

An Update of Weed Flora of Vineyards in Northwestern Turkey

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Abstract— The weed flora of vineyards in northwestern Turkey was determined in a survey carried out in 93 vineyards. Total of 68 species 53 dicotyledonous and 11 monocotyledonous belonging to 32 families were identified in grape growing areas. The majority of weed species were annual species with different vegetation periods. The dominant weed species in the region were *Capsella bursa pastoris*, *Convolvulus arvensis*, *Senecio vulgaris*, *Stellaria media*, *Sorghum halepense*, *Euphorbia helioscopia*. Meanwhile frequent families were *Poaceae*, *Asteraceae*, *Brassicaceae*, *Fabaceae*, *Geraniaceae*, *Lamiaceae*, *Polygonaceae* and *Euphorbiaceae*.

Keywords— Weed flora, vineyards, Thrace Region, Turkey.

I. INTRODUCTION

Weeds compete with grapevines for water, light, and nutrients leading to approximately 37% yield reduction, 68% cane weight loss, and 3% berry weight loss. Weeds growing within the vine rows can also reduce harvest efficiency [1]. Besides some species can reduce vine growth by releasing growth inhibiting allelopathic chemicals [2]. Besides this effects weeds can host of many pathogens and pests including disease vectoring insects and nematodes [3; 4; 5; 6; 7; 8; 9;10;11].

Many factors such as climate changes and seed dispersal throughout years results in significant change of weed flora. The populations of weed may increase as well. On the other hand due to higher rise in population throughout years one weed may become as serious treat to production.

Grapevine is important crop plant in northeastern Thrace Region of Turkey. Tekirdag, Edirne and Kırklareli are main grape growing provinces with total vineyard areas covering a surface of 37.4; 19,5 and 7 ha respectively. and vineyards were mostly established with Semillion, Merlot, Trakya Ilkeren, Okuzgozu, Cardinal, Gamay, Yapıncak, Cinsault, Italia, Erenkoy Beyazı, Alphonse L. and Cabernet Sauvignon grape varieties grafted mostly on Kober 5BB rootstock.

Weed infestations are problematic in the region especially in newly established vineyards affecting growth of young

rootstocks. In addition many weeds such as *Datura stramonium* and *Convolvulus arvensis* were found to host common grapevine diseases including *Grapevine Fanleaf Virus* and *Rhizobium vitis*. Root damage of Root Knot Nematodes (*Meloidogyne* spp.) were also observed in *Purtulaca oleraceae* and some other weeds.

Weed management in the region mostly relies on mechanical and chemical control. The application and selection of control methods depends on knowledge of species (broad leaved, narrow leaved) life cycles (seed germination period) and growth habitats (annual, biannual, perannual). Meanwhile effective chemical weed control can only be achieved by correct timing the application to the right target while mechanism of action of herbicides varies among species.

The aim of this study was to determine current weed species coinfecting wine-growing areas in northeastern Thrace Region of Turkey. The research area covered more than 70.000 ha vineyard area.

II. MATERIAL AND METHOD

To determine weed species field observations were carried out in randomly selected 93 vineyards varying in size of 5 to 25 da.

Species was recorded in each vineyard and density was evaluated by counting plants or shoots of weeds at 1 m² frame. Frequency of occurrence (f%) of species was calculated as the number of vineyards where the species was recorded divided by the total number of vineyards visited.

Furthermore herbarium of each plant were prepared by slow drying in air flow incubator at 30°C and were deposited in Tekirdag Viticulture Research Institute. Plants were identified by using various keys [12]

III. RESULTS

Based on our taxonomic identifications weed flora of Thrace Region was mostly composed of dicotyledons with % 69. The rest were monocotyledons with 31%. A total of 68 species of weeds belonging to 31 families were recorded (Table 1; figs.1&2&3&4&5&6). Results of our

taxonomic identification of families and species are given in Table 2 in alphabetical order.

Table.1: The list of families, the number of species and relative frequencies (%)

Family	No. of species	% f of total
Poaceae	12	17.6
Asteraceae	12	17.6
Fabaceae	5	7.35
Brassicaceae	5	7.35
Geraniaceae	3	4.41
Lamiaceae	2	2.94
Apiaceae	2	2.94
Euphorbiaceae	2	2.94
Malvaceae	2	2.94
Polygonaceae	2	2.94
Solanaceae	2	2.94
Fumariaceae	1	1.47
Convolvulaceae	1	1.47
Amaranthaceae	1	1.47
Violaceae	1	1.47
Caryophyllaceae	1	1.47
Chenopodiaceae	1	1.47
Cuscutaceae	1	1.47
Scrophulariaceae	1	1.47
Cucurbitaceae	1	1.47
Cyperaceae	1	1.47
Hyacinthaceae	1	1.47
Papaveraceae	1	1.47
Plantaginaceae	1	1.47
Apocynaceae	1	1.47
Urticaceae	1	1.47
Primulaceae	1	1.47
Rubiaceae	1	1.47
Portulacaceae	1	1.47
Aristolochia	1	1.47
Zygophyllaceae	1	1.47
Boraginaceae	1	1.47
Total	68	100



Fig. 1: *Centaurea solstitialis* from Asteraceae



Fig. 2: *Datura stramonium* from Solanaceae

Table.2: List of families and species of weeds identified in vineyards

FAMILY	SPECIES
Amaranthaceae	<i>Amaranthus retroflexus</i> L.
Apiaceae	<i>Daucus sativa</i> L.
	<i>Conium maculatum</i> L.
Apocynaceae	<i>Cynanchum acutum</i> L.
Aristolochia	<i>Aristolochia clematitis</i> L.
Asteraceae	<i>Senecio vulgaris</i> L.
	<i>Matricaria chamomilla</i> L.
	<i>Xanthium strumarium</i> L.
	<i>Xanthium spinosum</i> L.
	<i>Cirsium arvense</i> L.
	<i>Lactuca serriola</i> L.
	<i>Taraxacum officinale</i> L.
	<i>Silybum marianum</i> L.
	<i>Sisymbrium altissimum</i> L.
	<i>Sonchus arvensis</i> L.
	<i>Conyza canadensis</i> L.
	<i>Tragopogon dubius</i> L.
Boraginaceae	<i>Heliotropium purpureum</i> L.
Brassicaceae	<i>Capsella-bursa pastoris</i> L.
	<i>Raphanus raphanistrum</i> L.
	<i>Lepidium draba</i> L.
	<i>Sinapis arvensis</i> L.
	<i>Thlaspi arvensis</i> L.
Caryophyllaceae	<i>Stellaria media</i> L.
Chenopodiaceae	<i>Chenopodium album</i> L.
Convolvulaceae	<i>Convolvulus arvensis</i> L.
Cucurbitaceae	<i>Ecballium elaterium</i> L.
Cuscutaceae	<i>Cuscuta</i> spp.
Cyperaceae	<i>Cyperus rotundus</i> L.
Euphorbiaceae	<i>Euphorbia helioscopia</i> L.
	<i>Euphorbia villosa</i> L.
Lamiaceae	<i>Lamium amplexicaule</i> L.
	<i>Lamium purpureum</i> L.
Fabaceae	<i>Vicia sativa</i> L.
	<i>Trifolium repens</i> L.
	<i>Vicia cracca</i> L.
	<i>Medicago sativa</i> L.
	<i>Medicago polymorpha</i> L.
Fumariaceae	<i>Fumaria officinalis</i> L.
Geraniaceae	<i>Geranium dissectum</i> L.
	<i>Geranium molle</i> L.
	<i>Erodium cicutarium</i> L.
Hyacinthaceae	<i>Muscari armeniacum</i> L.

Fig. 3: *Papaver rhoeas* infested vineyard

Fig.4: Heavy infested vineyard in Tekirdag

Table.2: List of families and species of weeds identified in vineyards

FAMILY	SPECIES
Malvaceae	Malva sylvestris L.
	Malva neglecta L.
Papaveraceae	Papaver rhoeas L.
Plantaginaceae	Plantago lanceolata L.
Poaceae	Bromus tectorum L.
	Agropyron repens L.
	Alopecurus myosuroides L.
	Poa annua L.
	Sorghum halepense L.
	Echinochloa crus-galli
	Setaria verticillata L.
	Cynodon dactylon L.
	Hordeum murinum L.
	Avena fatua L.
	Lolium perenne L.
Polygonaceae	Rumex crispus L.
	Polygonum aviculare L.
Portulacaceae	Portulaca oleaceae L.
Primulaceae	Anagallis arvensis L.
Rubiaceae	Galium aparine L.
Solanaceae	Solanum nigrum L.
	Datura stramonium L.
Scrophulariaceae	Veronica hederifolia L.
Violaceae	Viola arvensis L.
Urticaceae	Urtica urens L.
Zygophyllaceae	Tribulus terrestris L.



Fig. 5: *Heliotropium purpureum* from Boraginaceae



Fig. 6: *Cuscuta* spp. from Cuscutaceae

The life forms of weeds in vineyards mostly composed of therophytes (71 %), followed by hemicryptophytes (22 %) and geophytes (7%) (Fig. 7).

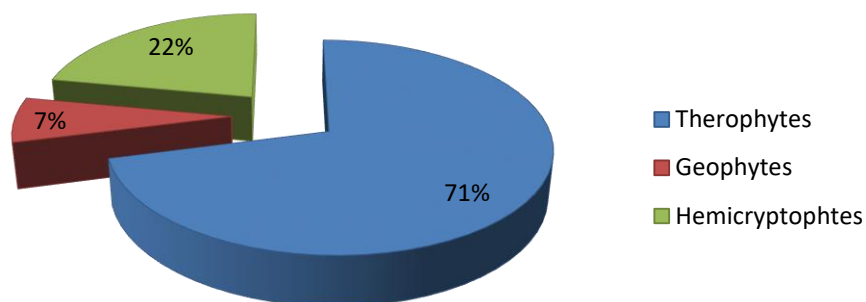


Fig. 7: Life forms of weed species (percentage %)

The species *Capsella-bursa pastoris* L., *Convolvulus arvensis* L., *Sorghum halepense* L., *Senecio vulgaris* L., *Lamium amplexicaule* L., *Papaver rhoeas* L., *Euphorbia helioscopia* L., *Stellaria media* L., *Geranium dissectum* L. and *Agropyron repens* L. were the most frequent weeds in Thrace Region (Fig. 8.)

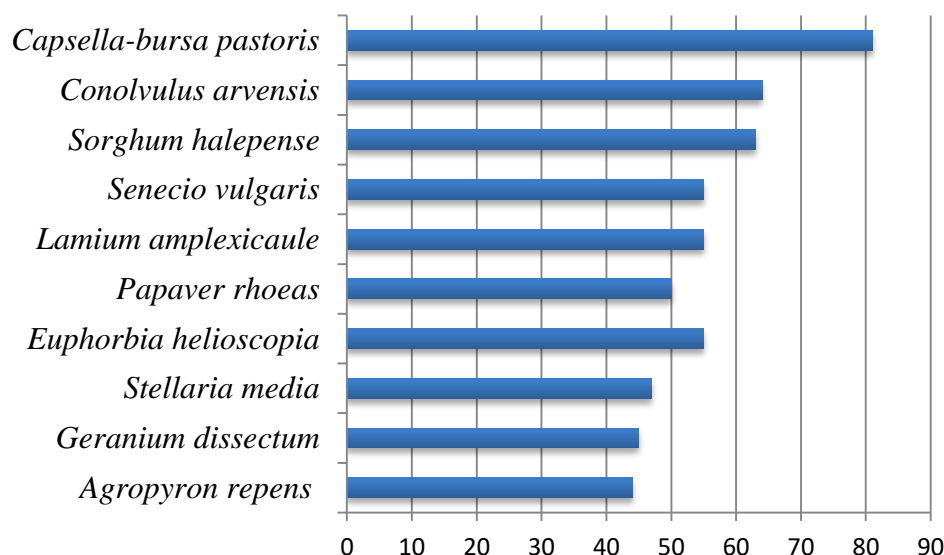


Fig.8: Occurance rate of some weed species in vineyards

The highest number of plants on raw were counted as 20 for *Hordeum vulgare* L., 20 for *Euphorbia helioscopia* L., 33 for *Agropyron repens* L., 25 for *Chenopodium album* L., 26 for *Lactuca serriola* L.

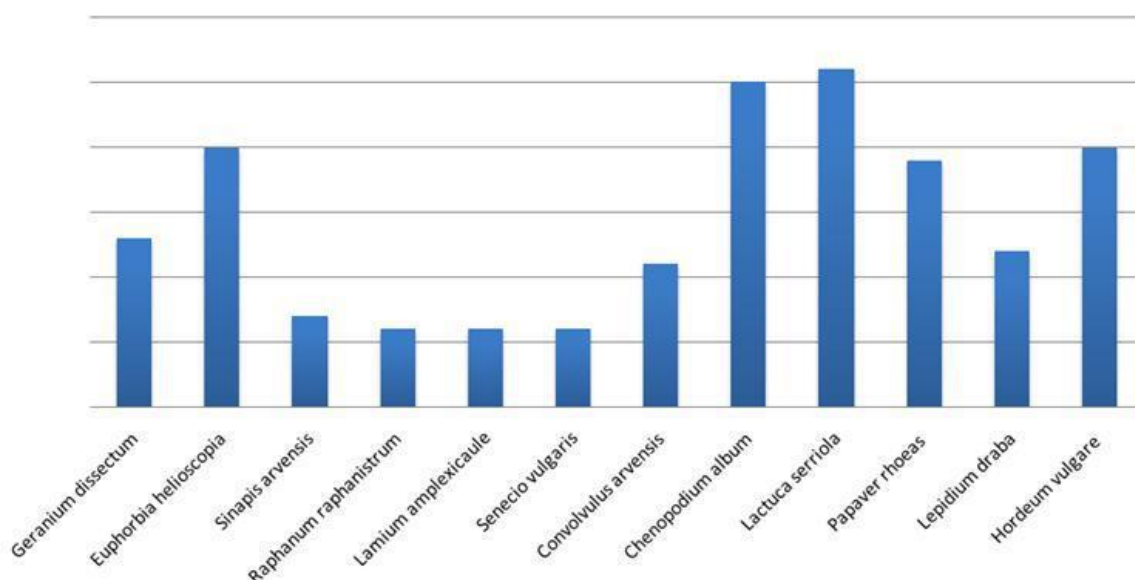


Fig.9: Relative density of some weed species in vineyards

IV. DISCUSSION

The weed flora of Thrace Region constitutes of 68 species from 31 families mostly from Poaceae, Asteraceae, Fabaceae and Brassicaceae. Similar results were obtained in a study carried out by researchers in western part of Turkey [13] Total of 36 weed species belonging to Poaceae, Brassicaceae, Polygonaceae and Amaranthaceae, Asclepiadaceae, Caryophyllaceae, Chenopodiaceae, Convolvulaceae, Cyperaceae, Fabaceae, Fumariaceae, Geraniaceae, Malvaceae, Papaveraceae, Poaceae, Portulacaceae, Solanaceae, Urticaceae, Zygophyllaceae families were identified in Aegean Region.

Meanwhile having similar climate conditions in neighbour country Iran 51 species (dicotyledonous 43 species) belonging to 22 families were reported. Poacea was the dominant family with a relative frequency of 17.4 %, and was followed by Fabaceae. [14]

Among all weed species in survey area *Capsella-bursa pastoris* L., *Convolvulus arvensis* L., *Sorghum halepense* L.were dominant species while *Datura stramonium* observed in a few locations. Besides some tall weeds were problematic to newly planted young rootstocks which has smaller sizes.

Dodder (*Cuscuta* spp.) are parasitic on several plants and is reported as virus vector. Grapevine Leafroll Associated

Virus-7 (GLRaV-7) is transmitted from one host to another by *C. reflexa* and *C. europea* [15]. *Cuscuta* spp. which only identified in 2 vineyards were not common in vineyards.

Recent flora of vineyards in the north eastern Turkey were not known. Due to agricultural practices many weed species may disperse to new area. On the other hand removed and newly established vineyards can alter the existing flora.

V. CONCLUSIONS

In this study we tried to evaluate the current weed status of local vineyards as well as the density of most important species, and distributions. Several perennal and annual weed species were identified in vineyards of north eastern part of Turkey. Most of the weeds were dicotyledonous. *Sorghum halepense* was a serious treat to young vinegrowth that needs to be controlled chemically or mechanically.

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