Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 4, No. 6, p. 225-230, 2014
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

Floristic survey of weeds and rangeland plants in Khalatposhan station of Tabriz county

Elham Abbasvand, Jalil Shafagh-Kolvanagh, Sirous Hassannejad*

Department of Plant Eco-Physiology, University of Tabriz, Iran

Article published on June 12, 2014

Key words: Cluster Analysis, Rangelands Plants, Weeds, TWINSPAN.

Abstract

In order to ordination of weeds and rangeland plants, investigations were done in Khalatposhan rangeland of Tabriz county in 2013. Vegetation in each section was sampled by 176 plots (0.5 m × 0. 5 m) in grid method (20 m × 40 m). Data of presence and absence plants in different sections were analyzed through two-way indicator species analysis (TWINSPAN) and cluster analysis (CA). One hundred species (83 Dicotyledonous and 17 monocotyledonous) belonging to 75 genera and 20 families were recorded along 176 stands in Khalatposhan rangeland. Asteraceae had the highest contribution (23% of the recorded species), followed by Poaceae (13%) and Papilionaceae (12%). TWINSPAN analysis showed that sections 5 and 7 had similar species such as *Artemisia* sp., *Atrriplex tatarica*, *Capsella bursa-pastoris*, *Xeranthemum squarrosum* and some others. *Lepidium vesicarium* and *Verbascum nudicaule* were observed in sections 5, 6, and 7. CA showed that in 50% similarity, four sections were separate, also sections 5 and 7 were located in the same group, and confirmed TWINSPAN results. In high level of this classified, separation is precisely and analysis of sampling units will be correctly. In 100% similarity, sections 3 and 4 were located in one group and had maximum similarity (43 species observed in these two sections).

***Corresponding Author:** Sirous Hassannejad ✉ sirous_hasannejad@yahoo.com

Introduction

One of the major problems that rangelands production faces is weeds that interfere with their growth and production. These unwanted guests compete with desire plants for water, light, nutrients and space. Weeds wide geographical distribution is probably due to their ability to compete for water, light, nutrients and space. Also, weeds can effect on a number of plant species by reducing their germination rates and seedling growth (Zahedi and Ansari 2011). Some weeds cause reduction of rangelands forage quality and quantity. So, these plants must be moderate in fields, rangelands and forests. If rangelands are pore, weeds can be deployed very quickly (Sellers and Ferrell, 2012). One of the main steps for weeds management is to know their relationships with our fields or rangelands plants. Plant communities and floristic study of them play an important role to know the variety of their present in an area and maintaining biodiversity and conserving the environment (Kandi *et al.* 2011). The purpose of most plant community's studies has been to identify patterns of species composition and distribution and to explain these patterns in relation to known or assumed gradients in the environment (Fried *et al.* 2008). Ordination and classification methods have been extensively used in order to found ecological relationships between plant communities and surrounding environment (Zhang and Zhang 2000).

Plant composition is strongly associated with regional climate and soil characteristics (Marshall *et al.* 2003). According to Slic *et al.* (2009), the phytogeographical region is the major factor for determining the weed species composition. The aim of this study is to found relationships between weeds and pasture plants in Khalatposhan rangeland of Tabriz county.

Materials and methods

Data sampling

Khalatposhan rangeland is located at 8 km of Tabriz-Basmenj road in Tabriz county. Sampling was done in nine section of this rangeland in 2013. Vegetation in each section was sampled by 176 plots (0.5 m × 0. 5 m) in grid method (20 m × 40 m). Herbaceous species in each plot were identified, counted (density and cover percentage), and recorded for subsequent data entry and analysis. The cover percentage was measured from 1% to 100%, in gridded plots. The collected specimens were cataloged, pressed, and identified with the help of flora Iranica (Rechinger 1963–2007) and Turkey (Davis 1965–85).

Multivariate analysis

Data of weeds or rangeland plant distribution in different sections were collected and analyzed through two-way indicator species analysis (TWINSPAN) and cluster analysis (CA). These ordination methods were done considering the presence and/or absence of 100 species using PC-ORD version 4.17 (MjM Software, Gleneden Beach, OR, USA) program (McCune and Mefford 1999) to found relationships between weed and pasture plants composition in different sections of Khalatposhan rangeland. Species richness was calculated as the average number of species per plot.

Results

Floristic features

One hundred species (83 Dicotyledonous and 17 monocotyledonous) belonging to 75 genera and 20 families were recorded along 176 stands in Khalatposhan rangeland. Asteraceae had the highest contribution (23% of the recorded species), followed by Poaceae (13%) and Papilionaceae (12%) (Fig. 1).

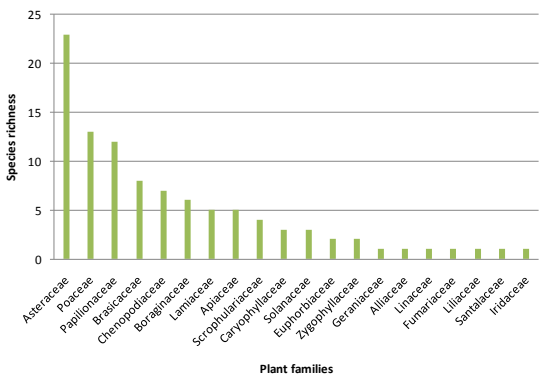

Fig. 1. Species richness (number of species) for different plant families observed in Khalatposhan rangeland of Tabriz county.

Multivariate analysis

Two way indicator species analysis (TWINSPAN) classified weeds and pasture species with requirements similarity in the same groups (Table 1). In this ordination method, the top numbers of the table indicate the numbers of sampling sections. Species with the same serial number are located in one group and have same requirements. Results showed that species such as *Artemisia* sp. with code 12, *Atrriplex tatarica* with code 20, and *Capsella bursa-pastoris* with code 26 until *Xeranthemum squarrosum* with code 99 are plants belong to one group, they only founded in sections 5 and 7, and may be have similar ecological requirements (Table 1). *Lepidium vesicarium* and *Verbascum nudicaule* with code 58 and 98, respectively, belong to same group and were located in sections 5, 6, and 7 (Table 1). *Dianthus crinitus*, *Echinops pachyphyllus*, *Lactuca scariola*, and *Salsola kali* subsp. *Tragus* with cods 35, 37, 55, and 79, respectively, were located in one group (Table 1). The ends of TWINSPAN table (Table 1) show that section 1 in order to its plant species was different from other sections (Table 1). Difference or similarity of sections in their plant species may be due to soil characteristics. Investigations showed that plant flora composition, their density and distribution from place to place over time are dependent upon soil factors of the site and the regional climatic condition (Andreasen and Stryhn 2008; Fried *et al.* 2008; Andreasen and Skovgaard 2009; Pinke *et al.* 2012; Gomaa 2012; Hassannejad and PorheidarGhafarbi, 2013).

Table 1. TWINSPAN analysis for weeds and pasture species observed in Khalatposhan rangeland of Tabriz county.

Scientific Name	Plant code	5	7	6	2	3	4	9	8	1						
Artemisia sp.	12	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Atrriplex tatarica L.	20	1	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Capsella bursa-pastoris	26	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Centaurea virgata Lam.	28	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Dianthus orientalis Adams	36	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Euphorbia seguieriana NECK.	42	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Gypsophila bicolor (freyn&sint) Grosh.	47	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Hyoscyamus pusillus L.	51	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Linaria lineolata sonsu. Groossh.	59	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Lolium rigidum L.	61	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Moltkia longiflora (Bertol.) wettst	65	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Poa bulbosa L.	75	1	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Rochelia macrocalyx Bge.	76	-	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Sisymbrium altisimum L.	85	1	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Trilobus terresteris L.	96	1	1	-	-	-	-	-	-	-	0	0	0	0	0	0
Xeranthemum squarrosum Boiss.	99	1	-	-	-	-	-	-	-	-	0	0	0	0	0	0
Lepidium vesicarium L.	58	-	1	1	-	-	-	-	-	-	0	0	0	0	0	1
Verbascum nudicaule (WYDL.) TAKHT.	98	1	-	1	-	-	-	-	-	-	0	0	0	0	0	1
Dianthus crinitus SM.	35	1	1	1	1	1	-	-	-	-	0	0	0	0	1	
Echinops pachyphyllus Rech.f.	37	-	1	-	-	1	-	1	-	-	0	0	0	0	1	
Lactuca scariola L	55	-	1	1	-	-	-	-	1	-	0	0	0	0	1	
Salsola kali L. subsp. *Tragus* (L.) Nyman	79	1	1	1	-	1	1	-	-	-	0	0	0	0	1	
Agropyron repens L.	5	-	1	1	-	1	-	1	-	-	0	0	0	1		
Alkana bracteosa Boiss.	7	-	1	1	1	1	1	-	1	-	0	0	0	1		
Onobrychis Hohenackeriana C.A.MEY.	70	1	-	-	1	-	1	-	1	-	0	0	0	1		
Heliotropium lasiocarpum fich. C.A. Mey	48	-	-	-	-	-	-	-	1	-	0	0	1	0	0	0
Hordeum spontaneum L.	50	-	-	-	-	-	-	-	1	-	0	0	1	0	0	0
Pimpinella aurea DC.	73	-	-	-	-	-	-	-	1	-	0	0	1	0	0	0
Teucrium polium L.	91	-	-	-	-	-	-	-	1	-	0	0	1	0	0	0
Thesium arvence Horvatovsky	92	-	-	-	-	-	-	-	1	-	0	0	1	0	0	0
Ferula szowitsiana Dc.	45	-	-	1	1	1	1	-	1	-	0	0	1	0	0	1
Verbascum kurdicum Hub.Mor.	97	-	-	-	-	1	1	1	1	-	0	0	1	0	0	1
Artemisia splendens Willd.	13	-	-	1	-	-	-	-	-	-	0	0	1	0	1	0
Astragalus (Grammocalyx) grammocalyx Boiss.&hohen.	19	-	-	1	-	-	1	-	-	-	0	0	1	0	1	0

Scientific Name	Plant code	5	7	6	2	3	4	9	8	1						
Erysimum repandum L.	41	-	-	1	-	-	-	-	-	-	0	0	1	0	1	0
Iris barnumae Baker	52	-	-	1	-	-	-	-	-	-	0	0	1	0	1	0
Aegilops ovata L.	4	-	-	-	-	1	1	-	-	-	0	0	1	0	1	1
Artemisia fragrans Willd.	11	-	-	-	-	1	-	-	-	-	0	0	1	0	1	1
Crepis foetida L.	32	-	-	-	-	1	-	-	-	-	0	0	1	0	1	1
Descurainia sophia L.	34	-	-	-	-	1	-	-	-	-	0	0	1	0	1	1
Erodium cicutarium (L.) L'Her.	38	-	-	-	-	1	-	-	-	-	0	0	1	0	1	1
Ferula Behboudiana (Rech. F. & Esfand.) Chamberlain	44	-	-	-	1	-	-	-	-	-	0	0	1	0	1	1
Pimpinella saxifraga L.	74	-	-	-	-	1	1	-	-	-	0	0	1	0	1	1
Senecio glaucus L.	83	-	-	-	-	1	-	-	-	-	0	0	1	0	1	1
Solanum nigrum L. Var nigrum	86	-	-	-	-	-	1	-	-	-	0	0	1	0	1	1
Ziziphora tenuir L.	100	-	-	-	1	1	1	-	-	-	0	0	1	0	1	1
Lycium ruthenicum Murray	62	-	-	1	1	1	1	1	1	1	0	0	1	1		
Stackys inflata Benth	88	-	-	-	1	1	1	-	-	1	0	0	1	1		
Astragalus (Tragacantha) parrowianus.	16	1	-	1	1	1	1	1	1	1	0	1	0			
Senecio vulgaris L.	84	1	-	1	1	1	1	1	-	1	0	1	0			
Linum usitatissimum L.	60	1	1	1	1	1	-	-	1	1	0	1	1	0	0	0
Achillea tenuifolia Lam.	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Acroptilon repens L.	3	1	-	1	1	1	1	-	1	1	0	1	1	0	0	1
Allium ampeloprasum L.	8	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Alyssum dasycarpum stapf	10	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Bromus arvensis L.	22	1	1	1	1	1	1	-	1	1	0	1	1	0	0	1
Bromus japonicus Thub	23	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Bromus tectrom L.	24	1	1	1	-	1	1	1	1	1	0	1	1	0	0	1
Ceratocarpus arenarius L.	29	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Euphorbia Szovitsii Fisch. Et Mey.	43	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Salsola kali L. subsp. *iberica* Sennen & Pau	77	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Salvia nemerosa L.	80	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Scariola orientalis L.	81	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Stipa sp.	89	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1
Alhagi persarum Boiss. & Buhse.	6	1	1	-	-	1	1	1	-	1	0	1	1	0	1	0
Couisnia urumiensis L.	31	-	1	1	-	1	-	1	-	1	0	1	1	0	1	0
Ersimum persicum Boiss.	39	-	1	1	1	1	1	-	-	1	0	1	1	0	1	0
Onobrychis atropatana Boiss.	69	-	1	1	1	1	-	-	-	1	0	1	1	0	1	0
Onopordon acanthium L.	71	-	1	-	-	1	1	-	1	1	0	1	1	0	1	1
Peganum Harmala L.	72	-	1	-	1	-	-	1	1	1	0	1	1	0	1	0
Erygnium coeruleum Bieb.	40	1	-	-	-	1	1	-	-	1	0	1	1	1		
Achillea Wilhelmsii C.Koch.	2	-	-	-	-	-	-	1	1	1	1	0				
Cynodon dactylon L.	33	-	-	-	-	1	1	-	-	1	1	0				
Scrophularia striata Boiss.	82	-	-	-	1	-	-	1	-	1	1	0				
Astragalus (Hymenostegis) lagopoides Lam.	14	1	-	1	-	-	-	-	-	1	1	1	0			
Hordeum glaucum Steud.	49	-	-	-	-	-	-	-	1	1	1	1	1	0		
Allyssum sp.	9	-	-	-	-	-	-	-	-	1	1	1	1	1		
Astragalus (Onobrychium) effusus.	15	-	-	-	-	-	-	-	-	1	1	1	1	1		
Astragalus (Tragacantha) strictifolius	17	-	-	-	-	-	-	-	-	1	1	1	1	1		
Astragalus sp.	18	-	-	-	-	-	-	-	-	1	1	1	1	1		
Bromos sterilis L.	21	-	-	-	-	-	-	-	-	1	1	1	1	1		
Camelina rumelica L.	25	-	-	-	-	-	-	-	-	1	1	1	1	1		
Centaurea pulchella ledeb.	27	-	-	-	-	-	-	-	-	1	1	1	1	1		
Chenopodium album L.	30	-	-	-	-	-	-	-	-	1	1	1	1	1		
Fumaria asepala Boiss.	46	-	-	-	-	-	-	-	-	1	1	1	1	1		
Jurinea lptoloba DC.	53	-	-	-	-	-	-	-	-	1	1	1	1	1		
Koelpinia linearis L.	54	-	-	-	-	-	-	-	-	1	1	1	1	1		
Lappula barbata (M.B.) Gurke	56	-	-	-	-	-	-	-	-	1	1	1	1	1		
Lepidium perfoliatum L.	57	-	-	-	-	-	-	-	-	1	1	1	1	1		
Medicago sativa L.	63	-	-	-	-	-	-	-	-	1	1	1	1	1		
Melilotus officinalis (L.) Pall.	64	-	-	-	-	-	-	-	-	1	1	1	1	1		
Muscari tenuiflorum Tausch	66	-	-	-	-	-	-	-	-	1	1	1	1	1		
Noea Mucronata L.	67	-	-	-	-	-	-	-	-	1	1	1	1	1		
Nonnea persica Boiss.	68	-	-	-	-	-	-	-	-	1	1	1	1	1		
Salsola dendroides pallas.	78	-	-	-	-	-	-	-	-	1	1	1	1	1		
Sonchus oleraceus L.	87	-	-	-	-	-	-	-	-	1	1	1	1	1		

Scientific Name	Plant code	5	7	6	2	3	4	9	8	1				
Taeniatherum crinitum (Shreb.) Nevski.	90	-	-	-	-	-	-	-	-	1	1	1	1	1
Thymus Kotschyanus Boiss.& Hohen.	93	-	-	-	-	-	-	-	-	1	1	1	1	1
Tragopogon kotsschys boiss	94	-	-	-	-	-	-	-	-	1	1	1	1	1
Trigonella fischeriana Ser.	95	-	-	-	-	-	-	-	-	1	1	1	1	1
		0	0	0	0	0	0	0	0	1				
		0	0	1	1	1	1	1	1	1				
		5	7	6	2	3	4	9	8	1	Sections number			

Claster analysis (CA) show that in 25% similarity, sampling sections are located in two group, and section 1 is different from others (Fig. 2). Results of CA confirm TWINSPAN results, but by this difference that TWINSPAN can not show the level of separation, whereas CA is precise in this subject. In 37.5% similarity, three sections were separate, level 1 include section 1, level 2 include sections 2, 6, 8, 9, 3, and 4, and level 3 include sections 5 and 7 (Fig. 2). In 50% similarity, four sections were separated, also sections 5 and 7 were located in the same group, and confirmed TWINSPAN results (Fig. 2 and table 1). In high level of this classified, separation is precisely and analysis of sampling units will be correctly. In 100% similarity, sections 3 and 4 were located in one group and had maximum similarity between their plant species (Fig. 2). Results show that from 43 species observed in these two sections, 29 species were located in both of them, 11 species were found in section 3 and only 3 species founded in section 4 (Data not showed).

Presence of specific species only in the specific area and information about their ecological needs will help to detect new species (weeds or pasture ones) especially noxious ones before their spread to wide areas. Multivariate analysis such as TWINSPAN and CA will help to found participant plant species, also for found difference ones. After classification of species and their habitats, in order to found relationships between the different plant communities, we need to study environmental factors such as soil's parameters and elevations. Plant communities are affected by many factors such as soil characteristics (Fried *et al.* 2008, Pinke *et al.* 2010; Hassannejad and PorheidarGhafarbi, 2013).

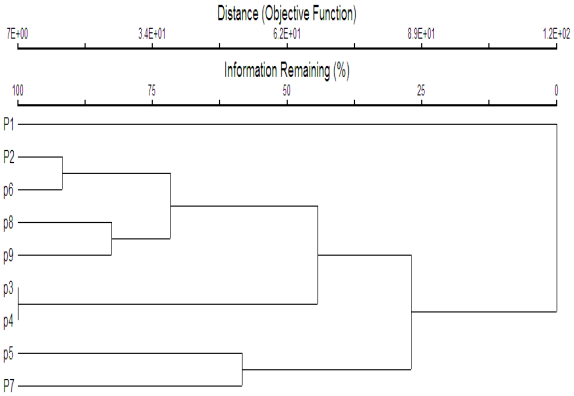

Fig. 2. Cluster analysis (CA) in order to classification of sampling units (sections) in Khalatposhan rangeland of Tabriz county.

References

Andreasen C, Stryhn H. 2008. Increasing weed flora in Danish arable fields and its importance for biodiversity. Weed Res. **48**, 1–9.

Andreasen C, Skovgaard IM. 2009. Crop and soil factors of importance for the distribution of plant species on arable fields in Denmark. Agric Ecosys Environ. **133**, 61–67.

Davis PH. 1965–85. Flora of Turkey and the East Aegean Islands, volume 1–9. Edinburgh: University Press.

Fried G, Norton LR, Rebound X. 2008. Environmental and management factors determining weed species composition and diversity in France. Agric Ecosys Environ. **128**, 68–76.

Gomaa NH. 2012. Composition and diversity of weed communities in Al-Jouf province, northernSaudi Arabia. Saudi J Bio Sci. **19**, 369–376.

Hassannejad S, PorheidarGhafarbi S. 2013. Weed flora survey in alfalfa (Medicago sativa L.) fields of Shabestar (northwest of Iran). Archives of Agronomy and Soil Science. 971-991

Kandi B, Sahu SC, Dhal NK, Mohanty RC. 2011. Species diversity of vascular plants of Sunabeda wildlife sanctuary, Odisha, India. New York Sci. J. **4**(3), 1-9.

Marshall EJP, Brown VK, Boatman ND, Lutman PJW, Squire GR, Ward LK. 2003. The role of weeds in supporting biological diversity within crop fields. Weed Res. **43**, 77–89.

McCune B, Mefford MJ. 1999. PC-ORD multivariate analysis of ecological data. Version 4. Gleneden Beach (OR): MjM Software Design.

Pinke G, Karacsony P, Czucz B, Botta-Dukat Z, Lengyel A. 2012. The influence of environment, management and site context on species composition of summer arable weed vegetation in Hungary. Appl Vegetation Sci. **15**, 136–144.

Pinke G, Pál R, Botta-Dukát Z. 2010. Effects of environmental factors on weed species composition of cereal and stubble fields in western Hungary. Cent. Europ. J. Biol. **5**(2), 283-292.

Rechinger KH. 1963–2007. Flora Iranica. Graz (Austria): Akademische Durck- und. Verlagsanstalt; p. 1–178.

Sellers BA, Ferrell JA. 2012. Weed Management in Pastures and Rangeland. Institute of Food and Agricultural Sciences, University of Florida.

Slic U, Vrbnicanin S, Bozic D, Carni A, Stevanovic D. 2009. Weed vegetation in the north-western Balkans: diversity and species composition. Weed Res. **49**, 602–612.

Zahedi SM, Ansari NA. 2011. Allelopathic potential of common mallow) *Malva sylvestris* (on the germination and the initial growth of tomato, cucumber and cress. Asian J. Agric. Sci. **3**, 235-241.

Zhang F, Zhang JT. 2000. Research progress of numerical classification and ordination of vegetation in China. J. Shanxi Univ. (Natural Sciences and Education) **23**, 278–282.