

DISTRIBUTION PATTERN OF THE GENUS *VERONICA* L. IN IRAN

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Abstract

In this study number, proportion of various phytogeographical elements and life forms of *Veronica* species and distribution map of some of them in Iran are provided.

Introduction

South-west Asia is the centre of diversity for the genus *Veronica* L. Approximately half of the species of the genus *Veronica* (Scrophulariaceae) occur in this region (Willis 1965). This genus has been classified into five sections by Fischer (1981). In Iran, 60 species of *Veronica* are reported to occur. Among them 18 species are endemic. The habitats of these species vary from humid soils, cultivated farms and rocky slopes. In the course of systematic revision of the genus *Veronica* in Iran, a taxa new to science has been discovered (Saeidi *et al.* 2001) and new records from Iran have been reported (Saeidi *et al.* 2001, Saeidi and Assadi 2003).

The aim of the present study is to analyse the distribution patterns and to recognize the various phytogeographical elements of *Veronica* species in Iran.

Materials and Methods

The present report is based on various botanical field studies carried out between 1998 and 2001. Several specimens of *Veronica* have been collected from many parts of Iran. These are kept in TUH (Tehran University Herbarium). Some duplicates are also in TARI (Herbarium of Research Institute of Forests and Rangelands). Terminology of the main phytochoria (Irano-Turanian, Mediterranean, Hyrcanian) is based on the classical work of Takhtajan (1986).

Results and Discussion

Phytogeographical distribution patterns: Table 1 shows that majority of the *Veronica* species (55 %) distributed in Iran belong to the Irano-Turanian area. This is followed by 21% Hyrcanian species and only 3.3% Mediterranean species. The biregional elements are Irano-Turanian/ Mediterranean (1.6%) and Irano-Turanian/Hyrcanian (11.6%). The percentage of the Irano-Turanian/Mediterranean/Hyrcanian species is 1.6. Five percentage of *Veronica* species are Cosmopolitan, namely *V. persica*, *V. polita* and *V. beccabunga*.

Table 2 lists the endemic species, phytogeographical elements, life form and their distribution in different locations of Iran. Seventy nine per cent of the species of *Veronica* are mono-regional elements. The rest are bi- or tri-regional and cosmopolitan in distribution.

A good number of species are found in North and North-west Iran. However, North-eastern and West of Iran are also rich in *Veronica* species. Some of them e.g. *V. orientalis*, *V. campylopoda*, *V. capillipes*, *V. anagallis-aquatica*, *V. persica*, *V. polita* and *V. biloba* are widely distributed in Iran (Figs. 1 and 2), while others such as *V. avromanica*, *V. verna*, *V. triphyllus* and *V. viscosa* have very limited distribution (Figs. 3 and 4).

Life form: Thirty two per cent of the *Veronica* species are hemichryptophytes, 57 per cent therophytes, 3.5 per cent chamaephytes, 5.3 per cent H/T and 8.9 per cent H/CH in Iran. Hemichryptophytes are the most dominant life form among the *Veronica* species distributed in Iran, chamaephytes are not common.

Table 1. Number and proportion of various phytogeographical elements of *Veronica* species in Iran.

Phytogeographical area	Abbreviation*	No. of species	%
Irano-Turanian	IT	33	55
Hyrceanian	HY	13	21
Mediterranean	M	2	3
Irano-Turanian/Mediterranean	IT/M	1	1.6
Irano-Turanian/Hyrceanian	IT/HY	7	11.6
Irano-Turanian/Mediterranean/ Hyrceanian	IT/M/HY	1	1.6
Cosmpolitan	COS	3	5

*IT= Irano-Turanian, HY=Hyrceanian, M = Mediterranean, COS=Cosmopolitan.

Table 2. List of *Veronica* species in Iran. EN = Endemic. In the following list the endemic species, phytogeographical elements, life forms and their distribution are presented. Life forms: CH = Chamaephyte, H = Hemichryptophyte, T = Therophyte.

Species	Distribution									
	Chorotype	EN	Life form	NW	N	NE	W	C	S	SE
<i>Veronica acrotheca</i>	IT/M	+	H/CH				+	+		
<i>V. anagallis-aquatica</i>	IT		H	+	+	+	+	+	+	
<i>V. anagalloides</i>	IT		H	+	+	+		+	+	
<i>V. argute-serrata</i>	IT		T	+	+	+		+		
<i>V. arvensis</i>	IT/HY		T	+	+	+				
<i>V. avromanica</i>	IT		T				+			
<i>V. aucheri</i>	IT	+	H		+			+		
<i>V. beccabunga</i>	COS		H	+	+			+		
<i>V. biloba</i>	IT		T		+		+	+		+
<i>V. bozakmanii</i>	IT		T	+						
<i>V. bungei</i>	IT/HY	+	?	+						
<i>V. campylopoda</i>	IT		T		+	+	+	+		
<i>V. capillipes</i>	IT		T			+		+		
<i>V. cardiocarpa</i>	IT		T	+						
<i>V. ceratocarpa</i>	HY		H/T	+	+					
<i>V. chionantha</i>	IT	+	H	+				+		
<i>V. crista-galli</i>	HY		T	+	+					

<i>V. cymbalaria</i>	M	T								+
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(Contd.)

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<i>V. czerniakowoskiana</i>	IT		H/CH							+
<i>V. daranica</i>	IT	+	H							+
<i>V. davisii</i>	IT		H	+						
<i>V. denudata</i>	IT		?	+						
<i>V. euphrasifolia</i>	HY	+	?	+						
<i>V. farinosa</i>	IT	+	CH						+	+
<i>V. ferganica</i>	IT		T						+	
<i>V. filiformis</i>	HY		H						+	
<i>V. fragilis</i>	IT	+	H						+	
<i>V. francispetae</i>	HY	+	T						+	
<i>V. gaubae</i>	IT/HY	+	H/T	+					+	+
<i>V. gentianoides</i>	HY		H	+					+	
<i>V. hederifolia</i>	IT/M/HY		T						+	+
<i>V. hispidula</i>	IT		T						+	+
<i>V. intercedens</i>	IT		T						+	+
<i>V. khorassanica</i>	IT	+	H/CH						+	+
<i>V. kopetdaghensis</i>	IT		H/CH						+	
<i>V. kurdica</i>	IT/HY	+	H	+					+	+
<i>V. macropoda</i>	IT		T						+	
<i>V. macrostachys</i>	IT/HY		H	+					+	
<i>V. magna</i>	HY		H	+						
<i>V. mazanderana</i>	HY	+	T						+	
<i>V. microcarpa</i>	IT		T	+						
<i>V. mirabilis</i>	IT/HY	+	H						+	
<i>V. multifida</i>	IT		CH	+					+	
<i>V. officinalis</i>	HY		H/CH						+	
<i>V. orientalis</i>	IT		H	+					+	+
<i>V. paederotae</i>	IT	+	H						+	
<i>V. panormitana</i>	M		?							+
<i>V. peregrina</i>	HY		T						+	
<i>V. persica</i>	COS		H/T	+					+	+
<i>V. polita</i>	COS		T	+					+	+
<i>V. pusilla</i>	IT		T	+					+	+
<i>V. rechingeri</i>	HY	+	H	+					+	
<i>V. reuterana</i>	IT		T	+						
<i>V. rubrifolia</i>	IT	+	T	+					+	+
<i>V. scardica</i>	IT		H							+
<i>V. serpyllifolia</i>	HY		H						+	
<i>V. siaretensis</i>	HY	+	T						+	

<i>V. triphyllos</i>	IT	T			+
<i>V. verna</i>	IT/HY	T	+	+	
<i>V. viscosa</i>	IT	T			+

Endemism: The most important speciation centre of *Veronica* is Turkey and Caucasus. *V. davisii*, *V. filiformis* and *V. bozakmanii* are known only from this region and adjacent areas (Fischer 1978). The species most closely related to *V. persica* and *V. polita* are *V. ceratocarpa*, *V. francispetae*, *V. siaretensis* and *V. filiformis*, which are distributed mainly in North Iran. Iran with 18 endemic species is one of the important diversification centres of the genus *Veronica*.

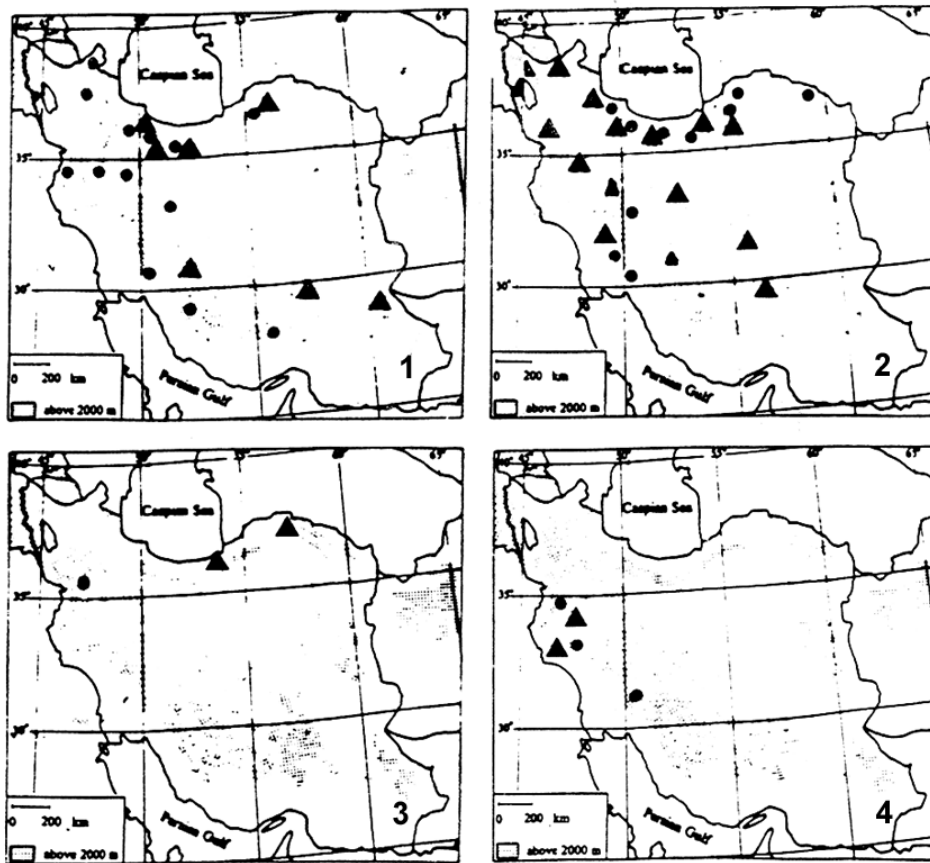


Fig. 1. Distribution map of *V. biloba* (●) and *V. anagallis-aquatica* (▲). Fig. 2. Distribution map of *V. persica* (▲) and *V. polita* (●). Fig. 3. Distribution map of *V. avromanica* (●) and *V. verna* (▲). Fig. 4. Distribution map of *V. viscosa* (●) and *V. triphyllos* (▲).

The largest mountain ranges of Iran, i.e. Alborz and Zagros, are other important speciation centres of *Veronica*. *V. rechingeri*, *V. chionantha*, *V. mazanderana*, *V. francispetae*, *V. siaretensis* and *V. mirabilis* are some of the endemic species in Alborz. *V. acrotheca*, *V. farinosa* and *V. fragilis* are some endemics known from Zagros. A similar distribution pattern has

already been reported for *V. farinosa* and *V. acrotheca* in Iran by Fischer (1984). The Kopet Dag mountain range in North-east Iran is another important speciation centre of *Veronica*, according to the report of many Russian taxonomists (Borrisova 1955), who described many new species from this region. *V. kopetdaghensis*, *V. czerniakowoskiana* and *V. ferganica* are the only endemic of Kopet Dag.

V. officinalis, *V. magna*, *V. mazanderana*, *V. gaubae*, *V. crista-galli* and endemic species e.g. *V. ceratocarpa*, *V. francispetae*, *V. siaretensis* are found in dense forests of North Iran.

Growth altitude: Most of the species of this genus occur at an altitude of 1000 - 2700 m, but *V. mirabilis* and *V. paederotae* occur in subalpine regions of Central and North Iran, while *V. peregrina* occurs at lower altitudes (down to 20 m). This species is a native of North Europe, being introduced in the 18th century (Bangerter 1964) and has since then become widespread. This species shows indigenous distribution in North Iran as a damp plant.

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