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Analysis of the flora of Mount Menikion, NE Greece

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ABSTRACT

KARAGIANNAKIDOU, V. (1991). Analysis of the flora of Mount Menikion, NE Greece. *Saussurea* 22: 33-42. In English, English and German abstracts.

The present paper is dealing with the phytogeographical analysis of Mt. Menikion's flora with particular reference to the Balkan element. The majority of the plant taxa growing in the mountain are Hemicryptophytes. Concerning their chorology, there is an obvious dominance of the North-Euroasiatic element — in a wide sense. The high participation of the Balkan element as well as the presence of the Mediterranean ones suggests that Mt. Menikion belongs to the submediterranean floristic zone.

ZUSAMMENFASSUNG

KARAGIANNAKIDOU, V. (1991). Analyse der Flora des Menikion-Gebirges, NO Griechenland. *Saussurea* 22: 33-42. Auf Englisch, englische und deutsche Zusammenfassungen.

Die vorliegende Arbeit beschäftigt sich mit der pflanzengeographischen Analyse der Flora des Menikion-Gebirges, besonders der Balkanelemente. Die meisten vorliegenden Spezies sind Hemikryptophyten. In chorologischer Hinsicht überwiegen die nördlichen, eurasiatischen Elemente im weiten Sinn. Wegen des grossen Anteils der Balkanelemente und des Vorkommens von Mittelmeerelementen gehört das Menikion-Gebirge zum submediterranen Bereich.

Introduction

Mount Menikion is situated in NE Greece (east of Serres city) and is bordered by the plains of Serres (to the south) and Dramas (to the east) as well as by Mount Vrontous (to the north). It has NW-SE direction and extends in an area of 380 km². The highest peaks lie to the west side (Karagioz Lofos 1963 m, Karpa 1800 m); it is important to note that these do not form isolated peaks in contrast to the geomorphology of most greek mountains, but they belong to a total of continuous levels with very small differences in altitude (Fig. 1).

From the geological point of view, Mt. Menikion belongs to the Rhodopi crystalline massif (KOSSMAT, 1924). DE BOER (1970) distinguishes two series belonging to this massif, the upper and the lower series which consists of siliceous rocks marbles and gneisses. Neogen sediments occur in lower parts (VAVLIAKIS, 1981).

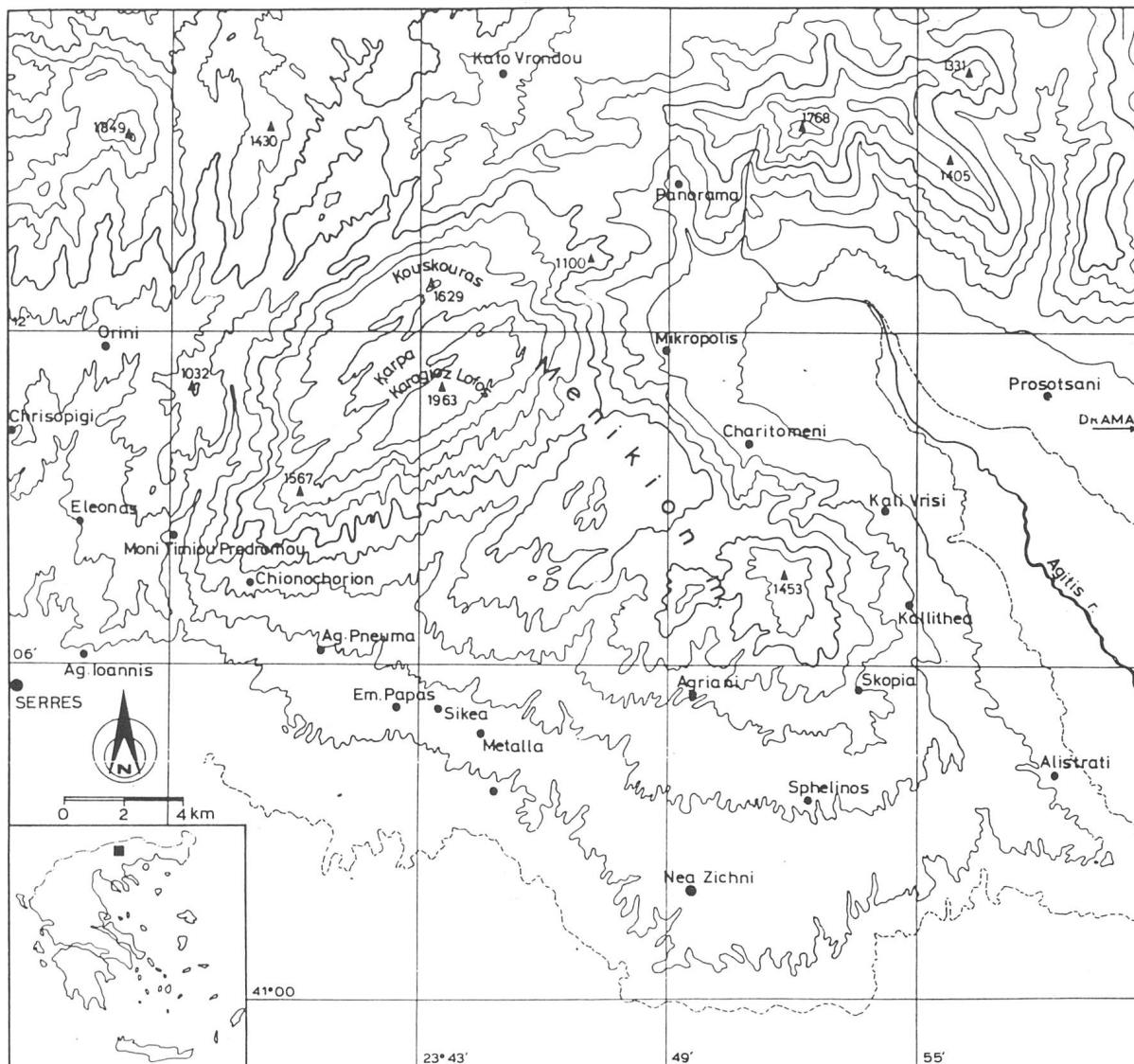


Fig. 1. — Geographical map of Mount Menikion.

<i>Systematic unit</i>	<i>Families</i>	<i>Genera</i>	<i>Species</i>	<i>Sub-species</i>	<i>Total number of species and subspecies</i>	<i>%</i>
Pteridophytes	6	7	7	1	8	1.45
Gymnosperms	1	1	—	3	3	0.54
Monocotyledones	56	212	327	126	453	82,22
Dicotyledones	6	47	65	22	87	15.79
Total	69	267	399	152	551	100.00

Table 1. — Flora composition of Mount Menikion.

The climate of Mt. Menikion is characterized as transitional between the mediterranean and the continental climate (BALAFOUTIS, 1977). The dry period lasts 2,5 months, from mid-July up to the end of September and the total annual amount of precipitation is 940 mm (PAPANASTASIS, 1982).

Mount Menikion presents four different, altitudinally vicarious vegetation zones, the zone of submediterranean semi-evergreen forests, the zone of deciduous oak forests, the mountainous zone of beech forests, the zone of subalpine grasslands (KARAGIANNAKIDOU & KOKKINI, 1988).

The most important references for the flora of Menikion, are RECHINGER (1939), STRID (1986) and KARAGIANNAKIDOU & KOKKINI (1987).

Material and methods

As material for the present paper, we used the 551 taxa (species, subspecies) which have been reported in the paper "The flora of Mount Menikion in NE Greece" (KARAGIANNAKIDOU & KOKKINI, 1987).

The nomenclature follows STRID (1986) or TUTIN & al. (1964-1980); the author's citations have been omitted for practical purposes. Voucher specimens are deposited in the Herbarium of the Institute of Systematic Botany and Phytogeography of the University of Thessaloniki (TAU).

The chorological data were taken from PIGNATTI (1982), TUTIN & al. (1964-1980), STRID (1986), GREUTER & al. (1984-1986). All taxa are grouped into chorological categories according to PIGNATTI (1982) and WALTER-STRAKA (WALTER, 1970).

Results and discussion

Table 1 presents the composition of Menikion's flora in relation to the main systematic units. 551 taxa occur in Menikion, belonging to 69 families, 267 genera, 399 species and 152 subspecies.

The life-form spectrum of the flora studied shows a clear dominance of Hemicryptophytes (Table 2). This evidence biologically characterizes the climate of Menikion. A comparison between the life-form spectrum of Menikion to that of the mountains of N Greece shows a similarity in the proportions of the main life-forms. On the opposite side, Therophytes are the dominant form in the islands (e.g. Paxi, Sciathos, Kythira; Table 2, Fig. 2). Concerning the differences in proportions of Therophytes for N Greek mountains, as it appears in Table 2, we think that these can be attributed to the following reasons: Lailias and Menikion which are situated at the same, more or less, altitude, have different substrate. Thus, the calcareous rocks of Menikion increase more the influence of dry period in plants than the igneous rocks of Lailias. Voras which is situated north of Menikion, has a higher connection with the flora of Balkan peninsula, while Vermion lying south of Menikion has a higher connection with the flora of mediterranean zone.

The high participation of Hemicryptophytes is obvious in the life-form spectra of the ten richest families, in number of taxa, of Menikion's flora. The percentages of Hemicryptophytes in these families are in most cases higher than the total percentage of Hemicryptophytes of Menikion's flora (Tables 2, 3). This fact is related to the more or less better representation of the above families in areas with cold winters like Mount Menikion (TURRILL, 1929; MANGENOT, 1973). The percentage of Phanerophytes is very small or absent and is mainly restricted to Rosaceae family which is known to consist of woody species. All Liliaceae taxa are Geophytes while the family Lamiaceae presents a high percentage of Chamaephytes.

<i>Life-forms</i>	<i>Menikion</i> KARAGIANNAKIDOU	<i>Voras</i> VOLIOITIS 1979	<i>Lailias</i> VOLIOITIS 1976	<i>Vermion</i> GANIATSAS 1939	<i>Vertiskos</i> PAVLIDES 1982
Phanerophytes	9.98	9.6	12.2	14.8	11.2
Chamaephytes	9.80	7.1	7.7	13.8	5.2
Hemicryptophytes	54.26	56.6	54.3	33.0	41.5
Geophytes	6.17	11.0	12.0	15.8	10.3
Therophytes	19.78	14.2	13.2	20.8	20.0
<i>Life-forms</i>	<i>Cholomon</i> VOLIOITIS 1967	<i>Prespa</i> PAVLIDES 1985	<i>Paxi</i> GEORGIADIS & al. 1986	<i>Sciathos</i> ECONOMIDOU 1969	<i>Kithyra</i> GIANNITSAROS 1969
Phanerophytes	15.0	9.53	12.18	8.3	7.61
Chamaephytes	7.7	5.20	7.59	7.1	10.93
Hemicryptophytes	31.4	47.96	21.38	25.0	17.15
Geophytes	15.3	7.61	11.50	12.3	11.48
Therophytes	26.3	23.70	47.35	44.6	52.00

Table 2. — Life-form spectra for some mountains of N Greece and some islands of Greece.

<i>Families</i>	<i>PH</i>	<i>CH</i>	<i>H</i>	<i>G</i>	<i>TH</i>
Asteraceae	—	2.77	83.33	—	13.88
Poaceae	—	—	70.49	4.91	24.59
Fabaceae	7.40	5.55	48.14	3.70	35.18
Lamiaceae	—	47.61	45.23	—	7.14
Caryophyllaceae	—	3.44	62.06	—	34.48
Rosaceae	54.83	—	45.16	—	—
Scrophulariaceae	—	—	66.66	—	33.33
Rubiaceae	—	6.66	53.33	—	40.00
Liliaceae	—	—	—	100.00	—
Brassicaceae	—	—	50.00	50.00	—

Table 3. — Life-form spectrum of the 10 richest families in number of species of the flora of Mount Menikion.

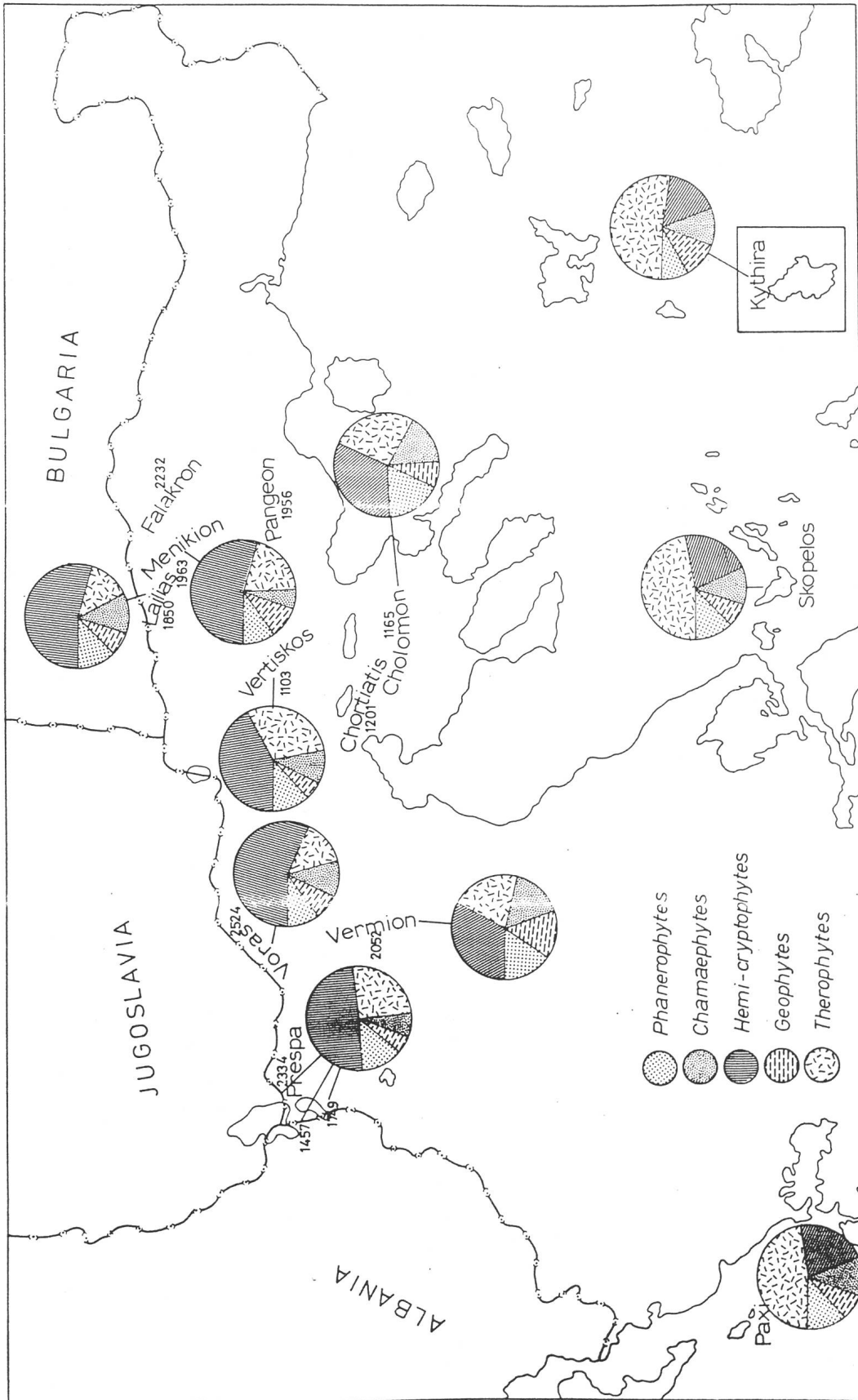


Fig. 2. — Schematic presentation of different life-form spectra of the Table 2.

Different chorological elements participate in the flora of Menikion; the most important are those of northern — in a wide sense — origin (Table 4). The Europe - Eurasiatic - Circumbor - Submediterranean - Balkan - Euri - Medit - Arct - Alp - Po - Subpo — taxa have a total percentage of 62.25%, while the Mediterranean — Hellenica and S, SE Europe, Paleotemp taxa represent a total percentage of 33.19%.

The typical mediterranean elements e.g. *Rhus coriaria*, *Pistacia terebinthus*, *Cercis siliquastrum*, *Cistus incanus*, mainly occur at the low altitudes of the mount up to 800 m, except *Quercus coccifera* which forms extensive shrubbies from low altitudes up to 1300 m, in west side.

A few Arctic-Alpine-Proalp elements such as *Thesium alpinum*, *Prenanthes purpurea*, *Arctostaphylos uva-ursi*, *Alopecurus gerardii* and *Bellardiochloa violacea*, occur at high altitudes of Menikion. Their presence is attributed to the migration-routes which have taken place during the glacial period. During that period several elements of the arctic-alpine flora spread from the north into the mountains of Balkan peninsula (TURRILL, 1929; VOLIOTIS, 1976; PHITOS, 1980).

The most important phytogeographical element of Menikion's flora is the Balkanic one. Due to the close geological and climatic relations of Menikion with the main Balkan massif (VAVLIAKIS, 1981; DE BOER, 1970) a high percentage of Balkan taxa (22.26%) grow here (Table 4). Most of them (57.37%) are typical Balkanic endemic taxa, while the remaining ones are also distributed in neighbouring countries (Table 5). It is worth noticing that the majority of Balkan endemic taxa occurring in Menikion, are mainly distributed in the southern-central area of Balkan peninsula. Among the Greek-Bulgarian endemic species (16 in total), there are some which have very limited appearance in Greek mountains e.g. *Campanula orphanidea*, *Trachelium jacquinii* subsp. *rumelianum*, *Thymus atticus*, *Bromus cappadocicus* subsp. *lacmonicus*, *Saxifraga stribrnyi*, *Veronica urumovii* and others. Hemicryptophytes is the dominant life-form of the Balkan taxa (71.32%) followed by the Chamaephytes (15.58%) (Table 6). The above percentages are higher than the respective ones of the total flora (54.26%, 9.80%, Table 7). It is probably due to the fact that the majority of Balkan taxa occur at the higher altitudes of the mountain as it clearly appears in Figure 3. The curve for the altitudinal distribution of Balkan taxa occurring in Mt. Menikion shows its maximum for the higher altitudes. In these altitudes the greatest proportion of species is perennial (short vegetative period). The greatest number of Balkan species belongs to the families *Asteraceae*, *Campanulaceae*, *Caryophyllaceae*, *Fabaceae*, which are richer in number of species in the Balkan region (TURRILL, 1929) and N Greek mountains (PAVLIDES, 1985, 1982; VOLIOTIS, 1967, 1976, 1979; PAPANIKOLAOU, 1986 and others).

A smaller number of species belongs to the families *Saxifragaceae*, *Scrophulariaceae*, *Poaceae*, *Rubiaceae*, *Polygonaceae*, *Dipsacaceae* and *Brassicaceae*.

It is important to notice the Hellenica species and subspecies which are met in Mount Menikion; they are: *Dianthus gracilis* subsp. *gracilis*, *Minuartia glomerata* subsp. *macedonica*, *Cerastium banaticum* subsp. *banaticum*, *Paronychia rechingeri*, *Petrorhagia thessala*, *Silene thessalonica* subsp. *thessalonica*, *Sideritis montana* subsp. *remota*, *Allium spherocephalon* subsp. *trachypus*, *Festuca graeca*, *F. macedonica*, *Rumex pulcher* subsp. *pulcher*, *Asperula aristata* subsp. *thessala*, *Galium capitatum*, *G. heldreichii*, *Scrophularia heterophylla* subsp. *laciniata*, *Verbascum speciosum* subsp. *speciosum*, *Euphorbia seguierana* subsp. *niciana*, *Astragalus angustifolius* subsp. *pungens* and *Centaurea orphanidea*. The most of them are spreading in N, central, E Greece and few in Aegean region and none in S Greece (STRID, 1986).

The life-form spectrum of Mount Menikion compared to the life-form spectrums of other Greek areas (Table 2, Fig. 2) presents one significant percentage of Hemicryptophytes (54.26%). This fact is considered as representative of a temperate mild climate.

<i>Chorological elements</i>	<i>Number of species and subspecies</i>	<i>%</i>
Balk.....	122	22.26
Hell.	19	3.46
Medit.	74	13.50
Submed.....	24	4.37
Euras.....	51	9.36
Europ.	67	12.22
S, SE Europ.....	63	11.49
Euri-Medit.	37	6.75
Circumbor.	25	4.56
Cosmop-Subcos.....	23	4.19
Paleotemp.	26	4.74
Arct-Alp-Proalp.	6	1.09
Po-Subpo.....	9	1.64
Pantr-Subtrop.	2	0.36
Total.....	548*	100.00

Table 4. — Chorological spectrum of the species occurring in Mount Menikion.

* = Three species (*Digitalis laevigata* × *D. viridiflora*, *Cotoneaster nebrodensis* × *C. integerrimus* and *Poa brevifolia*) have not been included.

<i>Chorological elements</i>	<i>Number of species and sub-species (%)</i>	<i>Contribution of Balk</i>	<i>Number of species and sub-species (%)</i>
Balk	70 (57.37)	Al, Bu, Gr, Ju, Rm	11 (15.72)
Balk + It*	13 (10.65)	Al, Ju, Gr	6 (8.57)
Balk + Tu	19 (15.58)	Ju, Bu, Gr	19 (27.14)
Balk + Rs (Krym)	14 (11.48)	Al, Ju, Bu, Gr	12 (17.15)
Balk + Pann	3 (2.46)	Gr, Bu	16 (22.85)
Balk + Tu + It	3 (2.46)	Gr, Al	3 (4.29)
		Gr, Ju	2 (2.86)
		Gr, Rm	1 (1.42)
Total	122 (100.00)	Total	70 (100.00)

Table 5. — Analysis of the Balkan taxa from Mount Menikion (* the abbreviations in table have been taken from “Flora Europaea”).

<i>Life-form</i>	<i>Number of species and subspecies</i>	<i>%</i>	<i>Duration</i>	<i>Number of species and subspecies</i>	<i>%</i>
Phanerophytes	4	3.27	Annual	9	7.38
Chamaephytes	19	15.58	Biennial	9	7.38
Hemicryptophytes .	87	71.32	Perennial	99	81.15
Geophytes	2	1.64	Shrubs	5	4.10
Therophytes	10	8.19	Trees	—	—
Total	122	100.00	Total	122	100.00

Table 6. — Life-form spectrum and duration of life of the Balkan taxa from Mount Menikion.

<i>Life-form</i>	<i>Number of species and subspecies</i>	<i>%</i>	<i>Duration</i>	<i>Number of species and subspecies</i>	<i>%</i>
Phanerophytes	55	9.98	Annual	108	19.60
Chamaephytes	54	9.80	Biennial	27	4.90
Hemicryptophytes . .	299	54.26	Perennial	365	64.42
Geophytes	34	6.17	Shrubs	49	8.89
Therophytes	109	19.78	Trees	12	2.17
Total	551	100.00	Total	551	100.00

Table 7. — Life-form spectrum and duration of life of the flora of Mount Menikion.

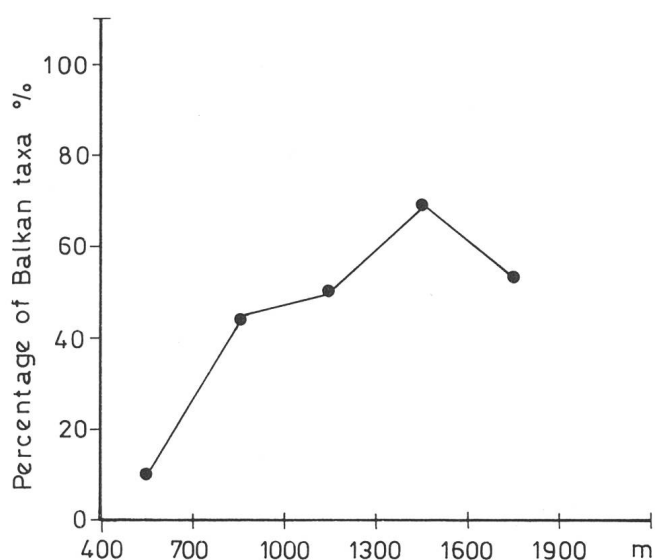


Fig. 3. — Altitudinal distribution of the Balkan taxa occurring in Mount Menikion

By the composition of the chorological elements of the species as found by different researchers (QUÉZEL & CONTANDRIOPOULOS, 1965; QUÉZEL, 1969; VOLIOTIS, 1967, 1976, 1979; KARAGIANNAKIDOU, 1983, 1988; GANIATSAS, 1939; PAVLIDES, 1982, 1985, et al.) in different areas of N Greece, it seems that there is a great mid-europe and Balkan influence particularly in the igneous mountains Bella Boda, Chortiatis, Cholomon, Lailias, Vermion, Bertiscos, Prespa. The same also happens on the calcareous Mount Menikion. However, the total chorological spectrum of the taxa of the Menikion shows that it probably belongs to the vegetation zone between mediterranean and european which is known as submediterranean and not a clearly Balkan vegetation zone (cf. REGEL, 1937, 1947; MARKGRAF, 1943, 1952; MEUSEL & al., 1965; TURRILL, 1929).

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