Bangladesh J. Bot. **40**(2): 177-184, 2011 (December)

ECOLOGICAL RESPONSE OF SOME *IRIS* L. TAXA (IRIDACEAE) IN TURKEY

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Key words: *Iris* taxa, Endemic, Rare, Ecological properties, Relationship

Abstract

Ecological relationships of some *Iris* taxa belonging to subgenera *Hermodactyloides* (*I. danfordiae*, *I. histrio* subsp. *aintabensis*, *I. histrio* subsp. *histrio*, *I. reticulata*, *I. bakeriana*, *I. pamphylica*) and *Scorpiris* (*I. aucheri* and *I. persica*) have been compared and relationships between taxa have been determined. These taxa are geophytes and flower in Spring. *I. danfordiae*, *I. pamphylica* and subsp. *aintabensis* are endemic to Turkey. *I. reticulata* and *I. persica* have widespread distribution while *I. aucheri*, subsp. *aintabensis*, subsp. *histrio, I. pamphylica* and *I. bakeriana* have restricted distribution in Turkey. Soil samples of the taxa were collected during flowering periods and physical and chemical properties (texture class, total salinity %, pH, $CaCO_3$ %, organic matter %, N %, P kg/da, K kg/da, Ca , Mg, Mn, Cu, Fe and Zn ppm) were determined. The correlations between the soil analyses and taxa were evaluated using regression analysis. The P and $CaCO_3$ values were found to be more effective than the other soil factors in the distributions of investigated taxa.

Introduction

Iris L. is one of the largest genus of Iridaceae family and comprises over 300 species in the world. They have been distributed in the Northern Hemisphere (Yu *et al.* 2009). *Iris* species have been used as ornamental plants in vegetative landscape of the parks and gardens in many countries since ancient times because of very beautiful and colorful flowers (specially in rock garden *I. histrio* and *I. reticulata*). *I. histrioides* (Wilson) Arnott, *I. nectarifera* Güner, *I. pamphylica* Hedge, *I. galatica* Siehe and *I. persica* are consumed as food in rural areas. *I. persica* is one of the symbols of Nevrus Festival which resembles as the coming of Spring (Kandemir and Engin 1998, 2000a, Anon. 2010).

The investigated taxa belong to *Hermodactyloides* and *Scorpiris* subgenera. The species of these two subgenera distribute naturally in Turkey (Güner and Peşmen 1980, Güner 1980, Christensen and Akpulat 2004, Güner and Duman 2007). In the distribution of species of *Hermodactyloides* subgenus Anatolia Diagonal plays an important role. Whereas the species of *Scorpiris* subgenus are distributed on both sides of Anatolia Diagonal (Güner 1980), *I. danfordiae* is found in the west of Anatolia Diagonal from north to south, *I. histrio* is at the south part, *I. pamphylica* is in vicinity of Antalya from the Toros Mountains to the west, and *I. reticulata* and *I. bakeriana* are in the east of Anatolia Diagonal. *I. reticulata* and *I. persica* occupied the largest area. However, subsp. *aintabensis,* subsp. *histrio, I. aucheri*, *I. bakeriana* and *I. pamphylica* are rare species and they are only known in the Southern part of Turkey (except *I. aucheri*).

Geophytic plants have interesting ecophysiological characteristics. They pass a long winter and drought period with under ground parts, so, this redistribution is important for the economical use of macroelements. In addition, they have interesting phenological properties with respect to

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spring or autumn of flowering time (Kutbay 1999). Therefore, it is necessary to know the ecological features of these taxa to grow and culture them easily and quickly. The purpose of this paper is to compare the ecological response of some *Iris* taxa and their relationships with soil properties.

Materials and Methods

Plant samples were collected from different locations between 2008 and 2010. Taxonomic description of the samples were made according to Mathew (1984, 1989) and Güner and Peşmen (1980). The distribution areas of the taxa were coded as A, B, C, D, E, F, G and H (Table 1). Soil samples (0-20 cm) were collected during generative growth period. Analysis of soil samples were

Table 1. The localities of collection of *Iris* taxa in Turkey.

Locality code	Description of locations
	***I. danfordiae* (Baker) Boiss.**
A1	Amasya: Boğa Village-Kaşka mezrası, near culture areas, 750 m., 22 February 2009, Kandemir, 427.
A2	Ordu: Mesudiye-Gölköy, Muzamana village vicinity *Quercus* shrub, rocky areas, 1100 m., 6 Mach 2009, Kandemir, 428.
A3	C5 Niğde: Ulukışla-Aktoprak Village, Gobatdere areas, *Abies cilicica* forest, metamorphic areas, 1800 m., 8 March 2009, Kandemir, 429.
	***I. bakeriana* Foster**
B1	Gaziantep: Yeşilce Village-Sof Mountain, *Quercus* forest, 1200 m., 10 March 2009, Kandemir, 434
B2	Mardin: Savur-Pınardere Village, Menzeli areas, *Quercus* shrub calcareous areas, 900 m., 20 March 2009, Kandemir, 435.
	***I. histrio* Reichb. subsp. *histrio* Mathew**
C1	Gaziantep: Islahiye-Fevzipaşa, Nur Mountain, scrub areas, 600-800 m., 10 March 2009, Kandemir, 432.
C2	Mersin: Silifke-Uzuncaburç, Delikılıç place, scrub and vineyard, calcareous rocky, 1150 m., 12 March 2009, Kandemir, 433.
	***I. histrio* subsp. *aintabensis* (Baker) Mathew**
D1	Gaziantep: Yeşilce Village-Sof Mountain, *Quercus* forest, 1200 m., 12 March 2009, Kandemir, 430.
D2	Gaziantep: Bahçearası-Acarobası Village, Kesmeliburun areas, scrub and calcareous rocky, 1100 m., 10 March 2009, Kandemir, 431.
	***I. reticulata* M. Bieb.**
E1	Gaziantep: Yeşilce village-Sof Mountain, *Quercus* forest, 1000 m., 10 March 2009, Kandemir, 436.
E2	Urfa: Karaca Mountain, open areas, 1550 m., 28 March 2009, Kandemir, 437.
E3	Urfa: Siverek-Sakaltutan Plateau vicinity. 1400 m., 20 May 2009, Kandemir, 438.
E4	Maraş: Göksun-Acalmak Cennet Stream, *Abies* forest, 1800 m., 2 April 2009, Kandemir, 439.
	***I. pamphylica* Hedge**
F1	Antalya: Manavgat-Akseki, Fersin Village, Çakılcık valley, south slope, rocky areas, 850 m., 14 March 2009, Kandemir, 440.
F2	Mersin: Fındık Pınarı Platae-Akarca güzlesi, road side and open forest areas, 900-100 m., 8 April 2009, Kandemir, 441.
	***I. aucheri* (Baker) Sealy**
G1	Gaziantep: Işıklı Village-Sof Mountain, rocky areas, 1200 m., 10 April 2009, Kandemir, 442.
G2	Urfa: Bilecik to Sorik, culture areas, 700 m., 11 April 2009, Kandemir, 443.
G3	Urfa: Karaca Mountain ,volcanic meadowland, 1100 m., 11 April 2009, Kandemir, 444.
G4	Maraş: Türkoğlu-Uzunsöğüt Village vicinity, shrub areas, 500-650 m., 10 April 2009, Kandemir, 445.
	***I. persica* L.**
H1	Amasya: Kışlacık Village-TV station vicinity, 1000-1100 m., 1 March 2009, Kandemir, 446.
H2	Tokat: Yıldızeli-Çamlıbel Pass, 1500 m., 8 March 2009, 447.
H3	Sivas: Suşehri to Gölköy vicinity, *Crataegus* woody bottom, 900 m., 8 March 2009, Kandemir, 448.
H4	Kayseri: Pınarbaşı-Gürün Kızılçevik, 1650 m., 9 March 2009, Kandemir, 449.
H5	Kilis: Kilis to Islahiye, calcareous shrub areas, 550 m., 11 March 2009, Kandemir, 450.
H6	Gaziantep: Gaziantep University Campus, shrub areas, 500 m., 11 March 2009, Kandemir, 451.
H7	Gaziantep:Yeşilce village-Sof Mountain, *Quercus* forest, 1000 m., 10 March 2009, Kandemir, 452.
H8	Urfa: Halfeti-Rumkale, rocky slopes near Fırat N, 500 m., 25 March 2009, Kandemir, 453.
H9	Urfa: Birecik- Mezra, steppe areas, 800 m., 25 March 2009, Kandemir, 454.

made in the soil analyses laboratory of Southeastern Anatolian Project Institution of Soil-Water Resources and Agricultural Research Directorate. Soil texture was determined by Bouyoucus hydrometer method, total salinity, calcium carbonate ($CaCO_3$) and pH were measured by Conductivity Bridge apparatus, Scheibler Calcimeter and Beckman pH meter, respectively (Kaçar 1996). Nitrogen, phosphorus, potassium, organic matter and microelements contents of the soil samples were analyzed by micro-Kjeldahl apparatus, ammonium-molybdate-stannous chloride, flame photometer and the Walkley-Black and DTPA (Diethylenetriaminepentaacetic acid) + $CaCl_2$ + TEAL Triethanolomine) methods, respectively (Kaçar 1996). Some species of *Hermodactyloides* and *Scorpiris* subgenera have great interspecific variations in morphology (particularly *I. reticulata*, *I. bakeriana*, *I. histrio* and *I. persica*), their taxonomic status and interspecific relationships are still disputed. That is why the regression analysis were used in the soil analysis results of these species.

Results and Discussion

All the investigated taxa prefer non saline and slightly saline soils (Table 2). *I. danfordiae*, subsp. *aintabensis*, *I. bakeriana*, *I. reticulata*, *I. aucheri* and *I. persica* were found to grow in clayey-loamy soils. Subsp. *histrio*, *I. danfordiae* and *I. pamphylica* grow in loamy soils. Most species are extremely distributed in loamy soils where drainage is good. Also, *I. aucheri* and *I. persica* prefer clayey soils. It has been observed that *I. histrioides* (Kandemir and Engin 2000 a), *I. pseudacorus* L. (Engin *et al*. 1998), *I. galatica* (Kandemir and Engin 2000 b), *I. sari* Schott ex Baker (Kandemir 2003), *Crocus pestalozzae* Boiss. (Kandemir 2009) and some *Crocus* taxa (Şık and Candan 2009) prefer clayey-loamy and loamy soils.

While *I. danfordiae*, subsp. *aintabensis*, subsp. *histrio*, *I. pamphylica*, *I. aucheri* and *I. persica* prefer soils with moderate level of $CaCO_3$, subsp. *aintabensis*, *I. bakeriana*, *I. reticulata* and *I. persica* prefer soils with low level of $CaCO_3$. Species such as *I. pseudacorus* (Engin *et al*. 1998), *I. histrioides* (Kandemir and Engin 2000a), *I. taochia* Woronow ex Grossh. (Kandemir 2006), *C. pestalozzae* (Kandemir 2009) and some *Iris* species (Malyer 1983) have been reported to prefer soils with moderate level of $CaCO_3$ whereas *I. danfordiae*, subsp. *aintabensis*, *I. reticulata*, *I. aucheri* and *I. persica* grow in slightly alkaline soils, *I. danfordiae*, subsp. *histrio*, *I. aucheri* and *I. persica* grow in well moderate level alkaline soils. *I. taochia* (Kandemir 2006), *I. nectarifera* (Kandemir and Engin 1998), *I. galatica* (Kandemir and Engin 2000b), *Alkanna haussknechtii* Bornm. (Kandemir and Cansaran 2010) and *I. histrioides* (Kandemir and Engin 2000a) grow in slightly alkaline soils, as do *I. danfordiae*, subsp. *aintabensis*, *I. reticulata*, *I. aucheri* and *I. persica*. However, *I. bakeriana, I. reticulata*, *I. persica* and *I. pamphylica* prefer neutral soils. In contrast, *I. aucheri* and *I. persica* prefer slightly acidic soils. It has been reported that *C. pestalozzae* (Kandemir 2009), *I. sari* (Kandemir 2003) and some *Crocus* taxa (Satıl and Selvi 2007) prefer slightly acidic soils.

The investigated taxa (except *I. persica*) grow well in soils containings moderate to rich organic matter. *I. persica* prefers to grow in soils having very rich organic matter. *I. danfordiae*, subsp. *aintabensis*, subsp. *histrio*, *I. bakeriana* and *I. persica* distribute well in soils with moderate to rich nitrogen containing soils. On the other hand, *I. reticulata*, *I. aucheri*, *I. pamphylica* and *I. persica* proper soils rich in nitrogen. *I. pseudacorus* (Engin *et al*. 1998), *I. galatica* (Kandemir and Engin 2000 b), *I. histrioides* (Kandemir and Engin 2000 a), *I. taochia* (Kandemir 2006), *A. haussknechtii* (Kandemir and Cansaran 2010), *I. sari* (Kandemir 2003) and *C. pestalozzae* (Kandemir 2009) grow in rich soils in respect of organic matter and nitrogen. 21% of all soils in Turkey have very limited amount of nitrogen (Boşgelmez *et al*. 2001). It can be said that the *Iris* taxa grow in soil with too little nitrogen. But, the investigated taxa have not been observed in soils deficient in N. All the investigated taxa grow well (except subsp. *histrio*) are usually sufficient in

P and K content. But, the K content of the soil samples where subsp. *histrio* is distributed was at insufficient levels (Table 2). It has been reported by various researchers that taxa such as *I. nectarifera* (Kandemir and Engin 1998), *I. pseudacorus* (Engin *et al*. 1998), *I. histrioides*, *I. galatica* (Kandemir and Engin 2000 a, b), *I. sari* (Kandemir 2003), *I. taochia* (Kandemir 2006), *C. pestalozzae* (Kandemir 2009) and some *Crocus* taxa (Işık and Candan 2009) prefer soils with sufficient potassium. The P content of soils where *C. pestalozzae* (Kandemir 2009), some *Crocus* taxa (Satıl and Selvi 2007, Işık and Candan 2009) and *I. histroides* (Kandemir and Engin 2000a) are distributed at sufficient levels. However, in previously ecologic investigations some *Iris* taxa have been enumerated in soils of sufficient P (Kandemir and Engin 2000a,b, Kandemir 2003). This state may occur due to phloem-immobile P and insoluable P in soils. From the Table 2, it is seen that the amount of microelements are satisfactory in all of the soil samples, except Zn in C2, G4, H1, H3 and H5 localities. Işık and Candan (2009) have reported that the amount of microelements of soils where some *Crocus* taxa grow, are generally enough.

Table 2. Physical and chemical properties of soil from different localities.

Locality code	Texture	Salinity (EC) (%)	$CaCO_3$ (%)	pH	Organic matter (%)	N (%)	P_2O_5 (kg/da)
A1	Clayey-loamy	0.947	14.80	7.94	1.31	0.059	5.76
A2	Clayey-loamy	0.961	5.70	7.75	2.61	0.174	15.33
A3	Loamy-calcareous	1.174	6.0	7.67	3.05	0.064	17.13
Mean ± Sd	-	1.03 ± 0.12	8.86 ± 5.22	7.78 ± 0.13	2.32 ± 0.90	0.09 ± 0.06	12.7 ± 6.11
B1	Clayey-loamy	0.557	1.50	7.32	1.89	0.156	25.33
B2	Clayey-loamy	0.167	1.47	6.96	2.20	0.127	26.17
Mean ± Sd	-	0.36 ± 0.27	1.48 ± 0.02	7.14 ± 0.25	2.04 ± 0.21	0.14 ± 0.02	25.7 ± 0.59
C1	loamy	0.293	10.20	7.70	1.74	0.121	2.06
C2	loamy	0.389	12.90	7.97	1.45	0.061	2.14
Mean ± Sd	-	0.34 ± 0.06	11.5 ± 1.90	7.83 ± 0.19	1.59 ± 0.20	0.09 ± 0.04	2.10 ± 0.05
D1	Clayey-loamy	0.557	1.50	7.32	1.89	0.156	25.33
D2	Clayey-loamy	0.623	2.50	7.61	2.47	0.057	26.73
Mean ± Sd	-	0.5 ± 0.04	2.0 ± 0.70	7.46 ± 0.20	2.18 ± 0.41	0.10 ± 0.07	26.0 ± 0.98
E1	Clayey-loamy	0.557	1.50	7.32	1.89	0.156	25.33
E2	Clayey-loamy	0.742	2.28	7.81	1.36	2.65	15.02
E3	Clayey-loam	0.586	1.96	6.90	2.25	3.07	24.16
E4	Clayey-loam	0.420	1.82	6.90	2.18	2.91	22.53
Mean ± Sd	-	0.57 ± 0.13	1.89 ± 0.32	7.23 ± 0.43	1.92 ± 0.40	2.19 ± 1.37	21.7 ± 4.63
F1	loamy	0.23	2.60	7.35	4.12	4.50	5.20
F2	loamy	0.41	3.05	7.60	3.80	3.55	6.75
Mean ± Sd	-	0.32 ± 0.13	2.82 ± 0.31	7.48 ± 0.17	3.96 ± 0.22	4.03 ± 0.67	5.98 ± 1.09
G1	Clayey-loamy	0.653	2.20	7.61	3.80	2.30	6.89
G2	clayey	0.431	9.2	7.85	1.33	2.80	5.28
G3	Clayey -loam	0.328	4.39	6.45	2.65	5.32	6.32
G4	clayey-loamy	0.671	4.40	7.83	1.60	3.94	4.12
Mean ± Sd	-	0.52 ± 0.16	5.04 ± 2.95	7.43 ± 0.66	2.34 ± 1.12	3.59 ± 1.34	5.65 ± 1.21
H1	clayey	0.503	2.65	6.32	3.05	0.177	21.81
H2	loamy	0.245	1.69	6.77	2.80	1.86	18.56
H3	Clayey-loamy	0.229	1.50	6.45	1.87	0.071	25.33
H4	Clayey-loam	0.325	2.5	6.78	4.56	1.38	17.56
H5	Clayey-	0.829	14.80	7.98	1.89	0.061	15.43
H6	Clayey-loamy	0.942	28.10	7.97	2.50	1.25	12.65
H7	Clayey-loam	0.557	14.80	7.77	1.89	0.156	14.50
H8	Clayey	0.512	28.8	7.83	1.30	0.168	10.16
H9	Clayey-loamy	1.011	10.6	7.61	5.17	1.28	12.80
Mean ± Sd	-	0.57 ± 0.29	11.7 ± 10.9	7.38 ± 0.58	2.78 ± 1.30	0.87 ± 0.74	18.2 ± 4.87

Table contd

Locality code	K_2O (kg/da)	Ca (ppm)	Mg (ppm)	Cu (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)
A1	196.5	2899	160	3.47	0.59	6.73	11.27
A2	127.40	3685	268	5.325	3.367	17.09	11.22
A3	141.50	3124	150	5.021	4.594	18.05	12.53
Mean ± Sd	155 ± 36.5	3236 ± 404	192 ± 65.4	4.60 ± 0.99	2.85 ± 2.05	13.9 ± 6.27	11.6 ± 0.74
B1	144.70	3378	298	2.963	2.607	15.77	25.95
B2	148.25	3256	350	3.35	2.21	18.95	27.81
Mean ± Sd	146 ± 2.51	3317 ± 86.2	324 ± 36.7	3.15 ± 0.27	2.4 ± 0.28	17.3 ± 2.24	26.8 ± 1.31
C1	38.80	3219	255	2.113	0.584	15.77	11.03
C2	25.90	3178	212	3.383	0.316	18.03	10.11
Mean ± Sd	19.4 ± 27.4	3198 ± 28.9	233 ± 30.4	2.74 ± 0.89	0.45 ± 0.19	16.9 ± 1.59	10.5 ± 0.65
D1	144.70	3040	165	2.963	2.607	15.77	25.95
D2	133.90	3130	159	3.621	2.918	18.05	15.65
Mean ± Sd	139 ± 7.63	3085 ± 63.6	162 ± 4.24	3.29 ± 0.46	2.76 ± 0.21	16.9 ± 1.61	20.8 ± 7.28
E1	144.70	3360	172	2.963	2.607	15.77	45.95
E2	172	3349	245	2.976	0.898	10.78	41.77
E3	152	3245	235	2.60	1.15	14.8	37.8
E4	182	3544	166	1.468	1.95	12.4	36.57
Mean ± Sd	162 ± 17.2	3374 ± 124	204 ± 41.2	2.50 ± 0.71	1.65 ± 0.77	13.4 ± 2.26	40.5 ± 4.24
F1	134	3256	145	2.4	0.67	3.8	15.5
F2	130	3140	155	2.6	0.58	3.5	14.6
Mean ± Sd	132 ± 2.82	3198 ± 82.0	150 ± 7.07	2.50 ± 0.14	0.63 ± 0.06	3.65 ± 0.21	15.0 ± 0.63
G1	209.50	3685	260	2.781	3.049	16.67	21.59
G2	177.7	3270	320	2.296	0.391	15.4	20.3
G3	188	3890	487	2.35	0.50	11.1	28.6
G4	200.80	3455	390	3.461	0.306	15.87	10.75
Mean ± Sd	194 ± 14.0	3575 ± 270	364 ± 97.5	2.72 ± 0.53	1.06 ± 1.32	14.7 ± 2.49	20.3 ± 7.34
H1	149.60	3456	205	1.81	0.269	4.99	24.17
H2	156	3241	210	3.41	1.78	5.32	32.65
H3	127	3120	235	2.32	0.349	9.49	16.484
H4	155.7	3675	284	1.67	1.22	10.6	18.20
H5	192.2	2989	310	2.87	0.331	6.47	10.42
H6	185	2886	183	2.37	2.341	14.4	54.6
H7	144.7	3080	283	2.96	2.607	15.7	45.95
H8	188.5	3568	334	2.99	0.647	5.50	20.46
H9	124	3380	312	3.87	2.792	7.93	37.59
Mean ± Sd	158 ± 25.5	3266 ± 270	262 ± 55.6	2.69 ± 0.72	1.37 ± 1.03	8.93 ± 3.97	28.9 ± 14.7

Some species of *Hermodactyloides* and *Scorpiris* subgenera have great interspecific variations in morphology (particularly *I. reticulata*, *I. histrio* and *I. persica*), their taxonomic status and interspecific relationships are still disputed (Güner and Peşmen 1980, Goldblatt 2001, Güner and Duman 2007). Güner and Peşmen (1980) and Mathew (1989) have reorganised the morphological characters of subspecies of *Hermodactyloides.* According to this reorganisation, *I. bakeriana* is accepted as a species since it has 8 evident lines on leaves. Thus, based on the leaf charecteristics, Güner and Peşmen (1980) suggested that *I. reticulata* and *I. bakeriana* should be two independent species with close relationship. It is also evident statistically that *I. reticulata* and *I. bakeriana* are different species. Although a weak correlation is seen between Mg, Mn and Fe values of *I. reticulata* and *I. bakeriana*, neither positive nor negative correlations are seen between other soil results ($p > 0.05$). It is assumed that *I. reticulata* and *I. bakeriana* are independent species as they have different ecologic characteristics. The same state is seen in other *Iris* taxa in China by Yu *et al*. (2009) and in Jordan by Gabbiesh *et al*. (2006).

I. histrio has been seperated into two subspecies by Mathew (1989) as subsp. *histrio* and subsp. *aintabensis* because of variations in leaf, perigon tube and segment measurements. Both subsp. *histrio* and subsp. *aintabensis* have limited distribution in Turkey. Some variation are seen in ecologic characteristics of both subsp. *histrio* and subsp. *aintabensis*. No correlation between salinity, organic matter, pH, N, Ca, Mg, Cu and Mn contents of soil samples of subsp. *histrio* and subsp. *aintabensis* ($p > 0.05$) have been observed. But positive correlation of the same with P, Zn and Fe and negative correlation with $CaCO_3$ were recorded ($p < 0.05$) (Fig. 1). Since there is no significant correlation between soil analyses with the two subspecies, it is presumed that subsp. *histrio* and subsp. *aintabensis* are independent subspecies with close relationship. The same state is seen in other *Iris* taxa in China by Yu *et al*. (2009) and in Jordan by Gabbiesh *et al*. (2006).

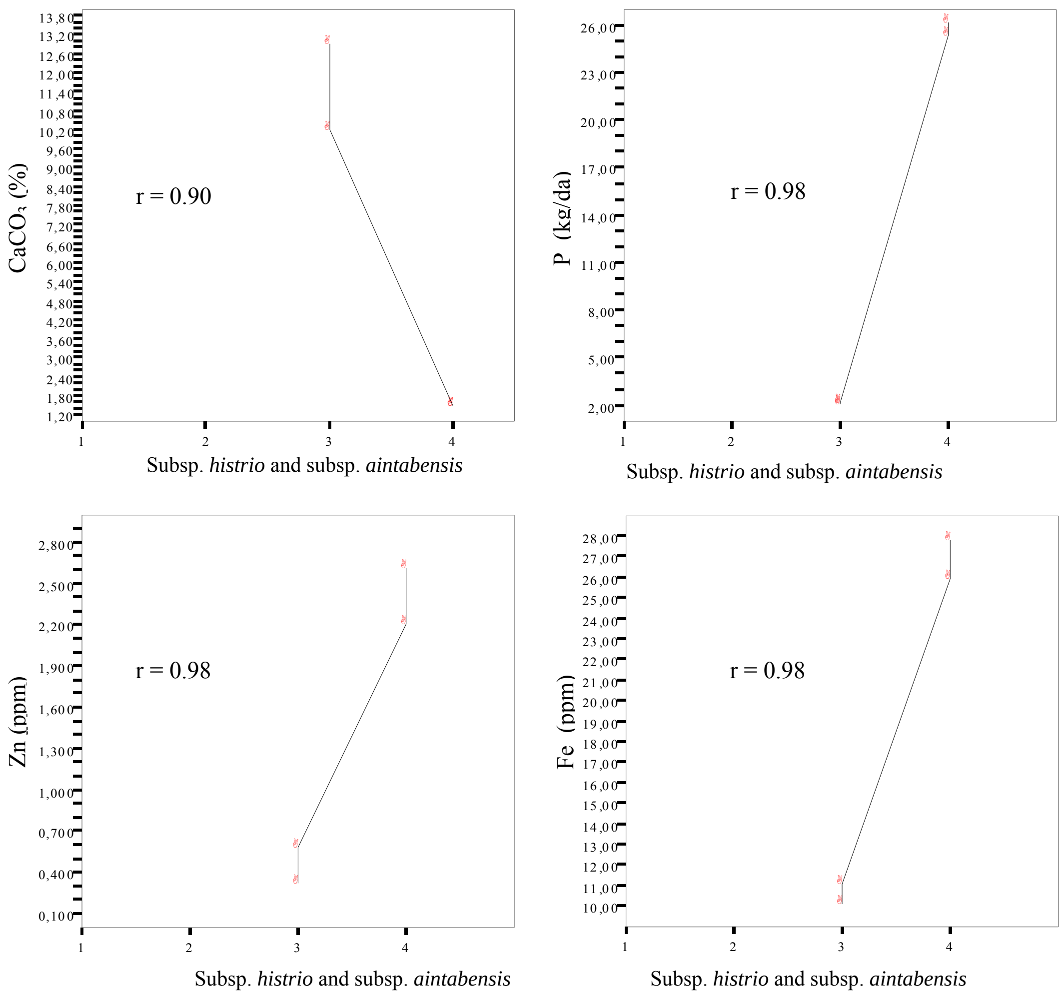

Fig. 1. Regression analysis graphs of two subsp. of *Iris histrio* with respect to soil $CaCO_3$, P, Zn and Fe.

I. persica is widely distributed species of *Scorpiris* subgenus in Turkey and it shows large variation in terms of morphological, anatomical and palinological characteristic. Especially, the samples of this species distributed in some parts of Turkey is confused with *I. galatica*. Some problems remain in taxonomical assessment of *I. persica*. Güner and Peşmen (1980) have suggested that this species should be separated into subspecies. It has been found that *I. persica* is disributed in different soil types. Although statistically the positive and negative correlations have been observed between only pH, $CaCO_3$ and P with *I. persica* ($p < 0.05$) (Fig. 2) in some soils but no significant correlation was observed in some other sols. Thus, *I persica* should be divided into subspecies as Güner and Peşmen suggested above.

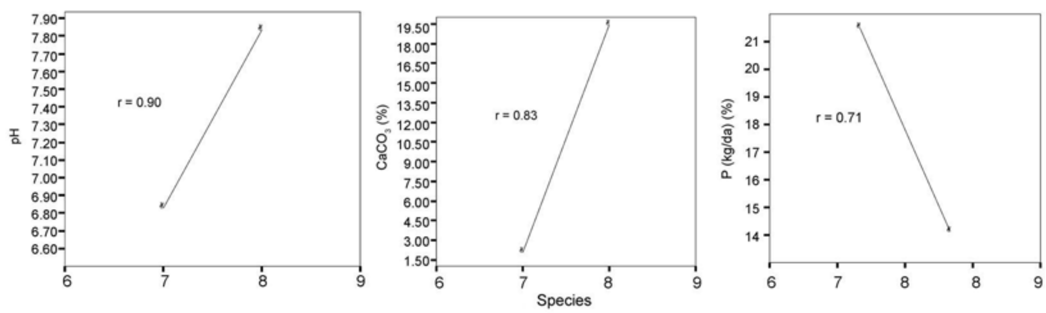

Fig. 2. Regression analysis graphs of *Iris persica* with respect to soil pH, $CaCO_3$ and P.

Many geophytic plants are under threat in Turkey. Specially, natural habitats of endemic plants have been destroyed by numerous activities. This state of destruction has been affecting the biological diversity of the plants. From field observations, it was observed that race of some *Iris* species such as *I. aucheri,* subsp. *aintabensis* and *I. pamphylica* became endangered because of some activities such as dam construction, agriculture, grazing, fires, using pestitades and change in climate. Only, *I. pamphylica* and *I. aucheri* were reported in the VU (Vulnerable) category by Ekim *et al*. (2000) and Eker *et al*. (2008). Subsp. *aintabensis* should be included into VU category because of the reasons mentioned above.

Thus, it is neccessary to carry out careful field observations, anatomical studies, plastid and nuclear DNA sequencing on the taxa of both *Hermodactyloides* and *Scorpiris* subgenera to solve the intra and interspecific relationships between the taxa.

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(Manuscript received on 19 May, 2011; revised on 12 October, 2011)