



## Distribution of Orchid species in urban and meadow areas of Bartın city (Turkey)

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### Abstract

In this research, taxa of species and subspecies at taxonomic levels, phytogeographical areas, risk categories, population status, threat status, distribution and new square records belonging to *Orchidaceae* family which is spread to the streets and grasslands of Bartın are defined. As a result of this study, 9 taxa of species and subspecies belonging to 3 types of *Orchidaceae* family are identified. 5 of these taxa are Mediterranean elements, 3 are European-Siberian elements and phytogeographical areas of 3 taxa are not defined. In addition, taxon of *Ophrys sphegodes* subsp. *caucasica* is a new record for The Western Black Sea Subregion. In this research, the pressure of collection of orchid tubers for production of sahlelep in the area and the importance of protection recommendations are emphasized, and it is attempted to ensure that unconscious collection and anthropogenic stress factors in the area are considered. And also it is determined that there is no protection for orchids in this area.

**Key words:** *Orchidaceae*, phytogeographical area, sahlelep, new record, urban

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## Bartın şehri kentsel ve çayırılık alanların Orkide tür dağılışı durumlarının belirlenmesi

### Özet

Bu araştırmada Bartın ili kent sokakları ve çayırılık alanlarda yayılışı gösteren *Orchidaceae* familyasına ait taksonomik seviyelerde tür ve tür altı taksonları, fitocoğrafik bölgeleri, risk kategorileri, populasyon durumları, tehdit durumları, yayılışları ve yeni kare kayıtları belirlenmiştir. Çalışma sonucunda *Orchidaceae* familyasının 3cinsine ait 9 tür ve tür altı takson belirlenmiştir. Bu taksonlardan 5 Akdeniz elementi, 3 takson Avrupa-Sibiryaya elementi ve 3 tane taksonun ise fitocoğrafik bölgesi belirli değildir. Ayrıca *Ophrys sphegodes* subsp. *caucasica* taksonu bölge için yeni kayıt niteliğindedir. Bu araştırma ile alanda Orkidelerin yumrularının sahlelep üretimi için toplanma baskıları, koruma önerilerinin önemi vurgulanmış olup, alanda bilinçsiz toplanmanın ve antropojenik baskıların dikkate alınması sağlanmaya çalışılmıştır.

**Anahtar kelimeler:** *Orchidaceae*, fitocoğrafik bölge, sahlelep, yeni kayıt, kent

### 1. Introduction

*Orchidaceae* is a cosmopolitan family living in different habitats and spreaded almost everywhere in the world. Orchids are plants, 70% of which are epiphytes, 25% survive in the soil and 5% survive under the soil, on the rocks, on decaying plants, etc. (Renz and Taubenheim, 1984). Sevgi et al (2012) reported that *Orchidaceae* family comprises almost 19,500 species spreaded all around the world. Turkey is a rich country of terrestrial orchids (Kreutz, 2000; Kreutz, 2009).

The reproduction of orchids outside their natural environment is still not easy. Studies carried out on orchids available in the world have not produced practicable results. Most of the orchids' roots are in a symbiotic, mycorrhizal relationship with mushrooms. Mycorrhiza increases the uptake of inorganic and organic compounds for orchids. Generative reproduction of plants needs specific mycorrhizal mushroom. In most sahlelep types, due to the small size of

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seeds and lack of endosperms, external nutrition is needed also in the early stages of germination. Nutrition can be provided by infection of a mycorrhizal mushroom found in nature. First, the seed sets in an appropriate place, takes water and shoots forth. Then after several divisions, protocorm structures, and to help them set, groups of root hairs emerge. It survives in this manner for two years and then with the effect of a suitable mycorrhizal mushroom, it puts forth the first leaf from the apical meristem and begins to develop (Sezik, 1984).

Furthermore, bacteria in the mycorrhizosphere are effective on increasing the uptake of nutrients and development of the plant, and ensure the protection of the plant against pathogens. Thanks to these relations, the plant can remain dormant for a couple of years. Besides, the number of orchid species is rapidly and consistently decreasing because of their low dispersion rate and collection from their habitat. Careless collection of these species causes serious genetic and ecologic erosions and many species are listed in the category of extinction danger. (Bektaş et al., 2013).

The nutrients stored in the main orchid tubers enable the formation of roots and first leaves. New tuber generation is provided while maintaining the leaf growth as a result of undergoing re-infection of mature plants with mycorrhiza (Rasmussen, 1995). That is why the new plant to grow the year after is also collected by inattentive uprooting of the orchids.

In addition to being a potential indicator for climate change, orchids can play a role in defining the healthy functioning mechanisms of ecosystems by identifying their sensitivity to environmental changes (Sydes, 1994).

Salep tubers are obtained from 85% of orchid species (Sezik, 2002). Tamer et al. (2006) report that there are 90 orchid species belonging to 24 genera used in salep production in Turkey, (Akgul, 1993; Gemici et al. 2004; Sezik, 1967; Sezik, 1984), while Sandal (2009) reports that there are 30 orchid species belonging to 9 genera (Sezik and Özer, 1983; Sezik and Baykal, 1991).

When rare plants such as orchids are protected, specific populations of the species are protected in their natural habitats together with their genetic variations, as orchids are the most evolved ones among all anthophyta (Boesse, 2014). Furthermore, they can develop in certain ecosystems under optimum conditions they require and in specific areas. If orchids are present in an ecosystem, it is an indication that the ecosystem is functioning well. When ecosystems are under stress, orchids are among the first species to die out. Orchids provide an early warning system about the deterioration of the health of an ecosystem, allowing protective actions to be taken without any delay. Epiphytics, in particular, are quite good at this. Among the terrestrial species, on the other hand, *Platanthera blephariglottis* orchid in Canada is an indicator species for the healthy environmental conditions of *Sphagnum* swamp (Laroche et al., 2012).

Orchids that are used for many purposes are in danger in most parts of the world. In some of these species, they are also collected from nature for utilization purposes. In some parts of the world, e.g. in Brazil, orchids are destroyed in nature for this purpose. Within the scope of this study it is planned to identify the status of orchid species available especially on the streets and in small grassland areas of Bartın.

## 2. Materials and methods

Habitat details, population status and threat factors of orchid species, which are identified in field researches carried out in 2012-2014 in the research area of Bartın - Orduyeri neighbourhood and surroundings, are defined. The species of orchids collected and plant samples are identified according to Davis's book titled "Flora of Turkey", according Kreutz (2000) and Adil Güner's book. The research area is located in A4 square according to the grid system in Davis (1968- 1988)'s "Flora of Turkey". The new record samples diagnosed are placed at the Herbarium of Ondokuz Mayıs University, Faculty of Science and Letters (OMUB).

## 3. Results

As a result of the research, 9 species and subspecies taxa of 3 genus belonging to the *Orchidaceae* family are identified in and around Orduyeri neighbourhood of Bartın Province. According to the phytogeographical distribution of the taxa defined in the study area, it is identified that 5 taxa belong to the Mediterranean, 3 taxa have unknown phytogeographical region and 1 taxon belongs to the European Siberian phytogeographic region (Güner, 2012). Within the scope of this study, the author names, Turkish local names, the number of members in the population, destruction elements, CITES status (IUCN International Union for Conservation of Nature), risk categories and phytogeographic regions of the species are shown in Table 1. Orchid species in the region are located in oak areas, particularly zones facing south and north west (Davis, 1965-1988; Ekim et al., 2000; IUCN 2001).

6 taxa of species and subspecies of the genus *Orchis* are defined in the study area. All of these taxa are stated among the endangered species list of CITES (The Convention on International Trade in Endangered Species of Wild Fauna and Flora). Their conditions are not specified according to the IUCN Red List categories. The population of *Orchis tridentata* Scop. taxon in the region consists of approximately 20-30 members and they are spread all over Turkey (Figure 1). The dispersion of *Orchis simia* Lam. taxon in Turkey involves Marmara Region, Black Sea Region, Aegean Region, Upper Euphrates and Hakkari Subregions, Mediterranean Region and Tigris Subregion. The population in the area consists of about 5 members (Figure 2). The dispersion of *Orchis purpurea* Huds. subsp. *purpurea* taxon in Turkey covers Marmara Region, Western and Central Black Sea Subregions, Aegean Region, Central Anatolia, and

Table 1. The local name of species (LN), the number of individuals in population (NIP), the damage factors (DF), the current state of species in the CITES list (CS), the risk category of species (RC), the phytogeographic region (PR) and the suggested risk category (SRC) of studied orchid taxa. \*The damage factors :1- Urbanization; 2- Anthropogenic factors; 3-Grazing; 4- Trampling; 5- Agricultural activities; 6- New farmlands

Name of Species	LN	NIP	DF						CS	RC	PR	SRC
			1	2	3	4	5	6				
<i>Orchis tridentate</i> Scop.	Katranalacası	20-30	×	×	×	×	×	×	+	-	Mediterranean	EN
<i>Orchis simia</i> Lam.	Salep püskülü	5	×	×	×	×			+	-	Mediterranean	EN
<i>Orchis purpurea</i> Huds. subsp. <i>purpurea</i>	Hasancık	12	×	×	×	×			+	-	Euro-Siberian	EN
<i>Orchis provincialis</i> Balb. ex Lam.& DC.	Katrancık	7	×	×	×				+	-	Mediterranean	EN
<i>Orchis coriophora</i> L. subsp. <i>coriophora</i>	Pirinç çiçeği	10	×	×	×	×			+	-	Unknown	EN
<i>Orchis laxiflora</i> subsp. <i>Laxiflora</i> Lam.	Salep sümbülü	15-20	×	×	×	×			+	-	Mediterranean	EN
<i>Serapias vomeracea</i> (Burm.fil.) Briq. subsp. <i>orientalis</i>	Sağırkulağı	30	×		×	×			+	-	Mediterranean	EN
<i>Ophrys oestifera</i> M. Bieb. subsp. <i>oestifera</i>	Sinek salebi	20	×	×	×	×	×		-	-	Unknown	EN
<i>Ophrys sphegodes</i> Mill. subsp. <i>caucasica</i> (Woronow ex Grossheim) Soo	Kafablamutu	30	×	×	×	×	×		-	-	Unknown	EN

Mediterranean Region. The population of the taxon consists of almost 12 members (Figure 3). *Orchis provincialis* Balb. ex Lam.& DC. taxon spreads to Southern Marmara, Black Sea Coast, Aegean Region, Upper Sakarya and Antalya Subregions in Turkey. The population of the taxon consists of about 7 members (Figure 4). The population of *Orchis coriophora* L. subsp. *coriophora* taxon consists of about 10 members and spreads all over Turkey. The population of *Orchis laxiflora* subsp. *laxiflora* Lam. taxon consists of 15-20 members and it spreads to Marmara, Black Sea and Aegean Regions, Middle Kızılırmak, Upper Euphrates, Mediterranean Region and Tigris Subregion (Figure 5). 1 taxon at the level of species is identified for *Serapias* genus. The taxon is included in the CITES list, but its status is not specified according to the IUCN Red List categories. The population of *Serapias vomeracea* (Burm.fil.) Briq. subsp. *orientalis* taxon consists of about 30 members and it spreads to the Main Aegean and Antalya Subregions in Turkey (Figure 6). 2 subspecies taxa are defined for *Ophrys* genus. The taxa are not listed in the CITES. Their status are also not specified according to the IUCN Red List categories. The population of *Ophrys oestifera* M. Bieb. subsp. *oestifera* taxon is about 20 members and spreads to Marmara Region, Black Sea and Aegean Regions, Upper Kızılırmak, Eastern Anatolia and Mediterranean Regions in Turkey (Figure 7). The population of *Ophrys sphegodes* Mill. subsp. *caucasica* (Woronow ex Grossheim) Soo taxon is about 30 members. It spreads to Central and Eastern Black Sea Subregions in Turkey and was defined for the first time by us in the Western Black Sea Subregion and the species is a new record for the region (Figure 8).



Figure 1. *Orchis tridentata*.



Figure 2. *Orchis simia*.



Figure 3. *Orchis purpurea* subsp. *purpurea*.



Figure 4. *Orchis provincialis*.

Figure 5. *Orchis laxiflora* subsp. *laxiflora*.Figure 6. *Serapias vomeracea* subsp. *orientalis*.Figure 7. *Ophrys oestifera* subsp. *oestifera*.  
Herbarium No: 8063)Figure 8. *Ophrys sphegodes* subsp. *caucasica* (OMUB

#### 4. Conclusions

Stress factors such as increasing urbanization in the region, collection of species for commercial purposes, agricultural activities, forestry, grazing and trampling are threatening the orchids. Destruction of natural and close to natural ecosystems can be avoided by preserving biological diversity and ecologies with nature protection activities in the cities (Koyuncu et al., 2011). Although the study area is in the Euro-Siberian Flora region, most of the taxa are Mediterranean elements. The Mediterranean climate impact creates microclimate zones in Bartın and surrounding areas. In these microhabitats most of the orchid species are located at pseudomaquis and oak areas, particularly in the zones facing the South and North-West. Therefore, habitat diversities contribute to the increase in the diversity of the species in the area.

Flora and vegetation researches done in our country is reported to be around 5000 (Demiriz, 1993). However, these researches are mostly carried out in natural areas. Krause (1937) and Göktürk and Sümbül (1997)'s studies are rare examples of the few flora studies performed in urban areas (Yılmaz, 2004). Within the scope of this study, it is attempted to emphasize that orchids in urban areas are facing human stress even at the neighbourhood level. With this

study the protection plannings to be conducted in the area should be prioritized, and action plans and risk categories of identified orchid species should be revised. In order to prevent commercial collection, on the other hand, in-situ and ex-situ protection activities should be performed under the leadership of authorized bodies and agencies. It is so important to determined the threatened risk categories of these orchids species to protect these taxa, immediately. In addition, preserving biological diversity not only concerns the types of species and ecosystems but also the conservation of the natural development and ecological processes forming the entire life (such as the food system, and the interaction and distribution between species) (Spies and Franklin, 1988).

Almost 5% of the orchid taxa in our country are found in the streets of Bartın. This can be explained by the general vegetation structure and different climate and habitat diversities of the area. Such valuable and sensitive species found in urban areas must be moved without delay to similar natural protection sites and areas far from human activities. As the orchid species are indicator taxa for the identification of ecosystem sensitivities, the protection of these sensitive species will enable us to obtain more detailed information about the functioning mechanisms and dynamics of ecosystems.

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