* spp. was detected as the second most common [4]. As a part of the control against the weed, found that *Trifolium* spp. and *Taraxacum* spp. were amongst the weed, besides the other weeds such as *Plantago* spp., *Convolvulus arvensis, Agropyron repens* and *Acroptilon repens* could also be observed albeit in small quantities [5,6]. Additionally, they realized Glyphosatei was effective againstthe species found in the areas to be grassed, *Agropyron repens, Cynodon dactylon, Acroptilon repens* and *Taraxacum* spp. The weeds detected in the conditions of Central Anatolia were *Acroptilon repens* (L.) D. C., *Agropyron repens* L., *Amaranthus albus*L., *Amaranthus viridis* L., *Chenopodium album* L., *Convolvulus arvensis* L., *Malva neglecta* L., *Portulaca oleracea* L. and *Tribulus terrestris* L. [7]. At the end of the survey conducted in the grass of Sabiha Gokcen Airport, 25 species and 26 genus of weed from 16 different familias were detected. These species were *Anagallis arvensis, Chenopodium album, Convolvulus arvensis, Matricaria chamomilla, Plantago lanceolata, Polygonum* spp., *Trifolium repens, Erigeron canadensis, Medicago sativa* and *Plantago major* [8].

First mowing fastens the plant spread, tillering and becoming more frequent. Mowing should be performed before the plants grow too tall. If moving is performed late, the bottom part of the grass becomes pallid. The time of the first mow depends on the species. However, in general, it is suitable for most grasses to be mowed when they reach 6 to 8 cm of height. It is usually recommended to leave the 2/3 of the grass un-mowed, i.e. mowing the grass at 4 to 5 cm from ground. Deep mowing causes the vegetation cover to lose its frequency. In light soils, rubbing before the first mow helps the plants remain attached to the ground. Sometimes, rubbing again after the mow gives a strengthening impact on the contact of plant roots with the soil. However, rubbing should be performed when the soil is dry. Rubbing might cause problem on wet and heavy soils [9]. It is rather expensive to constitute the lawns. Therefore, these areas need to be protected and the control against weeds are crucial for them to be long lasting. When left disturbed, weeds cause the grass to weaken by using their nutrition and water sources. Some weed species make the lawn disappear by dominating the area. They may ruin the appearance and increase the expense of maintenance. Although many species of weed may be present in the lawns, especially the biennial and perennial ones in the form of rosettes cause the biggest problems. Of these kinds of weeds, the most dangerous species for the lawn are *Taraxacum officinale* Wigg., *Plantago* spp., *Convolvulus arvensis* L., *Capsella bursa-pastoris* L. and *Trifolium* spp. [10]. Some of the weeds that are problematic in the growth of tulip, clove and gladiola in Turkey. *Amaranthus retroflexus* L, *Amaranthus viridis* L, *Cynodon dactylon, Agropyron repens* (L.) P.Beauv., *Setaria viridis, Taraxacum officinale, Portulaca oleracea* L., *Digitaria sanguinalis* (L.) Scop.,*Cyperus rotundus* L., *Sorghum halepense, Bromus tectorum, Rumex crispus* L., *Alopecurus myosuroides, Echinochloa crus-galli* (L.) P. Beauv., *Lactuca serriola* L., *Solanum nigrum, Malva neglecta, Chenopodium album* L., *Convolvulus arvensis, Avena sterilis* L., *Convolvulus sepium, Xanthium strumarium* L. and *Oxalis corniculata* [11]. The species used for the constitution of lawns; *Festuca*

rubra, *Zoysia* spp., *Poa pratensis*, *Festuca arundinacae*, *Cynadon dactylon*, *Agrostis tenius* and *Lolium perene* [12].

2. Methods

2.1. Used methods

The survey study was conducted in Adana region's (Adana Metropolitan Municipality, Aladag, Ceyhan, Cukurova, Feke, İmamoglu, Karaisalı, Karatas, Kozan, Pozantı, Saimbeyli, Sarıcam, Seyhan, Tufanbeyli, Yumurtalık and Yüregir) ornamental plants area in 2016. The region was divided 16 regions by considering region's ornamental plants area ranges and in a certain amount of examples from each region was taken as represent aforesaid region. It was considered that distance of studied orchards is at least 3 km and removing side affects by starting 15 m inside of the orchard side. In the survey study, a census was took by drawing a frame for 1 m^2 4 times in 1 decare area [13]. Number of weeds in m^2 was calculated by going into total number of all species in $1m^2$ area to total studied area. In the survey area, large leafed weeds were considered as plant, lanceolate leafed weeds were considered by counting stems and written on questionnaries. Species, numbers and coverage of weeds were written down and frequency of occurrence, number of plant and general coverage of obtained datas were calculated by using the following formulas [14]. Weed density was calculated via Density =B/n formula [15]. In the formula; B= Total weeds number in the taken example, n= Number of taken example. Frequency of occurrence (F.O.); the value that shows that a weed's seen rate inside how percent of studied farms about this weed, and calculated with following formula. Frequency of occurrence (%)= n/mx100, n: Number of farms where one species is in, m: Total number of farm that measured. Species Coverage (T.K.A.): It is expressed as average value that any species of weed covered surface. G.K.A (%)= T.K.A./m. G.K.A.: General coverage, m: Total number of exemplifications. Determined to Turkish names weeds the benefiting from [16] and [17] is stated in the results section.

It can not be diagnosed during a survey made herbarium samples taken weeds after in Faculty of Agriculture, Department of Plant Protection in KSU was diagnosed in Herbology laboratory. In the identification of weed species usually can not be diagnosed which was identified using in the field as a source of water weeds "Water Weeds" [18] and "Flora of Turkey" book [19].

As suggested by Ustuner and Güncan [20], density scale was used as follows;

Density scale,

A. High dense (The average plant more than 10)
B. Dense (The average plant 1-10 between)
C. Mid dense (The average plant 0.1-1)
D. Low dense (The average plant 0.01 to 0.1)
E. Scarce (The average plant less than 0.01)

The survey study was conducted in accordance with stated place and frame number in Table 1 in Adana regions.

Table1. Studied Regions, Ornamental Plants Areas are and Number of Drawn Frame in Adana Region

Regions	**Ornamental Plants area** (da)	The Number of Frames Discarded (number)
Adana	93	32
Aladag	0	-
Ceyhan	3	9
Cukurova	4	12
Feke	0	-
İmamoglu	0	-
Karaisalı	0	-
Karatas	0	-
Kozan	4	12
Pozantı	0	-
Saimbeyli	0	-
Sarıcam	0	-
Seyhan	5	15
Tufanbeyli	0	-
Yumurtalık	0	-
Yüregir	4	-
Total	**113**	**80**

2.2. Materials used in the study

These materials are garden plants (ornamentals) and weeds. According to this research plan, it was conducted in the municipality of parks and gardens of (Adana Metropolitan Municipality, Aladag, Ceyhan, Cukurova, Feke, İmamoglu, Karaisalı, Karatas, Kozan, Pozantı, Saimbeyli, Sarıcam, Seyhan, Tufanbeyli, Yumurtalık and Yüregir).

2.3. Geographical features of the research area

Adana province south of the Mediterranean, while the north west Nigde and Kayseri, Mersin province, north-east of Kahramanmaras, Osmaniye is located to the east and south east of the province of Hatay. Adana, located south of the Anatolian peninsula and the Mediterranean coast is situated between 34°48-36°41 east longitude and 36°30-38°25 north latitude. The Mediterranean climate prevails in the region,winters are mild and rainy, summers are hot and dry.

3. Results And Findings

At the result of survey, The weed species were detected 104 different species that belonging to 32 family in the park and gardens in Adana region. These weeds were belonged to 1 pterophyta (Pterydophyta), 21 monocots (monokotiledon) and 82 dicots (dikotiledon). The weed density was determined approximate 116.139 (piece/m^2) per square meter in Adana region. In this region, different 32 family were detected (Table 2). Tehese; Equisetaceae, Amaryllidaceae, Cyperaceae, Gramineae (Poaceae), Amaranthaceae, Apiaceae (Umbelliferae), Boraginaceae, Caryophyllaceae, Chenopodiaceae, Compositae (Asteraceae), Convolvulaceae, Cruciferae (Brassicaceae), Cuscutaceae, Euphorbiaceae, Fabaceae (Leguminosae), Geraniaceae, Hypericaceae (Guttiferae), Labiatae (Lamiaceae), Malvaceae, Oxalidaceae, Papaveraceae, Plantaginaceae, Polygonaceae, Portulacaceae,

Primulaceae, Ranunculaceae, Rosaceae, Rubiaceae, Scrophulariaceae (Scrophyllaceae), Solanaceae, Urticaceae and Zygophyhllaceae, respectively.

The weed density was detected the highest dense 165.390 (piece/m^2) per square meter for Adana Metropolitan Municipality in the center and this was followed by Cukurova 114.159 (piece/m^2), Seyhan 113.030 (piece/m^2), Yüregir 106.164 (piece/m^2), Kozan 99.896 (piece/m^2) and Ceyhan 98.199 (piece/m^2) respectively.

In Adana region's in park and garden plants average that density of weeds were found per meter square; The weed was detected high dense that *Agropyron repens* (L.) P. Beauv.(11.758 piece plant/m^2), *Cynodon dactylon* (L.) Pers.(10.805), *Setaria viridis* (L.) P. Beauv. (10.524), *Digiteria sangunialis* (L.) Scop. (10.211), *Taraxacum officinale* F.H.Wigg.and (10.090) (avarege weed in m^2>10); It was found dense *Portulaca oleracea* L. (9.081), *Cyperus rotundus* L.(7.086), *Sorghum halepense* (L.) Pers. (6.609), *Rumex crispus* L. (5.597), *Bromus tectorum* L. (5.535), *Alopecurus myosuroides* Huds. (5.157), *Echinochloa crus-galli* (L.) P. Beauv. (2.693), *Malva neglecta* (2.294),), *Amaranthus retroflexus* L (1.801), *Solanum nigrum* (1.749), *Chenopodium album* L (1.657),*Avena sterilis* L.(1.548 (average weed in m^2 1-10) in ornamental plants field.

Frequency of occurrence for weeds in the region; While *A. repens* (L.) P. Beauv., *C. dactylon* (L.) Pers.,*D. sanguinalis* (L) Scop., *S. viridis* and *S. halepense*are seen more than 50% in 6 district and *C. rotundus* L. is seen more than 50% one district.

In terms of coverage, the rate in the weeds species occurance, *A. repens* (L.) P. Beauv., *C. dactylon* (L.) Pers.,*D. sanguinalis* (L) Scop., *S. viridis*, *S. halepense* and *C. rotundus* L. were determined to be within a range of 25-35% while below 25% other species in the study.

Table 2. The Number Of Species And Family Were Problem Weeds İn Grown Of Ornamental Plants According To Districts

Regions	Family number	Species number
Adana	32	104
Ceyhan	23	72
Çukurova	19	60
Kozan	22	61
Seyhan	25	65
Yüregir	25	65

Survey results was evaluated separately that was did in Adana region 6 district. These are;

In Adana Metropolitan Municipality, 104 different weeds from 32 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 12.691 (piece plant/m^2) *Cynodon dactylon*, 11.826 *Agropyron repens*, 11.583 *Setaria viridis*, 11.205 *Taraxacum officinale*, 11.084 *Portulaca oleracea* and 10.654 *Digitaria sanguinalis* (average weed in m^2>10); dense 9.871 (piece plant/m^2) *Cyperus rotundus*, 9.482 *Sorghum halepense*, 7.894 *Bromus tectorum*, 7.351 *Rumex crispus*, 6.689 *Alopecurus myosuroides*, 6.462 *Echinochloa crus-galli*, 3.568 *Lactuca serriola*, 3.482 *Solanum nigrum*, 3.475 *Malva neglecta*, 3.314 *Amaranthus retroflexus*, 2.925 *Chenopodium album*, 2.836 *Convolvulus arvensis*, 1.352 *Avena sterilis*, 1.294 *Convolvulus sepium* and 1.150 *Xanthium strumarium* (average weed in m^2 1-10) in Table 3.

The maximum frequency occurrence for weed species was; 53.8% for *A. repens*, 52.7% for *P. oleracea*, 52.1% for *C. dactylon*, 51.4% for *T. officinale*, 50.9% for *S. viridis*, 50.5% for *D. sanguinalis* and 50.2% for *C. rotundus*.

General coverage of weeds were 34.1% for *P. oleracea*, 32.3% for *T. officinale*, 29.8% for *A. repens*, 28.2% for *S. halepense*, 27.9% for *D. sanguinalis*, 27.2% for *C. dactylon*, 26.8% for *C. rotundus* and 25.6% for *S. viridis*.

Table 3. Weed Density That Viewed As Significant, Frequency Occurrence (%) And General Coverage (%) ın Ornamental Plants Grown Areas

Weeds species	Density (weed/m^2)	Frequency(%)	Coverage(%)
Cynodondactylon	12.691	52.1	27.2
Agropyronrepens (L.) P.Beauv.	11.826	53.8	29.8
Setariaviridis	11.583	50.9	25.6
Taraxacumofficinale	11.205	51.4	32.3
*Portulacaoleracea*L.	11.084	52.7	34.1
Digitariasanguinalis (L) Scop.	10.654	50.5	27.9
*Cyperusrotundus*L.	9.871	50.2	26.8
Sorghum halepense	9.482	32.5	28.2
Bromus tectorum L.	7.894	27.4	21.6
*Rumexcrispus*L	7.351	14.2	19.3
*Alopecurusmyosuroides*Huds.	6.689	13.9	12.5
Echinochloa crus-galli (L.) P.Beauv.	6.462	11.2	10.8
Lactucaserriola L.	3.568	7.6	8.2
Solanumnigrum	3.482	6.8	7.1
Malvaneglecta	3.475	6.5	7.0
Amaranthusretroflexus L	3.314	6.2	6.8
Chenopodium album L.	2.925	6.1	6.4
Convolvulus arvensis L.	2.836	5.8	8.3
Avenasterilis L.	1.352	4.7	6.9
Convolvulus sepium	1.294	3.9	5.1
*Xanthium strumarium*L.	1.150	2.1	5.5

In Ceyhan, 72 different weeds from 23 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 12.148 (piece plant/m^2) for *C. dactylon*, 11.246 *A. repens*, 11.187 *P. oleracea*, 11.120 *S. viridis* and 10.094 *D. sanguinalis*; dense 9.155 (piece plant/m^2) for *T. officinale*, 6.405 for *C. rotundus*, 5.358 for *B. tectorum*, 5.106 for *S. halepense*, 4.160 for *A. myosuroides*, 3.342 for *R. crispus* L., 2.147 for *L. serriola* L., 2.060 for *A. sterilis*, 2.050 for *E. crus-galli*, 1.224 for *C. album*, 1.159 for *M. neglecta*, 1.100 for *A. retroflexus* and 1.090 for *X. strumarium* respectively (average weed in m^2 1-10).

The maximum frequency occurrence for weed species was; 52.4% for *A. repens*, 52.2% for *P. oleracea*, 51.7% for *C. dactylon*, 51.1% for *T. officinale*, 50.8% for *S. viridis*, 50.2% for *D. sanguinalis* and 40.4% for *C. rotundus.*

General coverage of weeds were 33.8% for *P. oleracea*, 30.3% for *T. officinale*, 29.8% for *A. repens*, 28.2% for *S. halepense*, 27.9% for *D. sanguinalis*, 28.2% for *C. dactylon*, 26.8% for *C. rotundus* and 25.6% for *S. viridis* respeciteviely.

In Cukurova, 60 different weeds from 19 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 11.547 (piece plant/m^2) for *T. officinale*, 11.260 for *A. repens*, 11.048 for *C. dactylon*, 10.725 for *S. viridis*, 10.184 *for P. oleracea*, 10.169 for *D. sanguinalis*; dense 6.830 for *S. halepense*, 6.154 for *R. crispus*, 5.820 for *C. rotundus*, 5.589 for *A. myosuroides*, 4.952 for *B. tectorum*, 3.620 for *L. serriola*, 2.745 for *M. neglecta*, 2.183 for *S. nigrum*, 2.100 for *A. retroflexus*., 2.063 for *E. crus-galli*, 1.862 for *C. album*, 1.260 for *A. sterilis* and 1.140 for *X. strumarium* respectively (average weed in m^2 1-10).

The maximum frequency occurrence for weed species was; 52.8% for *A. repens*, 51.8% for *P. oleracea*, 51.5% for *C. dactylon*, 50.7% for *S. viridis*, 50.5% for *T. officinale* and 50.1% for *D. sanguinalis*.

General coverage of weeds were 29.7% for *T. officinale*, 28.6% for *A. repens*, 28.4% for *P. oleracea*, 28.2% for *S. halepense*, 26.8% for *C. rotundus*, 26.2% for *C. dactylon*, 25.4% for *D. sanguinalis* and 25.1% for *S. viridis*.

In Kozan, 61 different weeds from 22 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 13.145 (piece plant/m^2) for *A. repens*, 11.218 for *D. sanguinalis* and 11.120 for *S. viridis*; dense 9.356 for *C. dactylon*, 8.100 for *S. halepense*, 7.405 for *C. rotundus*, 6.580 for *B. tectorum*, 5.187 for *P. oleracea*, 5.159 for *T. officinale*, 4.346 for *R. crispus*, 4.120 for *A. myosuroides*, 2.470 for *L. serriola*, 1.596 for *M. neglecta*, 1.148 for *S. nigrum*, 2.000 for *A. sterilis*, 1.506 for *E. crus-galli*, 1.310 for *C. arvensis* and 1.110 for *A. retroflexus* respecitvely.

The maximum frequency occurrence for weed species was; 51.8% for *A. repens*, 51.6% for *D. sanguinalis*, 50.4% for *S. viridis*, 50.1% for *C. dactylon*, 50.0% for *S. halepense* and 25.3% for *C. rotundus*.

General coverage of weeds were 32.1% for *A. repens*, 31.6% for *D. sanguinalis*, 29.2% for *S. halepense*, 28.0% for *S. viridis*, 26.9% for *C. dactylon* and 25.8% for *C. rotundus*.

In Seyhan, 65 different weeds from 25 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 12.320 (piece plant/m^2) for *T. officinale*, 11.548 for *C. dactylon*, 10.962 for *D. sanguinalis*, 10.826 for *A. repens* and 10.475 for *S. viridis*; dense 8.780 (piece plant/m^2) for *C. rotundus*. 8.283 for *P.oleracea*, 7.189 for *A. myosuroides*, 5.856 for *R. crispus*, 5.830 for *S. halepense*, 3.895 for *B. tectorum*, 2.375 for *M. neglecta*, 2.116 for *A. retroflexus*, 2.067 for *E. crus-galli*, 1.786 for *C. album*, 1.460 for *A. sterilis*, 1.435 for *C. arvensis*, 1.243 for *X. strumarium*, 1.185 for *S. nigrum* and 1.162 for *L. serriola* respecitvely.

The maximum frequency occurrence for weed species was; 52.7% for *T. officinale*, 51.6% for *C. dactylon*, 51.20% for *D. sanguinalis*, 50.9% for *A. repens*, 50.3% for *S. viridis*, 36.2% for *C. rotundus* and 27.5% for *P. oleracea*.

General coverage of weeds were 35.4% for *T. officinale* 32.1% for *C. dactylon*, 30.6% for *D. sanguinalis*, 29.8% for *A. repens*, 29.0% for *S. viridis*, 25.7% for *C. rotundus* and 24.6% for *P. oleracea* respectively.

In Yüreğir, 65 different weeds from 25 families that can be recognised were seen of ornamental plants grown areas. In this region, It was determined high dense 11.248 (piece plant/m^2) for *A. repens*, 11.159 for *T. officinale*, 10.184 for *P. oleracea*, 10.125 for *S. viridis* and 10.042 for *C.*

dactylon; dense 9.169 for *D. sanguinalis*, 6.534 for *R. crispus*, 4.532 for *B. tectorum*, 4.310 for *S. halepense*, 4.240 for *C. rotundus*, 3.240 for *L. serriola*, 3.196 for *A. myosuroides*, 2.415 for *M. neglecta*, 2.384 for *S. nigrum*, 2.014 for *E. crus-galli*, 1.826 for *C. album*, 1.543 for *C. arvensis*, 1.160 for *A. sterilis*, 1.070 for *A. retroflexus* and 1.040 for *X. strumarium* respectively (Table 4).

Table 4. Weed Species, Density and Family According to in Field Survey

Adana Metropolitan Municipality	Regions						Density(piecepl ant/m^2)
Weedspecies and family	Adana Metropo litan Municip ality	Ceyh an	Cukur ova	Koz an	Seyh an	Yüregir	
PTERİDOPHYTA							
Familya: Equisetaceae							
Equisetum arvense L.	0,980	0	0	0	0,001	0	0,1635
MONOCOTYLEDON EAE							
Familya:Liliaceae (Amaryllidaceae)							
Allium rotundum	0,492	0	0	0	0	0,018	0,085
*Allium vineale*L.	0,640	0	0	0	0	0	0,10666
Familya: Cyperaceae							
*Cyperus rotundus*L.	9,871	6,405	5,820	7,405	8,780	4,240	7,08683
Familya: Gramineae (Poaceae)							
Aegilops columnaris ZHUK.	0,865	0,214	0,019	0	0	0	0,183
Agropyron repens (L.) P.Beauv.	11,826	12,246	11,260	13,145	10,826	11,248	11,7585
*Alopecurus myosuroides*Huds.	6,689	4,160	5,589	4,120	7,189	3,196	5,15716
Avena sterilis L.	1,352	2,060	1,260	2,000	1,460	1,160	1,54866
*Bromus arvensis*L.	0,482	0,017	0,041	0,003	0	0	0,0905
Bromus tectorum L.	7,894	5,358	4,952	6,580	3,895	4,532	5,53516
Cynodon dactylon (L.) Pers.	12,691	10,148	11,048	9,356	11,548	10,042	10,8055
*Dactylis glomerata*L.	0,859	0,256	0,573	0,384	0,004	0,583	0,44316

Digitaria sanguinalis (L) Scop.	10,654	9,094	10,169	11,218	10,962	9,169	10,211
Echnicola crus-galli (L.) P.Beauv.	6,462	2,050	2,063	1,506	2,067	2,014	2,69366
*Hordeum vulgare*L.	0,210	0,210	0,016	0,024	0,001	0	0,07683
*Lolium temulentum*L.	0,326	0,156	0,015	0,003	0,029	0	0,08816
*Phalaris canariensis*L.	0,495	0,110	0,001	0,013	0,024	0	0,10716
Pharagmites australis (Cav.) Trın. ExSteudel	0,317	0,064	0,010	0,019	0,001	0,057	0,078
*Poa trivialis*L**.**	0,426	0,025	0,001	0,002	0,002	0	0,076
Setaria glauca(L.) P. Beauv.	0,568	0,116	0,021	0,038	0,024	0	0,12783
Setaria viridis (L.) P. Beauv.	11,583	9,120	10,725	11,120	10,475	10,125	10,5246
Sorghum halepense(L.) Pers.	9,482	5,106	6,830	8,100	5,830	4,310	6,60966
DICOTYLEDONEAE							
Familya:Amaranthaceae							
*Amaranthus blitoides*S.Wats.	0,712	0,015	0,002	0,026	0,018	• 0,073	0,141
Amaranthus retroflexus L.	3,314	1,100	2,100	1,110	2,116	1,070	1,80166
Familya: Apiaceae (Umbelliferae)							
*Caucalis platycarpos*L.	0,611	0	0	0	0	0	0,10183
Daucus carota L.	0,214	0,018	0	0,019	0	0	0,04183
Familya:Boraginaceae							
*Anchusa officinalis*L.	0,315	0	0,071	0	0	0	0,06433
Heliotropium europaeum L.	0,627	0,129	0,002	0,051	0,003	0	0,13533
Familya:Caryophyllaceae							
Agrostemma githago L.	0,218	0	0	0	0	0	0,03633
*Vaccaria pyramidata*Medik.	0,352	0,010	0	0,025	0	0	0,0645
Familya:Chenopodiace							

ae							
Chenopodium album L.	2,925	1,224	1,862	0,324	1,786	1,826	1,65783
*Chenopodium vulvaria*L.	0,516	0	0	0		0,063	0,1158
Familya:Compositae (Asteraceae)							
Acroptilon repens (L.) DC.	0,538	0,114	0	0	0	0	0,108667
*Carduus nutans*L**.**	0,046	0	0	0	0	0	0,007667
Centaurea solstitialis subsp. *solstitialis*	0,083	0,012	0	0,018	0	0,074	0,031167
Centaurea virgata Lam.	0,041	0	0	0	0	0	0,006833
*Chondrilla junce*aL.	0,034	0	0	0	0	0	0,005667
*Cichorium intybus*L.	0,027	0	0	0	0	0	0,0045
Cirsium arvense (L.) Scop.	0,098	0,013	0,012	0,011	0,003	0,082	0,0365
Lactuca serriola L.	3,568	2,147	3,620	2,470	1,162	3,240	2,701167
Conyza canadensis(L.) Crom.	0,056	0	0,001	0,026	0,032	0,095	0,035
*Matricariachamomilla*L.	0,480	0,125	0,253	0,218	0,053	0,357	0,247667
*Senecio vulgaris*L.	0,532	0	0	0	0	0	0,088667
Sonchus asper (L.) Hill.	0,167	0,001	0,035	0,014	0,002	0,063	0,047
*Sonchus oleraceus*L.	0,120	0,021	0,027	0,013	0,014	0,054	0,0415
Taraxacum aleppicum	0,083	0	0	0	0	0	0,013833
*Taraxacum officinale*F.H.Wigg.	11,205	9,155	11,547	5,159	12,320	11,159	10,09083
*Xanthiumstrumarium*L.	1,150	1,090	1,140	0,278	1,243	1,040	0,990167
*Xanthium spinosum*L.	0.459	0,026	0	0,002	0,006	0,014	0,0096
Familya: Convolvulaceae							
Convolvulus arvensis L.	2,836	0,130	0,435	1,310	1,435	1,543	0,9706
Convolvulus sepium	1,294	0	0	0	0	0,068	0,0136
Familya:Cruciferae(Brassicaceae)							
Brassica nigra (L.) Koch	0,145	0	0	0	0	0	0,024167

Capsella bursa-pastoris (L.) Medik.	0,492	0,028	0,001	0,013	0,007	0,079	0,103333
C. draba ssp *draba* (L.) Desv.	0,527	0,012	0,012	0,011	0,005	0,061	0,104667
Sinapis arvensis L.	0,321	0,027	0,056	0,003	0,009	0,059	0,079167
Familya: Cuscutaceae							
*Cuscuta campestris*Yuncker	0,814	0	0	0	0,023	0,042	0,1465
Familya: Euphorbiaceae							
Euphorbia helioscopia L.	0,135	0	0	0	0	0	0,0225
Euphorbia orientalis L.	0,782	0,056	0,068	0,003	0,005	0,063	0,162833
Euphorbia prostrata	0,328	0,050	0,031	0,036	0,067	0,094	0,101
Familya: Fabaceae (Leguminosae)							
Medicago minima(L.) Bart.	0,047	0	0,001	0,042	0,002	0,015	0,017833
Medicago rigidula (L.) All..	0,026	0,010	0,002	0	0	0	0,006333
Medicago sativa L.	0,451	0,018	0,043	0,087	0,063	0,086	0,124667
*Medicago truncatula*Gaertn.	0,123	0,027	0	0	0	0	0,025
Melilotus officinalis(L.) Desr.	0,248	0,092	0,002	0,041	0,082	0	0,0775
*Lotus corniculatus*L. var. *corniculatus*	0,136	0	0	0	0	0	0,022667
Prosopis farcta(Banks et Sol.) Mac.	0,074	0,062	0,031	0,083	0,094	0,051	0,065833
*Trifolium campestre*Schreb.	0,569	0,045	0,112	0,072	0,051	0,073	0,153667
*Trifolium fragiferum*L.	0,218	0,041	0,145	0	0	0	0,067333
*Trifolium pratense*L.	0,785	0,379	0,096	0,086	0,085	0,647	0,346333
*Trifolium repens*L.	0,864	0,274	0,210	0,192	0,612	0,711	0,477167
Vicia sativa L.	0,269	0,01	0	0	0,074	0	0,060167

		8					
*Vicia cracca*L.	0,170	0,021	0	0,004	0,005	0,006	0,034333
Familya: Geraniaceae							
Erodium cicutarium(L.) Lâ´Herit.	0,052	0	0	0	0	0	0,008667
*Geranium lucidum*L.	0,081	0	0	0	0	0	0,0135
Familya: Hypericaceae (Guttiferae)							
Hypericum perforatum	0,013	0	0	0	0	0	0,002167
Familya: Labiatae (Lamiaceae)							
Lamium amplexicaule L.	0,025	0	0	0,004	0,053	0,006	0,014667
Mentha longifolia(L.) Hudson	0,081	0	0	0,035	0	0	0,019333
Familya: Malvaceae							
*Malva neglecta*Wallr.	3,475	1,159	2,745	1,596	2,375	2,415	2,294167
*Malva sylvestris*L.	0,852	0,045	0,005	0	0,024	0,007	0,1555
Hibiscus trionum	0,096	0,001	0,032	0	0,012	0,053	0,032333
Familya: Oxalidaceae							
*Oxalis corniculata*L.	0,042	0,005	0	0	0,013	0,004	0,010667
Familya: Papaveraceae							
Fumaria officinalis L.	0,128	0,042	0	0	0	0	0,028333
Papaver dubium	0,463	0,148	0	0	0	0	0,101833
Papaver hybridum	0,319	0,213	0	0	0	0,032	0,094
Papaver rhoeas L.	0,680	0,359	0,437	0,725	0,613	0,836	0,608333
Familya: Plantaginaceae							
Plantago lanceolata L.	0,216	0,041	0,081	0,062	0,034	0,009	0,073833
Plantago majör L.	0,230	0,012	0,001	0	0,061	0,074	0,063

Familya: Polygonaceae							
Polygonum aviculare L.	0,114	0,002	0	0	0	0,043	0,0265
Polygonum convolvulus L.	0,169	0,003	0	0	0,005	0,027	0,034
Polygonu mpersicaria L.	0,142	0,001	0	0	0,004	0,006	0,0255
*Rumex crispus*L.	7,351	3,342	6,154	4,346	5,856	6,534	5,597167
Rumex tuberosus L.	0,130	0,004	0,001	0	0	0,006	0,0235
Familya: Portulacaceae							
*Portulaca oleracea*L.	11,084	9,187	10,184	5,187	8,283	10,184	9,018167
Familya: Primulaceae							
Anagallis arvensis L.	0,100	0	0	0	0	0	0,016667
Familya: Ranunculaceae							
*Adonis flammea*Jacq.	0,125	0,113	0	0,003	0	0	0,040167
*Ranunculus millefolius*L.	0,092	0	0	0	0	0	0,015333
*Ranunculus arvensis*L.	0,065	0	0,001	0,002	0,003	0,005	0,012667
Familya:Rosaceae							
*Rosa montana*Chaix.	0,002	0	0	0	0	0,009	0,001833
Rubus canescens D.C.	0,001	0	0	0	0	0,007	0,001333
Familya: Rubiaceae							
*Galium aparine*L.	0,074	0	0	0,002	0,004	0,003	0,013833
Familya: Scrophulariaceae (Scrophyllaceae)							
*Verbascum lasianthum*Boiss.Ex. Bent.	0,012	0	0	0	0,001	0,007	0,003333
Familya: Solanacea							
*Solanum nigrum*L.	3,482	0,114	2,183	1,148	1,185	2,384	1,749333
Familya: Urticaceae							
Urtica urens L.	0,326	0,001	0,002	0,001	0,002	0,005	0,056167
Familya:Zygophyhllace							

ae							
*Tribulus terrestris*L.	0,518	0,002	0,003	0,002	0,007	0,006	0,089667
Total density	**165,39**	**98,199**	**114,159**	**99,896**	**113,030**	**106,164**	**116,1397**

The maximum frequency occurrence for weed species was; 52.7% for*A. repens*, 52.3% for *T. officinale*, 52.1% for *P. oleracea*, 51.9% for *S. viridis*, 51.6% for *C. dactylon* and 50.8% for *D. sanguinalis*.

General coverage of weeds were 34.2% for *T. officinale*, 33.5% for *P. oleracea*, 32.1% for *A. repens*, 30.4% for *C. dactylon*, 29.8% for *D. sanguinalis* and 27.1% for S. viridis respectively.

In this study, weed species have been identified that with shows great similarities with Tastan and Ercis [4], Sözeri et al., [7], Ulug et al., [17], Kitis, [10], Güncan and Karaca [11], Güncan [2]. But Weed frequency of occurence, general coverage, the type and intensity may varies depending from region to region, ecological characteristics, soil structure, the types of crops grown and altitude.

Recommendations

The soil to be used for ornamental plant growth should be treated with pre-sowing or pre-planting herbicides. The herbicides should not be used only in the area of planting. The spaces between parcells must also be treated. Sowing and planting date must be determined by considering the effective duration of the herbicide used. Other control methods with weeds;

2.1. **Weeds control methods**

Weeds have the capability of germinating earlier compared to ornamental plants. Their riding lawn capacity is quite high as well. The harm of the weeds on ornamental plants can be classified into two types; primary and secondary. Primary harm is that weeds, thanks to their strong root system and the ability to grow fast, use the nutritions (nitrogen, phosphor, potasium, iron zinc, etc.) and water required for the growth of ornamentals and grass. They may even consume 3 to four times more of them compared to landscaping plants. Secondary harm is done by blocking humidity and the light needed by ornamentals because of the fact that weeds' above-soil section grow too fast (vegatatively).

2.2. Cultural control method Protective precautions

In order to prevent weeds from becoming a problem for ornamentals and the lawns, first thing to do is to check the weeds in the area to be used for constitution. To achieve this, the soil in the area must be processed superficially 45 days prior to the planting. 10 days after the process, growing weeds will be observed. Before the weeds bloom, the soil will be processed again, and the seeds that were dormant in the soil thus will germinate. After the tilth, a decrease in the population of weeds will decrease. With the soil processing to be performed during the planting, the amount of the weed existing as reserved in the soil will be lowered more, and the carbohydrate reserves in the storage organs of prenneial plants will also be reduced. Additionally, preparing the seed bed properly is crucial for all the seeds to germinate monotonously and that there would be no space between them. Otherwise, the weed would grow in the empty spaces. Drainage of the land must also be done. during or before the planting, the animal manure to be used must be fermented effectively. If not, the alive seeds in the fertilizer can germinate and spread. For these reasons, the maintenance of the ornamental and the lawns must be performed with great care. Of all these steps, watering, fertilizing and mowing are the most improtant ones.

2.3. Mowing method

One of the most important maintenance processes is mowing. The frequency and the height of mowing varies depending on the area in which the grass is used, the season and the mixture applied. Through this fighting method, tall and prenneial weed species for the ornamentals formed as trees, and bushes for the lawns, are tried to be eliminated by mowing them during the time of blossom.

2.4. Plucking by hand method

It is a fighting method based on plucking the weeds around the ornamentals or in the lawns by using hands and/or certain tools.

2.5. Mechanical control method Soil processing

This method is inexpensive and effective. It is mostly used for the fight against annual weeds.

2.6. Hoeing

In the cultivation of tupil, clove and gladiola, hoeing is crucial. It is generally applied when the weeds at the stage with 8 to 10 leaves.

2.7. Chemical control method

We try to fight against the weeds we could not eliminate through cultural and mechanical methods by chemical (herbicide) fighting. The first step in this method is to treat the soil with tootal herbicide before the seeds of the ornamentals are sewed or the cuts are planted. Sewing and planting time must be determined by considering how long the herbicides remain effective. Attention must be paid to that the herbicides treatment must be performed before sewing and planting. In case of being obligated to use after sewing or planting, it must be remembered that most herbicides show a phytotoxic effect on these plants.

It is a method that is commonly used in the lawns in recent years. The chemicals used in this method are separated into two groups according to the way they affect the weeds as contact and systemic effect. They cause the weeds die by cloking the phosynthesis, nucleic acid or protein synthesis in them. Nearly 1 to 7 days after treatment, the weeds begin to die off gladiola [21].

References

1. Anonymous, (2015). Crop production statistics.www.tuik.gov.tr
2. Güncan, A. (2016). Weeds and control principles. Selcuk University printing office Textbook, Page, 311. Konya. Turkey.
3. Batman, M., (1987). The control of weeds in grass in Ankara'. Ankara University, Institute of Natural and Applied Sciences, Plant Protection Department (Unpublished), Ankara. Turkey.
4. Tastan, B. and Ercis, A. (1989). Investigations on the challenges chemical Weed species and densities in.Ankara Province. KKGA-B-01-H-082 number project. Final report. Ankara Agricultural Struggle Research institute, Ankara. Turkey.
5. Tastan, B. and Ercis, A. (1993). Weed species their abundances and chemical control in lawns in Ankara province. Turkish Journal of Agriculture and Forestry, 17(2), P. 331-337.

6. Grant, D.L., Cooper, R.B. and Webster, H.L. (1990). Isoxaben for Brood-spectrum weed control in warm season Turf. In proceedings, Southern Weed Science Society, 43.nd Annual meeting, 145-153. (Weed Abstr. 1991, 40 (4), 1083).

7. Sözer, S. Maden, S., Yazgan, M.E., Açıksöz, S., Kendir, H., Dılek, E.F. and Karadeniz, N. (1998). A Research on the Weed Control Possibilities During Establishment Stages of Lawn Areas as a Maintenance Tool Under Central Anatolian Conditions. Journal of Agricultural Sciences.1998, 4 (2), P. 8-14.

8. Altınısık, N. and Kadıoğlu, İ. (2003). Study on the determination of weed species and their control measures in the turfgrassareas of Sabiha Gokcen. . University of Gazı Osman Pasa, Journal of Africulture Faculty, 20 (2), P.1-8.

9. Anonymous, (2007). Landscape gardening. www.konya.bel.tr/images/parkbahceler/pdf/bahce_duzenleme_peyzaj.pdf

10. Kitiş, Y.E. (2011). Weed Control in Lawns. Agriculture Journal Magazine, 2, P. 18-22.

11. Güncan, A.and Karaca, M. (2014). Weeds and control principles. Selcuk University Printing office Textbook, Konya, Turkey.

12. Anonymous, (2015a) Lawn area installation and maintenance.www.anadoluparkbahceler.com/pdf/cim-alan-tesisi-ve-bakimi.pdf

13. Odum,E.P. (1971).Fundamentals of Ecology.W.B.Saunders Company, Philadelphia, London,Toronto, 574 pp.

14. Uygur, F.N., Kadıoğlu, İ., and Boz, Ö. (1993). First Herbology Congress of Turkey.3-5 February 1993-Adana, P. 87-91.

15. Güncan, A. (2001). Weeds and Principles, Selçuk University, Agriculture faculty, Textbook., Konya. Turkey.

16. Baytop, A. (1985). Flora Of Turkey and the East Aegean Islands., Vol. 9:724.,

17. Uluğ, E., Kadıoğlu, İ. and Üremiş, İ. (1993). Turkey's weeds and some characteristics, Agriculture and Village Affairs Ministry, Agricultural Struggle Research institute. Publication number: 78, P. 513, Adana. Turkey.

18. Altınayar, G. (1988). Water weeds. T.C. Ministry of Public Works and Settlement, General Directorate of State Hydraulic Works, Directorate of Operation and Maintenance Department, Ankara/Turkey, P.231.

19. Davis, P.H. (1965-1988). Flora of Turkey and East Aegean ıslands. University Press Edinburg. Cilt1-10.

20. Üstüner, T. and Güncan, A. (2002). Researches on weed species which are problem density and importance with association in potato fileds of Niğde province. Turkey herbology journal, Volume;5, number;2, page;30-41.

21. Anonim, (2015b). Licensed Plant Protection Products. Ministry of Agriculture and Rural Affairs, General Directorate of Protection and Control publications, Ankara, Turkey.