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The ecological and floristic properties of *Artemisia santonicum* L. community in the southeast of central anatolia region (Ereğli-Karaman) of Turkey

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Key words: *Artemisia* community, Alkaline soils, Central Anatolia, Endemic Plant, Turkey.

Abstract

In this study, the *Artemisia santonicum* L.(facultative halophyte plant) community and soil peculiarity of Ereğli-Karaman had been analyzed based on the minimal area approach. Of the samples collected from the research area between the years 1995-1996 and 2012-2013, 100 plants were evaluated, and uncommon and endemic taxa were identified. The number of endemic taxa within the study area is 15. The study area is located in the southeast of Central Anatolia covered with alkaline soils. The *Artemisia santonicum* community is under the control of very cold and arid Mediterranean climate. Relations between the ecologial properties (such as soil properties and climate) and plant cover are examined. Based on the results of floral biodiversity and ecological properties were discussed. Results showed that, on the distribution of vegetation are important factors, respectively; climatic, edaphic, anthropogenic. In terms of biodiversity conservation of these areas it is very important furthermore the protection of these areas showed that very necessary.

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Introduction

Ereğli-Karaman located within the boundaries of Central Anatolia region. This study was carried out for the ecologic investigation of the *Artemisia santonicum* L. (facultative halophyte plant) community of the area. Central Anatolia has an important place in the phytogeographical region in terms of its climatic, soil and geographical characteristics. This region has been included into Irano-Turanian phytogeographical region by Zohary and named as "Central Anatolian" province (Zohary 1973). Irano-Turanian phytogeographical region includes the central, east and southeast Anatolian geographical divisions of Turkey. The region is characterized by a semi-arid lower cold Mediterranean type of climate with very cold winters and hot summers. The area of saline and degraded soils in the region is increasing. The factors responsible for this are over-irrigation practices, and salt accumulation due to evaporation (Abdelly *et al.* 2008). The first vegetation studies were carried out by the foreign experts. Some of the most important ones among them are the studies of Handel-Mazetti (1909) in north Anatolia, Czeczott (1938) in north-west Anatolia, Krause (1940) in west and middle Anatolia and Schwarz (1936) in west Anatolia. The studies of the local researchers have started in the second half of the 20th century and continued in an increasing manner up to now. Most of these studies concentrated on the synecologic and syntaxonomic analysis of the step vegetation of Turkey. In Central Anatolia, some of these studies were carried out by Birand (1947, 1970), Çetik *et al.* (1981, 1985), Yurdakulol (1974), Akman *et al.* (1984, 1985, 1996), Ocakverdi *et al.* (1991), Tatlı *et al.* (1994) and Geven *et al.* (2009, 2010). In this study, the *Artemisia* community and ecological characteristics of Ereğli-Karaman district, which is an old settlement on the Central Anatolia Region of Turkey, is presented. Endemic, rare, and endangered plant species and their threatened categories are listed in the Table.

The negative effects of uncontrolled grazing, excessive irrigation, agricultural activities, fires, unplanned urbanisation and industrialisation which were made without ecological consideration are also pointed out. It is hoped that this study will contribute to knowledge of steppe flora in Turkey and be useful as a guide for future research.

Materials and methods

Sampling and analysis of the plants

In this study, the materials were collected from the area between 1995-1996 and 2012-2013. The specimens were prepared according to established herbarium techniques. The Flora of Turkey (Davis, 1965-1984, 1988, Güner *et al.* 2000) and other floras (Townsend and Guest, 1966-1980, Tutin and Heywood, 1964-1981) were utilized in the identification of the specimens.

The phytogeographical region is given together with the species endemism and the life form of all taxa. Threatened categories are evaluated for endemic taxa according to IUCN risk categories (Ekim *et al.*, 2000, Anonymous, 2001) All of the plant specimens were kept at the herbarium of Gazi University (GAZI).

Sampling Method

The vegetation analysis were performed according to traditional Braun-Blanquet's "floristic unit system" (1932) and the unified abundance-cover values and sociability were determined.

The widths of the relevés were determined by according to "minimal area" method (Akman *et al.* 2001) which was 100 m² in *Artemisia santonicum* L. community. Also the addresses of six relevés were given for the definition of the community.

Brief description of the study area

The region is located Konya/Karaman province in the southeast of Central Anatolia region and C4-C5 square according to Davis' square system (1965).

The region is bounded by Konya province in the north and Karaman province in the south (Fig. 1).

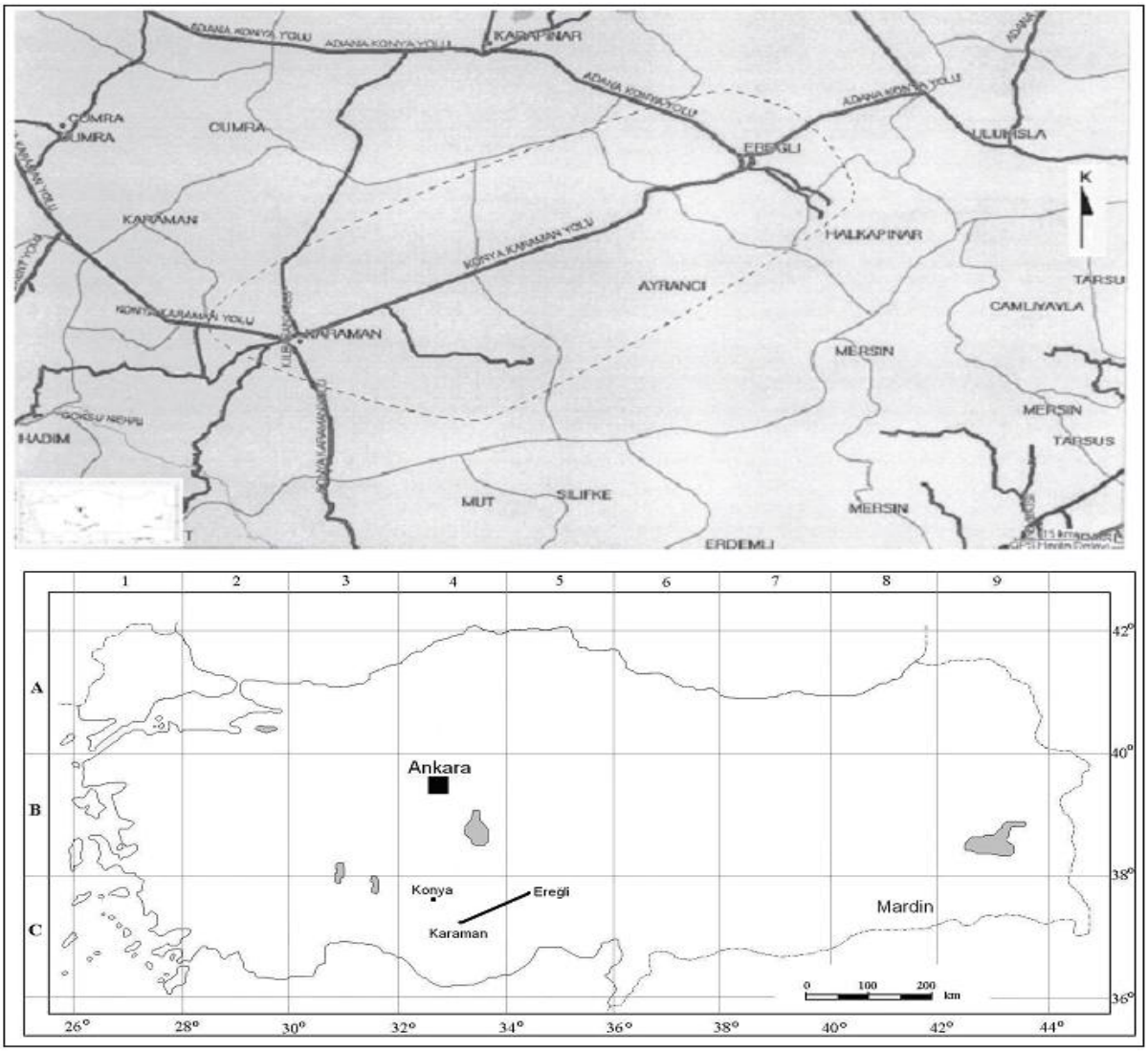

Fig. 1. Map of the study area.

The elevations in the area range between 1000-1160 m. The soil data related to Ereğli-Karaman were taken from "Konya İli Arazi Varlığı" prepared by Turkish Soil Works (Anonymous, 1992). According to this report the region is dominated by "lime brown" soil. The other types of soils in the region are "alluvial" and "kolluvial". Soil samples were taken at depths of 10-30 cm at six study spots. Physical and chemical properties of soil samples were analysed by the Soil and Fertilizer Research Institute. (Table 1a-1b). The climatic data of the study area were obtained from Ereğli and Karaman meteorological stations Anonymous (1974, 1984). The Summer rainfall (PE) of Ereğli and Karaman province are 33,5-28,6 mm. These values indicate that the working site is dominated by "semi-arid lower cold Mediterranean" climate (Table 2). The rainfall type of Ereğli-Karaman meteorological stations is SpWAS or "Eastern Mediterranean Rainfall II. Subtype" (Akman 1982). Ombrothermic diagrams were drawn (Fig. 2, Fig. 3).

Results

The flora of study area is consist of 100 species and subspecies or variety. All plant species are belonging to *Artemisia santonicum* L community (Table 3). The physiognomy of the community is dominated by *Artemisia santonicum* L., *Thymus sipyleus* Boiss. subsp. *rosulans* (Borbas) Jalas, *Bromus tectorum* L., *Poa bulbosa* L., *Cousiana iconica* Hub.-Mor., *Noaea mucronata* (Forssk.) Aschers.&Sch. subsp.

mucronata, *Nepeta congesta* Fisch.&Meyer var. *congesta*, *Peganum harmala* L., *Acantholimon caryophyllaceum* Boiss. subsp. *caryophyllaceum*, *Stipa holosericea* Trin. and *Bromus tomentellus* Boiss. *Artemisia santonicum* community extends along Ereğli-Karaman highway (Fig. 4). The climate has a marked effection the development of the community.

Table 1a. Soil chemical analaysis of the representative samples collected from the study area.

Qua. No	Depth (cm)	EC dS/m	Water saturation %	pH	Org. Matter%	Soluable ions in saturation extract								$CaCo_3$ %
						Kations(me/lt)				Anions (me/lt)				
						Ca^{++}	Mg^{++}	Na^{+}	K^{+}	$CO_3^{=}$	HCO_3^{-}	Cl^{-}	SO_4^{-}	
1	10–30	0.78	40,33	8,58	1,77	4,73	1.58	0.65	0,67	0.83	2.29	1.75	2.76	30,1
2	10–30	0.75	41,42	8,64	1,47	6,30	1.46	0.65	0,21	0.83	1.82	1.50	4.47	28,6
3	10–30	0.63	36,37	8,64	1,35	4,20	2.11	0.56	0,24	0.83	1.40	2.00	2.87	30,8
4	10–30	0.53	49,61	8,58	1,44	4,20	1.62	0.24	0,21	0.83	1.66	1.25	2.52	17,5
5	10–30	0.81	53,80	8,60	2,10	5,25	1.54	0.90	0,32	0.73	1.77	3.75	1.76	18,6
6	10–30	0.58	48,52	8,62	2,31	5,25	1.06	0.36	0,28	0.83	2.03	1.25	2.84	22,6

Table 1b. Soil physical analaysis of the representative samples collected from the study area.

Quadrat No	Depth (cm)	Sand	Silty	Clay	Texture
1	10–30	46.6	30.6	22.8	L
2	10–30	41.2	34.0	24.8	L
3	10–30	34.5	37.9	27.6	CL
4	10–30	18.6	38.6	42.8	C
5	10–30	7.5	48.3	42.2	SİL
6	10–30	16.0	44.3	39.7	SİCL

Table 2. Climatic synthesis of Ereğli, Karaman meteorological stations.

Station	Altitude (m)	P (mm)	M (°C)	m (°C)	Q	PE	S	Bioclimatic Type	Precipitation Regime
Ereğli	1044	306,5	30,1	-3,9	31,5	33,3	1,1	semi-arid lower cold	Sp.W.A.S.
Karaman	1025	347,3	30,3	-3,1	36,2	28,6	0, 9	semi-arid lower cold	Sp.W.A.S

P (mm): Mean annual precipitation, M (°C): Mean maximum for the hottest month,m (°C): Mean minimum for the coldest month, Q: Emberger's pluviometric quotient (2000. P / M^2- m^2), PE: Summer rainfall, S: Emberger's index of xericity (S=PE / M),
W: Winter, Sp: Spring, S: Summer, A: Autumn.

The community develops at 1000-1160 m. alkali soil and southeast slopes with inclination 1°-4° . The general coverage varies between 75 to 95%. The life-form spectrum is consist of 43% Hemicryptophytes, 40% Therophytes, 14% Chamephytes and 2% Geophytes, respectively (Fig. 5). The life forms of the taxa were determined according to Raunkiaer (1934) and Ellenberg and Mueller-Dombois (1967). While 16% of these plants belong to Euro-Siberian, 18% Mediterranean floristic region, 47% Irano-Turanian region, 28% Cosmopolitan and %2 unknown (Fig. 6). The chorotype of the taxa were determined according to Zohary (1973), Davis (1965-1988), Donner (1990), Güner *et al.* (2000). The number of endemic and

threatened taxa within the study area is 15 (Table 4). The dominance of the Irano-Turanian elements is expected because the study area is phytogeographically located totally with in the Irano-Turanian region. This region is neighboured by Mediterranean phytogeographic regions. Due to this geographical proximity the floristic composition of the region contain Mediterranean elements. This situation is also reflected in the vegetation table.

Table 3. Analysis of the steppe vegetation of Ereğli-Karaman Characteristic species of the Artemisia santonicum Community.

Number of quadrat	1	2	3	4	5	6			
Altitute (m.)	1160	1150	1070	1060	1040	1050			
Inclination (°)	3-4	1-2	1-2	1-2	1-2	1-2			
Exposition	SE	SE	SE	SE	SE	SE			
Square size (m²)	100	100	100	100	100	100			
Cover (%)	75	65	85	80	95	95	Present	*Chorotypes	**Life Forms
Plant species of Artemisia santonicum Community									
Artemisia santonicum	43	43	43	43	43	53	V	Ch	ES
Thymus sipyleus subsp. *rosulans*	+1	33	32	11	+1	+1	V	Ch	IT
Bromus tectorum	12	+1	+2	+1	+1	+1	V	Th	Cos.
Poa bulbosa	+2		32	33	54	54	V	G	Cos.
Cousiana iconica	+1	+1	+1	+1	+1		V	H	IT-End.
Noaea mucronata subsp. *mucronata*	12		+1	+1	+1		IV	H	Cos.
Nepeta congesta var. *congesta*	11	+1	+1	+1	+1		IV	H	End.
Bromus japonicus	+2	+1	+1	+1			IV	Th	ES-Med-IT
Gaudiniopsis macra	+1	+1	+1	+1			IV	Th	Cos.
Stipa holosericea	12	11	+1	+1			IV	H	Cos.
Ziziphora tenuior	+1		+1	+1		+1	IV	Th	IT
Phlomis armeniaca	+2	+2	+1	+1			IV	H	End.
Androsace maxima	+1	+1	+1	+1			IV	Th	Cos.
Loliolum subulatum	+1	+1		+1			III	Th	Cos.
Alyssum sibiricum	+1	+1	+1	+1			III	H	ES
Astragalus karamasicus	+1	+1		+1			III	H	IT
Koeleria cristata			+1	+1	+1		III	H	Med.
Centaurea virgata			+1	+1		+1	III	H	Cos.
Nigella arvensis var. *glauca*	+1	+1				+1	III	Th	U
Bromus tomentellus	+1		+1	+1			III	H	IT
Eryngium campestre	+1	+1		+1			III	H	Cos.
Astragalus lydius			+1	+1			II	Ch	IT-End.
Acantholimon caryophyllaceum subsp. *caryophyllaceum*		+1			+1		II	Ch	IT.
Achillea aleppica subsp. *zederbaueri*			+1	+1			II	H	IT-End
Consolida stenocarpa		+1	+1				II	Th	IT-End.
Onobrychis armena			+1	+1			II	Ch	Cos.
Scabiosa argentea			+1	+1			II	H	ES
Valerianella coronata			+1	+1			II	Th	Cos.
Teucrium polium	+1			+1			II	Ch	ES.Med.IT
Helianthemum salicifolium			+1	+1			II	Th	ES
Peganum harmala					11	21	II	H	Cos.
Cyathobasis fruticulosa					11	+1	II	H	End.
Eremopyrum bonaepartis	+1		+1				II	Th	Cos.
Anthemis kotschyana var. *kotschyana*						+1	I	H	Med.-IT
Ceratocephalus falcatus		+1					I	Th	ES
Marrubium parviflorum subsp. *parviflorum*		+1					I	H	IT
Allium macrochaetum subsp. *macrochaetum*				+1			I	G	IT
Achillea wilhelmsii					+1		I	H	IT
Alyssum lycaonicum				+1			I	H	IT-End.
Erysimum crassipes				+1			I	Ch	IT
Lappula barbata				+1			I	H	Med-IT
Dianthus zonatus				+1			I	H	Cos.

Logfia arvensis	+1					I	Th	Cos.
Thymelea passerina			+1			I	Th	Cos.
Echinaria capitata	+1					I	Th	Cos.
Galium floribundum subsp. *floribundum*				+1		I	Th	Med-IT
Echinophora tournefortii				+1		I	H	IT
Sideritis montana subsp. *remota*			+1			I	H	ES-Med.
Stipa lessingiana			+1			I	H	IT
Bupleurum heldreichii					+1	I	Th	IT-End.
Convolvulus arvensis				+1		I	H	Cos.
Reseda lutea				+1		I	H	Cos.
Sanguisorba minor					+1	I	Th	ES-MedIT
Taeniatherum caput-medusae		+1				I	Th	Cos.
Heliotropium europaeum					+1	I	Th	Med
Boreava orientalis				+1		I	Th	Cos.
Caragana leiocalysina					+1	I	Ch	IT
Stachys cretica subsp. *anatolica*					+1	I	H	IT-End.
Hypericum aviculariifolium subsp. *depilatum* var. *depilatum*				+1		I	H	IT-End.

Explanation:

Other Species of study area: *Scabiosa micrantha* (Th, IT), *Krascheninnikovia ceratoides* (H, Cos.), *Alyssum desertorum* var. *desertorum* (Th, Cos.), *Bufonia tenuifolia* (Th, Cos.), *Alyssum linifolium* subsp. *linifolium* (Th, Med.), *Minuartia sclerantha* (H, IT), *Onosma tauricum* (H, ES), *Paronychia kurdica* subsp. *kurdica* (Ch, ES, IT), *Callipeltis cucullaria* (Th, IT), *Veronica multifida* (Ch, IT), *Onobrychis cornuta* (Ch, IT), *Asphodelina taurica* (H, ES, Med), *Helichrysum plicatum* subsp. *plicatum* (Ch, Med, IT), *Minuartia hirsuta* (H, Med), *Euphorbia macroclada* (H, IT), *Galium verum* subsp. *verum* (Ch, ES, IT), *Anthemis cretica* subsp. *anatolica* (H, Cos.), *Gundelia tournefortii* (H, IT), *Allium flavum* (G, U), *Cynodon dactylon* (H, Cos.), *Senecio vernalis* (Th, Med, IT), *Cerastium dichotomum* subsp. *dichotomum* (Th, IT), *Evax anatolica* (Th, IT), *Hordeum marinum* (Th, IT), *Bupleurum lyconicum* (Th, End, Med), *Carduus nutans* (H, Cos), *Koelpinia linearis* (Th, Med, IT), *Chardinia orientalis* (Th, IT), *Euphorbia falcata* subsp. *macrostegia* (H, End, Med), *Moluccella laevis* (Th, IT), *Salsola ruthenica* (Ch, ES), *Centaurea carduiformis* (Th, IT), *Centaurea patula* (Th, IT), *Herniaria incana* (H, ES), *Onopordum davisii* (H, End, IT,), *Lepidium perfoliatum* (Th, ES), *Glaucium corniculatum* subsp. *corniculatum* (H, IT), *Dianthus balansae* (H, End), Centaurea solsititialis (Th, Cos), *Caucalis platycarpos* (Th, Med, IT), *Malcolmia africana* (Th, Cos).

The cover-Abundance: Cover < %1: +, cover %1- %5: 1, cover %5–10: 2, cover %11–33: 3, cover %34–75: 4, cover %76–100: 5 (Braun-Blanquet 1932).

* Chorotypes: End Endemic for Turkey (15), ES Euro-Siberian region (16), IT Irano-Turanian region (47), Med Mediterranean region (18), U Unknown (2), Cos Cosmopolitan (29). [Davis *et al.* (1965-1985, 1988); Güner *et al.* (2000); Zohary (1973); Donner (1990)].

** Life forms: Ch Chamaephyte (14), G Geophyte (3), H Hemicryptophyte (43), Th Therophyte (40). [Raunkiaer (1934); Ellenberg & Mueller-Dombois (1967)].

Locality of quadrat: 1:Ereğli-Karaman 9 km., 2: Ereğli-Karaman 20 km., 3: Ayrancı-Karaman, 4: 70 km. from Ereğli, 5: Sudurağı village vicinity, 6: 22 km. before Karaman.

Cousiana iconica Hub.- Mor., LR(cd), (Fig. 7).
Nepeta congesta Fisch.&Meyer var. *congesta*, LR(lc).
Phlomis armeniaca Willd., LR(lc), (Fig. 8).
Astragalus lydius Boiss., LR(lc), (Fig. 9).
Achillea aleppica DC subsp. *zederbaueri* (Hayek) Hub.- Mor., (Fig. 10).
Consolida stenocarpa (Davis et Hossain) Davis, LR(lc).
Cyathobasis fruticulosa (Bunge) Aellen, (Fig. 11).
Alyssum lycaonicum (Schulz) Dudley, LR(cd).
Bupleurum heldreichii Boiss. et Bal., LR(lc).
Stachys cretica L. subsp. anatolica Rech. fil., LR(lc).
Hypericum aviculariifolium Jaub. et Spach. subsp. *depilatum (*Freyn et Bornm.) Robson var. *depilatum*.
Bupleurum lyconicum Snogerup, LR(cd).
Euphorbia falcata subsp. *macrostegia* (Bornm.) O. Schwartz.
Onopordum davisii Rech. Fil., NT, (Fig. 12).
Dianthus balansae Boiss., LR(lc)

A. santonicum communities are found on the flat land with deep soils. The alkali soil is located of Ereğli province in the north and Karaman province in the easth in the middle of Central Anatolia region.

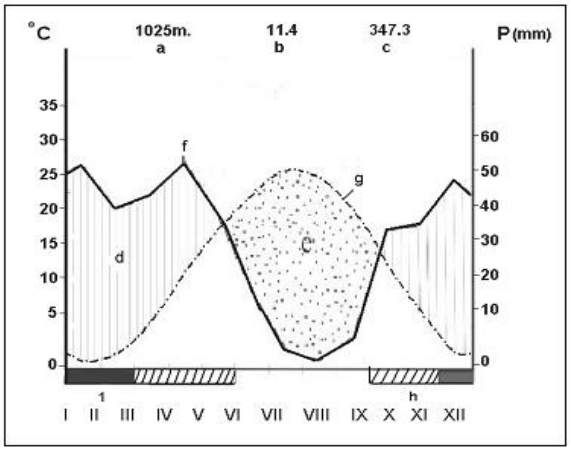

Fig. 2. The ombrothermic graph of Karaman meteorological station. a. Altitude of meteorological station, b. Annual average of temperature, c. Annual avearage of rain, d. Rainy period, e. Arid period, f. Rain curve, g. Temperature curve, h. Probable freezing month, 1. freezing month.

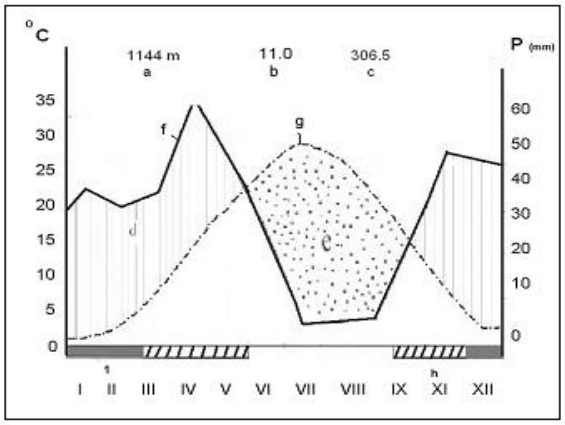

Fig. 3. The ombrothermic graph of Ereğli meteorological station. a. Altitude of meteorological station, b. Annual average of temperature, c. Annual avearage of rain, d. Rainy period, e. Arid period, f. Rain curve, g. Temperature curve, h. Probable freezing month, 1. freezing month.

The physico-chemical characteristics of soil samples are shown in (Table 1a, Table 1b). The organic matter in these soils is generally 1,35-2,31 (%), EC (dS/m) 0,53-0,81, water saturation (%) 36,37-53,80. The pH value changes between 8,58 and 8,64. Soluable ions in saturation extracted kations (me/lt) and anions (me/lt) exchange capacity of the soils is approximately calcium (Ca^{++}) 4,20-6,30, magnesium (Mg^{++}) 1,06-2,11, sodium (Na^{+}) 0,24-0,90, potasium (K^{+}) 0,21-0,67, chloride (Cl^{-}) 1,25-3,75, carbonate ($CO_3^{=}$) 0,73-0,83, bicarbonate (HCO_3^{-}) 1,40-2,29, sulfate ($SO_4^{=}$) 1,76-4,47 and calcium carbonate ($CaCo_3$) 17,5-30,8 (%).

Fig. 4. Studied area (*Artemisia santonicum* L.).

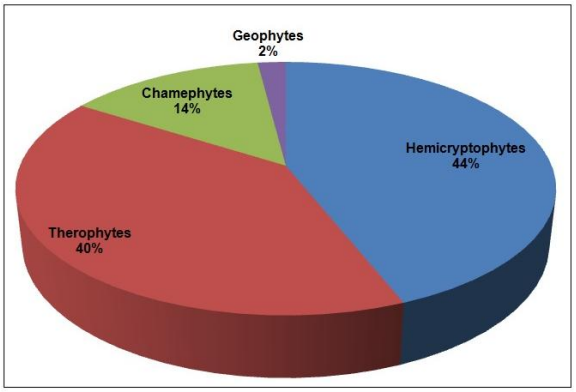

Fig. 5. The biological spectrum of study area.

Alkali is one of the most serious problems facing agriculturists of the Ereğli-Karaman. According to Harold (1947) "Management of alkali soils is dependent on many factors, such as type of soil, slope, proximity to drainage outlet, depth of water table, climate, type of alkali, land values etc. Many techniques have been devised for control of alkali, but such measures are temporary at best, unless it is possible to eliminate the source of new alkali and to eradicate surplus accumulation within the soil". One of the earliest quantitative studies of plant communities as biological indicators of alkali soils

was made in the area (Birand, 1947, 1970, Yurdakulol, 1974). According to values obtained from Ereğli and Karaman meteorological stations, climate type is "semi arid, lower cold Mediterranean" (Akman, 1982). The floristic structure of the determined steppe communities is highly heterogeneous.

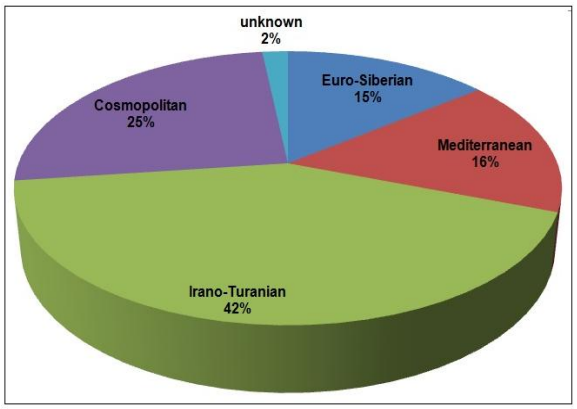

Fig. 6. The floristical distributions of study area.

Fig. 7. *Cousiana iconica* Hub.- Mor.

Fig. 8. *Phlomis armeniaca Willd.*

Discussion

The steppe formation of the area was formed with regressive succession as in the large part of the Central Anatolia region. *Artemisia santonicum* communities were reported in some phytogeographical studies in Central Anatolia (Birand, 1947; Yurdakulol, 1974). Artemisia santonicum is considered to be as a phytogeographicaly important species and border element of the Turkey flora (Öztürk *et al.* 2006). It is a typical representative of the Anatolian salty steppes (Çetik, 1985, Geven *et al.*) salty habitats are among the most important centers of endemism.

Fig. 9. *Astragalus lydius* Boiss.

Fig. 10. *Achillea aleppica* DC subsp. *zederbaueri* (Hayek) Hub.- Mor.

According to Hobohm (2013) "endemism is a pre-extinction phenomenon. Endemics are threatened with extinction. Due to international nature conservation policies and due to the perception of the public the concept's importance is increasing. Endemism can result from different biological and environmental processes. Depending on the process

conservation measures should be adapted. Endemic vascular plant taxa, in the setting of their species composition and vegetation types are important features of landscapes and indicators of the quality of relating habitats". The rate of endemism in the study area was determined to be 15%.

Fig. 11. *Cyathobasis fruticulosa* (Bunge) Aellen.

The ratio of endemism is compared with those in some other studies carried out in the region. These rates; Sultan Mountains 13.4% (Ocakverdi, 1984), Takkalı Mountains 15.5% (Dural and Ekim, 1984), Apa Dam 11.1% (Serin *et al*. 1988), Kızılören, Çal and Loras Mountains 13.0% (Tatlı *et al*. 1993), Selçuk University Campus 3.2% (Kargıoğlu and Tatlı, 1994), Bozdağ 16.6% (İpekci and Şanda, 2014). In Turkey's flora, 16 monotypic (having only one species) endemic genus are available. In the study area shows the distribution *Cyathobasis* one of these endemic genus (Fig. 11). Because of the saline conditions, halophytic plants are favored and woody plants do not occur here. The most abundant species of the salt steppes belong to the *Chenopodiaceae* and *Plumbaginaceae* families. The floristic compositions of the salty steppe of Central Anatolia are dominated by the taxa having hemicryptophyte and therophyte life forms. Hemicryptophytes have a high ratio (43%) because of our study area have a semi arid, lower cold climate (Raunkiaer, 1934). Soil salinity has been affected by above- and belowground live and dead biomass negatively. It can be concluded that soil parameters may be the predictors of the community biomass (Karaer *et al*. 2007). *Artemisia santonicum* have covered vast areas in Central Anatolia in the near past. These areas are very limited recent years because of the anthropological activities.

Fig. 12. *Onopordum davisii* Rech. Fil.

A greater part of these areas have been separated for agricultural cultivations. Some areas of Konya plain are being drained and these drained areas were used for farming however this gained lands have become unproductive and turned barren because of salinification, wind erosion etc. At the same time, this steppe vegetation has been pressure from uncontrolled and excessive grazing. This diminishing areas have suffered destruction due to overgrazing. *A. santonicum* communities have been lost main floristic structure. These areas are very important especially endemic plants and they have special importance as habitat (Ekim *et al*. 2000). Palynological evidence from the Central Anatolia although sparse, the evidence is available. The pollen record of the study area c. 1 5,600 years (c. 1 3 ,000 14C years) of vegetation history in Central Anatolia. The varved lower sediment provides fairly detailed information about the duration of the Late Glacial subphases and concomitant changes in the steppe vegetation (Woldring and Botteme, 2001). Turkey is an important center for plant genetic resources and genetic diversity. It is necessary to protect these valuable genetic resources.

Conclusions

In this study, the floristical and ecological properties of *Artemisia santonicum* L. community have been investigated. According to many researchers, the

wildlife in Turkey is having hard time in regenerating as the other countries on the Earth. That is the reason why it is really important to protect the diversity of plants. Therefore several measures need to take such as endemic and threatened species in surrounding area, restoration of damaged habitats, transferring the species in surrounding protected areas and cultivation in greenhouse and botanical gardens. In addition, environmental education should be given to the people from a young age. The future of live, should be placed in the knowledge that it depends on the preservation of the natural environment.

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