Contribution to the knowledge of the vascular flora of NE Greece: Floristic composition of the beech (Fagus sylvatica L.) forests in the Greek Rodopi

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Contribution to the knowledge of the vascular flora of NE Greece: Floristic composition of the beech (*Fagus sylvatica* L.) forests in the Greek Rodopi

Abstract


The first floristic inventory of the beech forests in the Greek Rodopi is presented. The investigation included pure beech (*Fagus sylvatica* L. s.l.) stands as well as mixed stands of beech with *Pinus sylvestris*, *P. nigra*, *Picea abies*, *Abies ×borisii-regis*, *Quercus petraea* subsp. *medwediewii* and *Q. frainetto*. The floristic catalogue is based on the floristic data of 584 phytosociological beech forests relevés and on a supplementary floristic inventory. Published information of records from inside beech forests has also been taken into account. For each taxon information is given about its spatial and altitudinal distribution and constancy in the Greek Rodopi as well as about its ecological preferences. The floristic catalogue is divided in two parts. The first part includes the taxa that constitute the beech forest community. The second part includes taxa that appear randomly in the beech forests. Three species, *Hieracium praecurrens*, *Pyrola media* and *Verbascum lanatum*, are recorded for the first time from Greece.

1. Introduction

The Rodopi mountain range is located in NE Greece and extends in a west to east direction along the Greek-Bulgarian border. The Greek part of the Rodopi mountain range is bounded to the west and south by the Nestos river, while eastwards it gradually declines in elevation to the Evros plains.

To date only a small part of the Greek Rodopi has been studied floristically. Extensive floristic inventories have been conducted in the cold broad-leaved and coniferous forests and in the zone above the timberline in the Elatia area (Eleftheriadou 1992) and the Frakto Virgin Forest (Eleftheriadou & Raus 1996), Drama prefecture. Records for the flora of the Greek Rodopi are documented in various publications and come mainly from botanical excursions, phytosociological and stathmological investigations, and studies of the distribution of rare taxa.
Fig. 1. Topographic map of the Greek Rodopi with the collecting localities in beech forests and the nine subareas distinguished and named (compare Table 1).
2. Investigated area

The investigated area of the Greek Rodopi comprises pure *Fagus sylvatica* forest and mixed forest, mainly with *Pinus sylvestris*, *P. nigra*, *Pinus nigra*, *Abies alba* × *A. borisii-regis*, *Quercus petraea* subsp. *medwediewii* and *Q. frainetto*. The floristic inventory has been conducted inside the beech forests and not in the wider area of the beech zone. In the mixed stands the floristic inventory has been conducted only in those in which beech is the dominant tree species. Our collecting localities are situated inside the area confined by the coordinates 41°10'12'' to 41°33'26''N and 24°13'39'' to 25°52'05''E.

In the Greek Rodopi a western and an eastern part can be distinguished. The ridge of Koula in the Xanthi prefecture can be considered as the border between both parts, according to the differentiation of the vegetation. The investigated area was divided in nine subareas (Fig. 1, Table 1), of which six are in the western and three in the eastern Rodopi. The collecting localities of the taxa reported from beech forests in Rodopi in the literature are inside these subareas, except for one of Gamisans & Hebrard (1980), which is situated about 3 km southwest from our southwestern locality in subarea 7 = Exinos and has a very low altitude (180-210 m).

The collecting localities and subareas as shown in Fig. 1, in fact represent the beech forests in Rodopi. In the western Rodopi beech forms an almost continuous zone. Also forests of *Pinus sylvestris*, *P. nigra* and *Picea abies* appear in this zone. In warmer and drier sites, forests of *Quercus petraea* subsp. *medwediewii* replace beech forests. In the eastern Rodopi, beech forests are usually extrazonal and restricted to the moister sites (north exposures and depressions) in areas in which forests of *Quercus petraea* subsp. *medwediewii* and *Q. frainetto* dominate. As an exception, a zone of beech forest occurs in the higher altitudes of Mt Papikio. In the eastern Rodopi coniferous forests do not exist.

Four meteorological stations exist in the investigated area (Livaditis, Echinos, Thermes, Monastiraki). Only one is situated in the western Rodopi, at an altitude above 1000 m. Three further stations (Sidironero, Skaloti, Kerasea) are close to the beech zone. Based on the data of these seven stations the bioclimate (according to Mavrommatis 1980) in the beech forests is humid with harsh winters. Exceptionally, in some areas at low altitude, the bioclimate is between humid and subhumid and the winters are cold and not harsh.

The substrate of the majority of beech forests consists of acid igneous and metamorphic rocks, though a small part has calcareous bedrocks. Specifically, the beech forests in Elatia stock on granodiorite and gneiss and in the southern part of the area on marble. In Anthero they occur on granodiorite and gneiss and rarely on marble. In the northern part of Frakto, they are found on granodiorite and in the southern part of the same area on granodiorite and marble. In Stamna, they occur, mainly, on marble and only in a few places on granodiorite. In Lepidas and Drymos the substrates are gneiss and granodiorite, while in Echinos, Papikio and Kechros are mainly gneiss.

It proved rather difficult to determine the subspecies of beech (*Fagus sylvatica*) in the investigated area. The determination was based mainly on the length of the fruiting peduncle and the
shape and the width of the cupule scales. A systematic sampling of beech leaves was not carried out, since their morphological characteristics vary according to the available light and other environmental conditions (Denk 1999). Our observations can be summarized as follows.

Beech of the western Rodopi has cupules that notably differ from those in the eastern Rodopi. In contrast to what Alden (1986) mentions, we observed cupules in areas 7, 8 and 9 with 2-5 mm wide spatulate scales and in many of them a median vein was easily visible. It seems that the distribution of the different forms of cupule scales is related with the altitude. Cupules with spatulate scales were observed at low altitudes in the western Rodopi, while cupules with linear scales were found at higher altitudes of the eastern Rodopi. Regarding the length of the peduncle, both cupules with spatulate scales and a peduncle shorter than 15 mm as well as cupules with linear scales and peduncle longer than 15 mm were found. Generally, in the western Rodopi the cupules have linear and subulate scales and very rarely spatulate ones.

Therefore, in western Rodopi *Fagus sylvatica* subsp. *sylvatica* and *F. sylvatica* subsp. *moesiaca* dominate, whereas forms closely resembling *F. sylvatica* subsp. *orientalis* are rare. In eastern Rodopi and in the area of Echinos cupules with spatulate or linear scales occur with the same frequency. In the area of Papikio cupules with linear scales appear less often and in Kechros area these are rare. Beech of eastern Rodopi can thus be regarded as *F. sylvatica* subsp. *moesiaca*, although *F. sylvatica* subsp. *orientalis* also occurs, especially eastwards. It remains unclear whether true *F. sylvatica* subsp. *sylvatica* grows in this part of the Rodopi.

Our observations are in accordance with the description of the morphological differentiation of beech in Rodopi given by Moulopoulos (1965). If his classification is applied, in western Rodopi occur ‘*Fagus sylvatica*’, ‘*F. moesiaca* forma *taeniolepis*’ and rarely ‘*F. moesiaca* forma *spatulolepis*’. In eastern Rodopi occur ‘*F. moesiaca*’ (‘forma *taeniolepis*’ and ‘forma *spatulolepis*’) and ‘*F. orientalis*’. There is also an obvious decrease of ‘*F. moesiaca* forma *taeniolepis*’ eastwards and simultaneously an increase of the other two taxa.

Eleftheriadou & Raus (1996) report from the Frakto Virgin Forest *Fagus sylvatica* subsp. *sylvatica* and *moesiaca*. Gamisans & Hebrard (1980) report from the Drymos area the subspecies *sylvatica*, *moesiaca* and *orientalis* and from the southern part of the Echinos area the subspecies *moesiaca* and *orientalis*. Our observed spatial-morphological differentiation of the beech population in the Greek Rodopi does not support, in contrast, the view of Gömöry & al (1999) that in the Rodopi and the Balkans in general only a single, separate subspecies of *Fagus sylvatica* occurs.

### Table 1. Coordinates and altitudes of our collecting localities in the nine subareas of the Greek Rodopi.

<table>
<thead>
<tr>
<th>Subarea</th>
<th>Latitude (N)</th>
<th>Longitude (E)</th>
<th>Altitude (m)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>minimum</td>
<td>maximum</td>
<td>minimum</td>
</tr>
<tr>
<td>western Rodopi</td>
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<td></td>
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<tr>
<td>Elatia</td>
<td>41°25'36&quot;</td>
<td>41°32'16&quot;</td>
<td>24°13'39&quot;</td>
</tr>
<tr>
<td>Amthoro</td>
<td>41°30'07&quot;</td>
<td>41°31'43&quot;</td>
<td>24°21'51&quot;</td>
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<tr>
<td>Frakko</td>
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<td>41°33'26&quot;</td>
<td>24°27'24&quot;</td>
</tr>
<tr>
<td>Stamna</td>
<td>41°23'01&quot;</td>
<td>41°28'05&quot;</td>
<td>24°31'45&quot;</td>
</tr>
<tr>
<td>Lepidas</td>
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<td>41°25'37&quot;</td>
<td>24°37'00&quot;</td>
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<tr>
<td>Drymos</td>
<td>41°15'58&quot;</td>
<td>41°21'53&quot;</td>
<td>24°35'42&quot;</td>
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<tr>
<td>eastern Rodopi</td>
<td></td>
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<td></td>
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<tr>
<td>Exinos</td>
<td>41°11'29&quot;</td>
<td>41°22'05&quot;</td>
<td>24°52'01&quot;</td>
</tr>
<tr>
<td>Papukio</td>
<td>41°11'37&quot;</td>
<td>41°16'55&quot;</td>
<td>25°18'26&quot;</td>
</tr>
<tr>
<td>Kechros</td>
<td>41°10'12&quot;</td>
<td>41°13'15&quot;</td>
<td>25°48'35&quot;</td>
</tr>
</tbody>
</table>
3. Material and methods

The majority of the specimens were collected during a phytosociological study conducted by the first author in the beech forests of the Rodopi. In total, 584 own phytosociological relevés were floristically evaluated. Specimens outside the relevés were collected simultaneously. Additional collections were done in spring and autumn. The specimens were all collected inside beech forests, whereas forest edges and clearings were avoided. The floristic recording was performed in July and August 1995, in June, July and August 1996 and in May, June, July and October 1997. Few additional collections were made during the summer of 1998 and 1999. Voucher specimens are deposited in the herbarium of the Institute of Forest Botany / Geobotany (Department of Forestry, Aristotle University of Thessaloniki) as well as in the personal collection of the first author. Duplicates of *Hieracium* specimens are in the personal herbarium of G. Gottschlich.

In addition, the floristic data from 30 relevés investigated by Zoller & al. (1977), Gamisans & Hebrard (1980), Smiris (1985) and Volpers (1989) were included. Further records were taken from Strid & Papanicolaou (1981), Eleftheriadou (1992) and Eleftheriadou & Raus (1996). In these publications the habitat of the collections is clearly recorded. The beech forest specimens reported in the last two publications have all been seen by us.

The taxa found by us and those taken from the literature were divided into two sections. The first section includes the taxa that belong to the flora of beech forests of Rodopi. These are taxa that occur, even rarely, in beech forests under certain ecological conditions, even extreme ones (e.g. xerothermic forests, wet places in beech forests). Additionally, in this section taxa were included that enter beech forests from adjacent habitats relatively often or occasionally, due to certain ecological conditions (e.g. mixed forests). All these taxa are understood as those that constitute the Rodopi beech forest community. The second section comprises taxa that appear accidentally in beech forests. These are taxa that have been found by us in one or two (in few cases up to four) localities with very few individuals (usually one) or taxa recorded in the literature but do, after our experience, not belong to the beech forest flora.

Our 584 and the 30 published relevés were also evaluated ecologically. Based on the phytosociological tables, the relevés were classified in four ecological groups: mesophilous, acidophilous, calciphilous and thermophilous beech forests (Tsiripidis & Athanasiadis 2002). On this basis, for each taxon its constancy in the subareas of Rodopi and in the ecological groups is given. The constancy was estimated mainly on the basis of the occurrence of the taxa in the relevés, which can be considered as sampling plots. For the constancy per subarea the characterizations ‘rare’, ‘scattered’ and ‘common’ are used, when the taxon was present up to 10 %, from 10 to 20 % and in more than 20 % of the relevés per subarea, respectively. For the constancy per ecological group the characterizations ‘very rare’, ‘rare’, ‘scattered’, ‘common’ and ‘very common’ are used, when the taxon is present up to 5 %, from 5 to 10 %, from 10 to 20 %, from 20 to 40 % and in more than 40 % of the relevés per ecological group, respectively.

Additionally, the minimum and maximum altitudes for each taxon are reported. For those taxa with many localities (usually more than 30) the altitudinal extremes as well as the altitudinal range in which more than 70 % of the localities of a taxon occur, are reported (the extremes in brackets). When the above values differ less than 150 m, only the extremes are reported (without brackets).

Certain specimens could not be identified with certainty. For instance plants of *Senecio nemorensis* agg. have been collected or observed in some localities. In the specimens with flowers two taxa have been distinguished. In this case the above information is reported for these two taxa on the basis of the adequate specimens, but additionally for the whole group on the basis of all specimens (adequate and not) and on our observations.

In the floristic catalogue the following abbreviations are used:

Z: Zoller & al. (1977)
G: Gamisans & Hebrard (1980)
P: Strid & Papanicolaou (1981)
S: Smiris (1985)
V: Volpers (1989)
E: Eleftheriadou (1992)
R: Eleftheriadou & Raus (1996)

[1, 2, 3, ...]: taxon found by us in subareas 1, 2, 3, etc. (for the correspondence of the numbers with subarea names see Table 1)

[1 (Z, E), ...]: taxon found by us in subarea 1 and also by Zoller & al. (1977) and Eleftheriadou (1992)

[(1: E) ...]: taxon found in subarea 1 by Eleftheriadou (1992), but not by us

A, B, C, D: mesophilous, acidophilous, calciphilous and thermophilous beech forests.

vr, r, s, c, vc: taxon very rare, rare, scattered, common and very common in an ecological group.

!: the exclamation mark indicates the preference of a taxon for a certain ecological group, when this cannot be derived from its constancy in the ecological groups.

4. Floristic catalogue

4.1. Taxa constituting the Rodopi beech forest community

Pteridophyta

Equisetaceae

Equisetum arvense L. [1, 3]. Rare, in wet places. 1190-1350 m

E. hyemale L. [3]. Rare, in wet places. 1190 m

Polypodiaceae

Asplenium adiantum-nigrum L. [3, 5, 6, 7, 8, 9]. Common in 7 and in the west part of 6, rare elsewhere [B: vr, C: vr, D: c]. 380-1000 (1280) m

A. ceterach L. [(1: E), 4]. Rare [C: vr]. 950-1380 m. (E: as Ceterach officinarum DC.)

A. onopteris L. [6, 7 (G)]. Rare [B: vr, D: vr!]. 180-900 m

A. trichomanes L. subsp. trichomanes [1, 3, 4, 6, 7]. Scattered in 7, rare elsewhere [A: vr, B: vr, C: r, D: r]. 380-1360 m

Athyrium filix-femina (L.) Roth [1 (E), 3 (Z, S, V, R), 4, 5, 6 (Z, G), 7]. Rare, but in the western Rodopi locally scattered [A: c, B, C, D: vr]. (850) 1200-1840 m

Cystopteris fragilis (L.) Bernh. [1 (E), 3, 4, 5, 6, 7, 9]. Rare [A, B, C, D: vr]. 660-1520 m

Dryopteris carthusiana (Vill.) H. P. Fuchs [(1: E)]. 1450 m

D. dilatata (Hoffm.) A. Gray [1, 3 (Z, V, R)]. Rare in 1, scattered in 3 [A: s]. 1450-1780 m. (Z: as D. austriaca auct.)

D. expansa (C. Presl) Fraser-Jenk. & Jermy [1, (3: R)]. Found in one locality in mesophilous forest. 1750 m

D. filix-mas (L.) Schott [1 (E), 2, 3 (Z, S, V, R), 4, 5, 6 (Z, G), 7, 8]. Common in 3, scattered in 1 and 7, rare (but locally scattered) elsewhere. In 8 is rare and restricted to the higher altitudes [A: vc, B, C, D: r]. In all cases found in good quality stands. (540) 900-1850 m

Gymnocarpium dryopteris (L.) Newman [1 (E), 3 (R), 6]. Rare [A: s]. 1140-1700 m

Polystichum aculeatum (L.) Roth [1, 3 (Z, V, R), 6]. Rare [A: r!, B: vr]. 1140-1770 m

P. lonchitis (L.) Roth [(3: V)]. 1640 m

P. setiferum (Forssk.) Woyn. [7 (G), 8]. Scattered in 7, rare in 8. The taxon has also been recorded (as Dryopteris setifera (Forssk.) Schinz & Thell.) by Smiris (1985) for the Frakto Virgin Forest. However, its presence there is rather unlikely; it was neither found by us nor by Eleftheriadou & Raus (1996) [C: vr, D: r!]. 200-920 m
Polypodium vulgare L. [2, 3, 4, 5, 6 (G), 7, 8]. Scattered in 3 and 6, rare elsewhere [A: vr, B: s, C, D: r]. (660) 900-1400 (1650) m.

Pteridium aquilinum (L.) Kuhn subsp. aquilinum [1, 2, 3, 4, 5, 6 (G), 7, 8]. Common in all areas [A: s; B: c; C: vc, D: vc]. (180) 600-1400 (1580) m. (G: as P. aquilinum (L.) Kuhn)

Selaginellaceae
Selaginella helvetica (L.) Spring [3, (4: P), 5]. Rare, found mainly at the edges of beech forests. 1200-1500 m.

Gymnospermae
Cupressaceae
Juniperus communis L. subsp. communis [1, 2, 3, 4, 5, 6 (G), 7, 8]. Scattered in 5 and 6, rare elsewhere. Very rare in the eastern Rodopi [A, D: vr, B, C: s]. (460) 1100-1550 m. (G: as J. communis L.)

J. oxycedrus L. subsp. oxycedrus [1, 2, 3, 4, 8, 9]. Common in 9, rare elsewhere [B, C: vr, D: r!]. 690-1230 m.

Pinaceae
Abies ×borisii-regis Mattf. [1(Z, E), 2, 3 (Z, S, V), 4, 5, 6 (G), 8]. Fir does not form pure stands in Rodopi, except in 6 (small thickets in beech forest) but appears mainly in mixed stands with beech and spruce. In the western Rodopi it is common in 3, scattered in 1 and 6 (but locally common), rare elsewhere. In the eastern Rodopi it was found only at the higher altitudes of Mt Papikio [A: vc, B: s; C: r; D: vr]. (900) 1200-1850 m.

Picea abies (L.) H. Karst. subsp. abies [1, 2, 3 (Z, S, V), 4, 5, 6]. Spruce forms extended stands in 1 and 3. In 5 it forms small thickets in a limited area. In 4 isolated trees of spruce appear. In 6 only two saplings were found (saplings were found in 6 also by Milios (2000a)) [A: vc, B, C: s; D: vr]. 1010-1850 m. (Z, S, V: as P. abies)

Pinus nigra subsp. nigra var. caramanica (Loudon) Rehder [1 (E), 2, 3, 4]. Natural forests of black pine occur in 3 and 4. Their boundaries westwards are the southeastern area of 2. In 1 isolated trees appear, mainly in areas with calcareous substrate [A: vr, B: r; C: !sl; D: vr]. 1000-1490 m. (E: as Pinus nigra J. F. Arnold subsp. nigra)

P. peuce Griseb. [6]. The Balkan pine occurs in Frakto (Eleftheriadou & Raus 1996) and in Gyftokastro, a locality at the boundaries between western and eastern Rodopi, where a young, mixed stand of beech, fir, Balkan pine and Scotch pine occurs. A sapling was also found in 6, southwest and some kilometers distant from Gyftokastro. 1250-1520 m.

P. sylvestris L. [1, 2, 3, 4, 5, 6, 8]. Scotch pine appears often in the tree layer of beech forests, as it is one of the commonest pioneer species in the western Rodopi, which has occupied the abandoned grazing lands in the last decades. Beech has established later in Scotch pine stands, so as today many high trees of Scotch pine still exist in beech stands (Zagas 1990, Milios 2000a, 2000b). In the eastern Rodopi it does not occur naturally, but a sapling was found in 8 [A: vr, B: c; C: c; D: vr]. (770) 1200-1580 m.

Dicotyledoneae
Aceraceae
Acer campestre L. [4, 5, 7 (G)]. Rare [D: vr]. 180-950 m

A. heldreichii Boiss. subsp. heldreichii [1, 3, 4, 6, 8]. Rare [A: vr, B: vr]. 910-1710 m

A. hyrcanum subsp. intermedium (Pančić) Bornm. [(1: E), 2, 3, 4, 5, 6, 7, 8]. Scattered in 2, 3 and 7, rare in 4, 5 and 6, common in 8 [A: vr, B: r, C: s; D: sl]. (380) 600-1300 (1520) m.

A. platanoides L. [1, 3, 4, 5, 6, 7, 8]. Scattered in 8, rare elsewhere [A, B, C: vr, D: r!]. 540-1220 m

A. pseudoplatanus L. [1 (E), 3 (Z, S, V), 4, 5, 6]. Common in 3 and 4, scattered in 1 and rare in 5 and 6 [A, B: r; C: c; D: vr]. 950-1500 (1820) m.
Adoxaceae  
*Adoxa moschatellina* L. [1, (3, 6: Z)]. Rare. Found by us in one locality (41°32'04''N, 24°16'44''E) in mesophilous forest. 1400-1770 m

Araliaceae  
*Hedera helix* L. subsp. *helix* [1, 3, 4, 5, 6, 7 (G), 8]. Scattered in 4 and 7, rare elsewhere [C, D: s]. (180) 400-1320 m (G: as *H. helix* L.)

Asclepiadaceae  
*Vincetoxicum hirundinaria* Medik. s.l. [3, 5, 6, 7]. Rare with flowers belong to *V. hirundinaria* subsp. *nivale* (Boiss. & Heldr.) Markgr.

Balsaminaceae  
*Impatiens noli-tangere* L. [1 (E), (3: Z), 5, 6 (Z)]. Rare [A: r !, B: vr]. Also in wet places in beech forests. 1400-1650 m

Betulaceae  
*Betula pendula* Roth [1 (E), 2, 3, 4, 6]. Rare but locally (3) scattered; declining especially in the Fagetalia zone, as a result of the increase of the area that occupy more competitive woodland species; we observed many dead plants in beech stands [A, B: r, C: s, D: vr]. 1040-1480 m  
*Carpinus betulus* L. [1: E), 3, 4, 5, 6, 7, 8, 9]. Scattered in 3, 7 and 8, rare elsewhere [A, B, C: vr, D: s]. Forming mixed stands with *Fagus sylvatica* s.l. and *Quercus petraea* subsp. *medwediewii* in relatively warm environments, in depressions and along rivulets. 380-1330 m  
*C. orientalis* Mill. [4, 7 (G), 8]. Rare [C: vr, D: !]. It occurs mainly in 7, in mixed stands with *Fagus sylvatica* s.l., *Carpinus betulus*, *Quercus petraea* subsp. *medwediewii* and *Fraxinus ornus* along rivulets at low altitudes. 390-780 (1200) m  
*Corylus avellana* L. [1 (E), 2, 3, 4, 5, 6 (G), 7, 8, 9]. Common in 1, 3, 4, 5 and 7, scattered elsewhere [A: s, B, C: c, D: vc]. (180) 600-1400 (1580) m  
*C. colurna* L. [8]. A single juvenile plant found in one locality. 920 m

Boraginaceae  
*Myosotis arvensis* (L.) Hill [6, 7, 8, 9]. Scattered in 7, rare elsewhere [D: s]. 400-1210 m  
*M. nemorosa* Besser [1 (E), 6]. Rare, in wet places. 1500-1520 m  
*M. sylvatica* Hoffm. s.l. [1, 2, 3 (Z), 4, 5, 6, 7, 8, 9]. Rare, but locally (5) scattered [A, B, C, D: r]. (180) 1100-1650 m. It was not possible to determine always the subspecies, two subspecies were identified:  
*M. sylvatica* subsp. *cyanea* (Hayek) Vestergr. [1, (3: R), 4, 5, 6 (G), (7: G), 8]. The majority of the specimens belong to this subspecies. (180) 700-1570 m  
*M. sylvatica* cf. *subarvensis* Grau [6, 7]. 460-1410 m

Pulmonaria rubra* Schott [1 (Z, E), 2, 3 (Z, S, R), 4, 5, 6 (G), 7, 8]. Common in 1 and 3, scattered in 4, 5, and 6, rare elsewhere [A: vc, B: s, C, D: r]. (370) 1100-1850 m. In spring 1997 we collected many specimens. All individuals had deep pink to red flowers; on drying the flowers became blue (especially when the drying was not made properly) in some specimens. Therefore we conclude that *P. mollis* Hornem. (Eleftheriadou 1992) or *P. cf. dacica* (Simonk.) Simonk. (Eleftheriadou & Raus 1996) do not exist in the Fagetalia zone of Rodopi

Symphytum *ottomanum* Friv. [1, 3 (Z, S), 4, 5, 6 (Z, G), 7 (G), 8, 9]. Scattered in 8, rare elsewhere [A, D: s, B, C: vr]. (180) 600-1500 (1840) m  
*S. tuberosum* subsp. *angustifolium* (A. Kern.) Nyman [3 (V), 4, 5, 6 (Z)]. Common. The absence in 1 is remarkable (also not found there by Eleftheriadou 1992) because of its frequent presence in the adjacent areas [A: c!, B, C: c, D: vr]. (950) 1200-1500 (1780) m. (Z, V: as *S. tuberosum* L.)
Campanulaceae

Campanula cervicaria L. [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 6 and 7, rare elsewhere. Common in the southeastern part of 6 [B, D: s, C: vr]. (450) 700-1300 (1480). Some specimens from 1 and 3 have flowers 25 mm long, approaching C. moesiaca Velen.

C. lingulata Waldst. & Kit. [2, 6, 7, 8]. Rare, but more frequent in the eastern Rodopi [D: r]. 460-1240 m

C. patula agg. [1, 2, 3, 4, 5, 6, 7, 8]. Common in 2, 5 and 7, rare elsewhere [A: r, B, D: s, C: vr]. (410) 700-1500 m

C. sparsa Friv. subsp. sparsa [5]. 1350-1580 m

C. trachelium subsp. athoa (Boiss. & Heldr.) Hayek [1, 3, 4, 5, 6, 7]. Common in 8 and 9, scattered in 4 and 5, rare elsewhere [B: vr, C: r, D: s]. (180) 550-1440 m. (G: as C. trachelium L.)

Caprifoliaceae

Lonicera xylosteum L. [1, 4]. Rare [C: r]. 1140-1330 m

Sambucus nigra L. subsp. nigra [1, 3, 5, 6, 7, 8]. Scattered in 7, rare elsewhere [A, B, C: vr, D: r]. Usually in the lower parts of slopes and in depressions along rivulets. 400-1500 m. – Taxonomy according to Bolli (1994)

S. racemosa L. var. racemosa [(1: E), 3 (Z, R)]. Rare [A: vr]. 1390-1700 m. (Z, E: as S. racemosa L.) – Taxonomy according to Bolli (1994)

Caryophyllaceae

Moehringia pendula (Waldst. & Kit.) Fenzl [(1: E) 2, 3 (R), 4]. Common in 2, scattered in 3, rare in 4 [A, B, C, D: r]. 1040-1780 m

M. trinervia (L.) Clairv. [1 (E), 2, 3 (R), 4, 5, 6 (Z, G), 7, 8, 9]. Rare in 1 and 9, scattered elsewhere [A, B, D: s, C: r]. (390) 800-1400 (1750) m

Silene atropurpurea (Grisseb.) Greuter & Burdet [1 (E), 3, 4, 5, 6 (G), 7, 8]. Common in 7 and 8, scattered in 3 and 6, rare elsewhere [B: r, C: vr, D: c]. (380) 600-1200 (1420) m. (G, E: as Lychnis viscaria subsp. atropurpurea (Grisseb.) Chater)

S. coronaria (L.) Clairv. [2, 6, 7, 8]. It rarely enters into thermophilous forests [D: vr]. 400-1240 m

S. heuffelii Soó [6, 8]. It enters rarely beech forests [A, B, D: vr]. 770-1260 m

S. italica (L.) Pers. subsp. italica [2, 6 (G), 7, 8, 9]. Rare in 2 and 7, scattered in 6, common in 9 [D: r]. 580-1100 m. (G: as S. italica (L.) Pers.)

S. viridiflora L. [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 2, 7 and 8, rare elsewhere [B, C: vr, D: s]. 460-1420 m

S. vulgaris subsp. bosniaca (G. Beck) Greuter & al. [2, 3, 4, 5, 6 (G), 7, 8]. Scattered in 5, 6, 7 and 8, rare elsewhere [B: r, C: vr, D: s]. (400) 700-1510 m. (G: as S. vulgaris (Moench) Garcke)

Stellaria holostea L. [8]. It was found only in one locality (41°15'20''N, 25°22'02''E), but with many individuals. 760 m. In Greece known only from Dirfi (Evvia), Athos and Cholomontas (Chalkidiki)

S. nemorum L. s.l. [1 (E), 3 (Z, R, V), 6 (G)]. Rare but locally (3) scattered [A: s]. 1350-1780 m. (Z, G, V, R: as S. nemorum L.). According to Strid & Tan (1997) the Greek populations represent subsp. montana (Pierrot) Berher, but it is noteworthy that in our specimens the second pair of bracts is distinctly more than 1/3 as long as the first.
Celastraceae

Euonymus latifolius Mill. [4, 5, 7, 8]. Rare [B, C, D: vr]. 700-1280 m
E. verrucosus Scop. [1 (E), 3, 6]. Rare [B, C, D: vr]. 1050-1280 m. – For the spelling of the genus name see Karagiannakidou & Raus (1996)

Compositae

Achillea grandifolia Friv. [1 (E), 5, 8]. Scattered in 8, rare elsewhere [B: vr, D: vr!]. 680-1240 m
Anthemis tinctoria L. subsp. tinctoria [7, 8]. It rarely enters into thermophilous forests [D: vr]. 460-1020 m.
A. tinctoria subsp. parnassica (Boiss. & Heldr.) Franzén [2, 3]. Rare
Cicerbita alpina (L.) Wallr. [1, 3 (Z)]. Rare. 1530-1750 m
Cirsium appendiculatum Griseb. [1, 3, 6]. Rare [A: r!, B, C: vr]. 1350-1780 m
Doronicum austricum Jacq. [1 (E), 3 (Z), S, V, R), 6 (Z, G)]. Rare, but locally (3, 6) scattered
[A: c, B, D: vr]. (1010) 1200-1820 m. (Z, G, S: as D. orphanidis Boiss.)
D. columnae Ten. [6, (7: G)]. Rare, found along rivulets and on rocks covered with moss. (180) 1140-1190 m. The altitude (180-210 m) given by Gamisans & Hebrard (1980) is surprising
D. orientale Hoffm. [7, 8, 9]. Rare, but locally scattered [A: c, B, D: vr]. (1010) 1200-1820 m. (Z, G, S: as D. orphanidis Boiss.)

Hieracium bauhini Besser [8]. It rarely enters into thermophilous forests [D: vr]. 640 m. Some not adequate specimens that resemble this taxon have also been collected from areas 6 and 9

H. bifidum Hornem. [6]. Rare, but perhaps undercollected [B: vr]. 1260-1420 m
H. erythrocarpum Peter [1, 3, 5, 6, 7, 8, 9]. Rare, but locally scattered [B, D: r, C: vr]. 450-1490 m. H. erythrocarpum may be confused with H. rechingerorum Zahn. Both have leaves attenuate at base and the determination of specimens without flowers is impossible. Nevertheless, the occurrence of H. erythrocarpum in the above areas is documented by adequate specimens

H. heldreichii Boiss. [1]. It rarely enters into calcareous forests [C: vr]. 1110-1330 m
H. cf. jankae Uechtr. [2]. Rare (found in one locality in acidophilous forest). 1330 m
H. lachenalii C. C. Gmel. [7, 8]. Rare [D: vr]. 510-650 m
H. murorum L. [1, 2, 3 (R), 4, 5, 6 (G), 7, 8, 9]. Common in 2, 3, 6, and 7, rare in 4 and 5, scattered elsewhere [A: vr, B: s, C: r, D: c]. (380) 600-1300 (1750) m. (G: as H. grex murorum L., R: as H. murorum subsp. semisilvaticum (Zahn) Zahn)
H. olympicum Boiss. [1, 2, 3, 4, 5, 6, 7, 8, 9]. Common in 2, 7, 8 and 9, scattered in 3 and 6, rare elsewhere [B: r, C: vr, D: c]. (380) 600-1200 (1490) m
H. cf. olympicum Boiss. × H. murorum L. [8]. Rare (collected in one locality in thermophilous forest). 630 m
H. pavichii Heuff. [7, 8, 9]. Rare [D: r]. 450-840 m
H. praecurrens Vuk. [5]. Rare, found in one locality (41°23’29”N, 24°37’36”E) in thermophilous forest. 950 m. According to G. Gottschlich (pers. comm.) this taxon is new to Greece
H. racemosum Willd. [1 (E), 2, 3, 4, 6, 7, 8]. Common in 7, scattered in 6, rare elsewhere [B: r, C: vr, D: c]. 390-1420 m. Many specimens have features intermediate between H. olympicum and H. racemosum
H. rechingerorum Zahn [3, 5, 6, 7, 8, 9]. Rare (see comments for H. erythrocarpum) [B, D: vr]. 490-1500 m
H. scardicum Bornm. & Zahn [4]. Rare (collected in one locality in calcareous forest). 1140 m
H. sparsum Friv. s.l. [3, 6]. It rarely enters into beech forests [B, D: vr]. 1160-1780 m. Two specimens belong to H. sparsum subsp. schultzianum (Pančić & Vis.) Zahn [3 (R), 6], and one to H. sparsum subsp. sparsum [6]
H. cf. subnitenos Zahn vel tschankorijense Zahn? [1]. Found in one locality in mesophilous forest. 1450 m
Lapsana communis L. subsp. communis [1 (Z), 2, 3, 5, 6, 7, 8, 9]. Common in 7, 8 and 9, scattered in 5, rare elsewhere [A: r, B, C: vr, D: c]. All the adequate specimens belong to this subspecies, but the occurrence of other subspecies must be considered possible. (390) 600-1400 (1580) m. (Z: as L. communis L.)
Mycelis muralis (L.) Dumort. [1 (Z), 2, 3 (S, V), 4, 5, 6 (Z, G), 7 (G), 8, 9]. Common [A, B, C, D: vc]. In acidophilous forests it is relatively less frequent than in the other ecological groups. (180) 700-1500 (1850) m

Prenanthes purpurea L. [1 (E), 2, 3 (Z, S, V, R), 4, 5, 6 (G), 8]. Common in 3 and 6, scattered in 4, rare elsewhere. In 8 it was found only in one locality, at relatively high altitude [A: c!, B: c, C: D: r]. (750) 1000-1700 (1850) m

Senecio nemorensis agg. [1, 3 (V), 5, 6 (Z, G), 8]. Scattered in 3, rare elsewhere [A: s, B: D: vr]. (760) 1100-1780 m. (Z: as S. fuchsii C. C. Gmel., G: V: as S. nemorensis L.). In adequate specimens the following two taxa have been distinguished:

S. germanicus Wallr. var. germanicus [(1: E), 8]. Rare. Collected in mesophilous and generally in good quality stands. 1000-1100 m. (E: as S. nemorensis L. subsp. nemorensis)

S. hercynicus Herborg var. hercynicus [1 (E), 3, 6]. Scattered in 3, rare elsewhere. Collected in mesophilous forests. 1470-1700 m. (E: as S. nemorensis subsp. fuchsii (C. C. Gmel.) Čelak.)

S. squallidus L. [1, 3 (V, R), 4]. It rarely enters into beech forests [A, B, C: vr]. 1280-1700 m

Solidago virgaurea L. [4, 5, 6, 7, 8]. Rare but locally (southeast part of 6, 7) scattered [B: vr, D: r!]. (380) 600-1200 (1520) m

Tanacetum corymbosum (L.) Sch. Bip. subsp. corymbosum [1, 2, 3, 4, 5, 6, 7, 8]. Common in 3, 7 and 8, scattered in 6, rare elsewhere [B: r, C: s, D: c]. 380-1460 m

Cornaceae

Cornus mas L. [1, 3, 4, 6, 7 (G), 8]. Common in 7, rare elsewhere [B: vr, C: r, D: s]. (180) 400-1000 (1230) m

Crassulaceae

Sedum cepaea L. [6, 7, 8]. Common in 7, rare in 6 and 8 [D: r]. 390-830 m

Hylotelephium telephium (L.) Ohba [3, 7]. Rare [D: vr]. 460-1120 m

Umbilicus luteus (Huds.) Webb & Berthel. [8]. Found only in two localities, but with many individuals [D: vr]. 890-920 m

Cruciferae

Arabis procurrens Waldst. & Kit. [3, 4, 5, 6]. Rare but locally scattered in 6 [B, D: vr, C: r]. Our localities were reported by Eleftheriadou & al. (1998). 750-1430 m.

A. turrita L. [(1: E), 2, 4, 5, 6, 7, 8]. Rare, except in 8, where it is scattered [A, B, C: vr, D: r!]. 410-1460 m

Cardamine amara subsp. balcanica Marhold & al. [1 (E), 3 (Z, R), 6]. Rare, in wet places. 1210-1700 m. (Z, E, R: as C. amara L.)

C. bulbifera (L.) Crantz [1 (E), 2, 3 (Z, V, R), 4, 5, 6 (Z, G), 7 (G), 8]. Common in 3, 4, 5 and 8, rare in 2, scattered elsewhere [A: vc, B: r, C: c, D: s]. Independent of the ecological group, it occurs in good quality stands. (180) 900-1600 (1780) m

C. impatiens L. subsp. impatiens [(1: E), 3, 4 (P), 5, 6, 7]. Rare [A, B, C, D: vr]. 750-1380 m. (E: as C. impatiens L., S: as C. impatiens s. str.)

C. impatiens subsp. pectinata (DC.) Stoj. & Stef. [1 (E), 3, 6]. Rare. 1140-1770 m. (E: as C. pectinata DC.)

C. acris Griseb. [6]. Rare, in wet places. 1550 m

Rorippa thracica (Griseb.) Fritsch [(1: E), 2, 3, 4, 5, 6 (G), 7, 9]. Common in 2, rare elsewhere (locally scattered in the southeastern part of 6). [B, C: vr, D: r!]. 700-1480 m

Dipsacaceae

Knautia ambiguia (Friv.) Boiss. & Orph. [1, 3, 4]. It rarely enters into beech forests, especially on calcareous substrates [B, C, D: vr]. 1020-1310 m

K. drymeia subsp. nympharum (Boiss. & Heldr.) Ehrend. [1, 2]. It rarely enters into beech forest [B, C: vr]. 1180-1390 m
**Ericaceae**

*Vaccinium myrtillus* L. [1, 2, 3 (S, V), 4, 5, 6 (Z, G)]. Scattered in 4, common elsewhere [A: c, B: vc!, C, D: r]. (750) 1200-1500 (1830) m

*V. vitis-idaea* L. [2, 3 (R), 5, 6 (G)]. Rare in 3, scattered elsewhere [A: vr, B: s]. 1040-1750 m

**Euphorbiaceae**

*Euphorbia amygdaloides* L. subsp. *amygdaloides* [1 (Z), 2, 3 (Z, S, V), 4, 5, 6 (Z, G), 7 (G), 8]. Common [A, B, C, D: vc]. (180) 700-1500 (1840) m. (Z, G, S, V: as *E. amygdaloides* L.)

*E. epithymoides* L. [7, 8]. Scattered in 7, rare in 8 [D: r]. 410-910 m

*E. seguieriana* subsp. *niciciana* (Borbás) Rech. f. [1, 4, 6]. Rare [B, C, D: vr]. 1100-1380 m

*Mercurialis perennis* L. [3, 4 (P), 6, 7 (G), 8]. Rare [C, D: vr]. (180) 750-1300 m

**Fagaceae**

*Quercus cerris* L. [1 (E), 4, 9]. Scattered in 1, rare in 4 and 9 [B, D: vr, C: s]. 740-1360 m

*Q. frainetto* Ten. [1, 7, 9]. Common in 7, rare in 1 and 9. Only in Echinos (7) beech forest intergrades with *Q. frainetto* forest [C: vr, D: s]. 380-700 (1310) m

*Q. petraea* subsp. *medwediewii* (A. Camus) M. Novitsky [1, 2, 3, 4, 5, 6 (G), 7 (G), 8, 9]. Scattered in 3, rare in 1 and 4, common elsewhere. Much more common in the beech forests of eastern Rodopi than in west [B: r, C: s, D: vc]. (180) 600-1150 (1450) m (G: as *Q. dalechampii* Ten.)

*Q. petraea* Liebl. subsp. *petraea* [3]. Found only in one locality in an opening of mixed spruce-beech stand in the Virgin Forest of Frakto

**Gentianaceae**

*Gentiana asclepiadea* L. [1 (E), 3, 4, 6]. Scattered in 3, rare elsewhere [A, B: vr, C: r]. 1050-1480 m

**Geraniaceae**

*Geranium macrorrhizum* L. [1, 2, 3 (Z, S), 4, 5, 6 (G)]. Scattered in 1 and 4, rare elsewhere.

Mainly on rocks and rock-rubble along rivulets [A, B, C: s, D: vr]. (940) 1100-1600 (1800) m

*G. robertianum* L. subsp. *robertianum* [1 (Z), 2, 3 (S, V, R), 4, 5, 6 (Z, G), 7, 8, 9]. Scattered in 3 and 7, rare elsewhere [A: c, B: vr, C, D: r]. (400) 800-1600 (1840) m. (Z, G, S, V: as *G. robertianum* L.)

*G. sanguineum* L. [1, 3, 4, 6]. Rare [B, D: vr, C: r]. 1110-1430 m

*G. sylvaticum* L. subsp. *sylvaticum* [3 (R)]. Rare (found in two localities). 1690-1780 m

**Gesneriaceae**

*Haberlea rhodopensis* Friv. [4]. Rare. Found in a small area (41°26′24″-41°27′03″N, 24°34′17″-24°34′35″E) in the beech forest in 1250-1300 m. Scattered on calcareous boulders

**Grossulariaceae**

*Ribes alpinum* L. [1 (E), 3 (Eleftheriadou & al. 1994), 4, 5, 6 (Eleftheriadou & al. 1994)]. Rare [A, B, C: vr]. Usually in good quality stands, 1210-1680 m. The first time recorded for Greece by Athanasiadis & Gerasimidis (1981) from Mt Lailias, Nomos of Serres

**Guttiferae**

*Hypericum aucheri* Jaub. & Spach [7, 8]. Rare in 7, scattered in 8. It enters into thermophilous, bad quality forests [D: vr]. 600-1030 m

*H. cerastoides* (Spach) N. Robson [1, 2, 3, 4, 5, 6 (G), 7, 8, 9]. Rare in 1, 3, 4, scattered in 6, common elsewhere [A, C: vr, B: s, D: c]. (390) 600-1400 (1650) m

*H. maculatum* subsp. *immaculatum* (Murb.) A. Fröhl. [1, 3, 4, 5, 6]. Rare [A: r, B, C, D: vr]. 1100-1660 m

*H. perforatum* L. [1, 2, 3, 4, 5, 6, 7, 8, 9]. Common in 2, 5, 6 and 7, scattered in 1 and 4, rare elsewhere [A: r, B: c, C, D: s]. 550-1580 m
H. spruneri Boiss. [3, 4, 6 (G), 7 (G), 8, 9]. Common in 8, scattered in 7 and 9, rare elsewhere (scattered in the southeast part of 6) [B, C: vr, D: c]. (210) 400-1100 (1340) m

Juglandaceae
Juglans regia L. [1, 3, 4, 6, 7, 8, 9]. Common in 7, rare elsewhere [B, C: vr, D: s]. Its occurrence is connected with human impact. 390-1000 (1180) m

Labiatae
Ajuga genevensis L. [1 (E), (6: G), 7]. It rarely enters into beech forests [A, B, C: vr]. 1210-1550 m

A. genevensis L. × A. pyramidalis L. [(3: R)]. 1750 m

A. pyramidalis L. [5]. Rare. In two localities (41°24’59”N, 24°41’00”E; 41°24’03”N, 24°42’20”E) in acidophilous forest [B: vr]. 1410-1480 m. The only known localities in Greece are Elatia and Frakto Virgin Forest (Eleftheriadou 1992, Eleftheriadou & Raus 1996)

A. reptans L. [1 (Z, E), 3 (S, V), 4, 5, 6, 7, 8]. Common in 1 and 3, scattered in 5 and 8, rare elsewhere [A: c, B: C: vr, D: s]. (450) 1000-1600 (1850) m

Galeopsis bifida Boenn. [1, (3: V, R)]. Rare [A: vr]. 1400-1750 m

G. speciosa Mill. [1]. Rare [A: vr]. 1280-1530 m

Lamium galeobdolon (L.) L. subsp. galeobdolon [1 (E), 3 (S, V, R), 4, 5, 6, 7, 8]. Rare but locally scattered [A: c, B: C, D: vr]. 950-1840 m. (S, V: as Lamiacrium galeobdolon (L.) Ehrend. & Polatschek, E: as Lamiastrum galeobdolon subsp. galeobdolon)

L. garganicum subsp. laevigatum Arcang. [4, 6, 8]. Rare [B, C, D: vr]. 920-1410 m

L. maculatum L. [3 (V), 5, 6, 7, 8]. Scattered in 8, rare elsewhere [A, D: r, C: vr]. (410) 700-1300 (1780) m

Melittis melissophyllum subsp. albida (Guss.) P. W. Ball [6, 7 (G), 8, 9]. Scattered in 6 (but common in its southeastern part), rare in 9, common in 7 and 8 [B: vr, D: c]. (180) 500-1000 (1340) m. (G: as M. albida Guss.)

Prunella vulgaris L. [3, 7, 8]. It rarely enters into beech forests [C, D: vr]. 410-1350 m

Salvia glutinosa L. [1 (E), 2, 3, 4, 5, 6, 7, 8]. Common in 3, 4 and 7, scattered in 2, rare elsewhere [A: vr, B: r, C: c!, D: s]. (450) 700-1460 m

Satureja menthifolia (Host) Fritsch [2, 4, 6, 7, 8]. Common in 7, scattered in 8, rare elsewhere [C: vr, D: c]. 390-1000 (1290) m

S. vulgaris (L.) Fritsch s.l. [1 (Z), 3, 4, 5, 6, 7, 8, 9]. Common in 5, rare in 9, scattered elsewhere [A, B: r, C: c, D: s]. (390) 700-1580 m. Adequate material allowed the identification of the following subspecies:

S. vulgaris subsp. orientalis (Bothmer) Greuter & Burdet [1, 4, 5, 8]. 850-1580 m

S. vulgaris (L.) Fritsch subsp. vulgaris [1, 3 (R), 4, 5, 6, 7]. 410-1580 m. Much more common than the first subspecies but many specimens have intermediate characteristics (length of calyx and of its upper teeth)

S. sylvatica L. [1 (Z), 6(G)]. Rare [A: vr]. 1210-1580 m

Teucrium chamaedrys L. subsp. chamaedrys [1, 4, 5, 6, 7]. Rare [C, D: vr]. 410-1320 m

Thymus species [1, 2, 3, 5, 6, 7, 8, 9]. Common in 2, 7 and 9, scattered in 8, rare elsewhere [B, C: vr, D: c]. 380-1100 (1410) m. They enter thermophilous forests quite often, but they are in most cases cachectic. Therefore, a small number of specimens are sufficient for determination, the following taxa have been identified:

T. degenii Heinr. Braun [7]. 640 m

T. longicaulis subsp. chaubardii (Boiss. & Heldr.) Jalas var. chaubardii [6, 7, 8, 9]. 410-1110 m

T. sibthorpii Benth. var. sibthorpii [7, 8]. 780-810 m
**T. thracicus** Velen. var. *thracicus* [8]. 760 m.

The second and the third taxon occur more often than the other.

**Leguminosae**

**Chamaecytisus australis** (L.) Link [4, 6, 7, 8]. Rare in 4 and 6, common in 7 and 8 [B: vr, D: c]. 390-1000 (1330) m

**C. hirsutus** agg. [4, 6, 8]. Common in 8, rare in 4 and 6 [A, B, C: vr, D: r]. 490-1340 m. Most of the specimens have rather big leaves and probably belong to *C. falcatus* (Waldst. & Kit.) Holub. Two specimens [8] have rather small leaves and legumes covered all over with hairs and thus probably belong to *C. polyrichus* (M. Bieb.) Rothm.

**Genista carinalis** Griseb. [2, 3, 4, 5, 6, 7, 8, 9]. Scattered in 2, 8 and 9, rare elsewhere [B, C: vr, D: s]. (380) 600-1350 m

**G. tinctoria** L. [8]. It rarely enters into thermophilous forests [D: vr]. 410-850 m

**Lathyrus laxiflorus** (Desf.) Kuntze subsp. *laxiflorus* [8, 9]. Common in 8, scattered in 9 [D: r]. 410-870 m

**L. niger** (L.) Bernh. subsp. *niger* [6, 7 (G), 8]. Scattered in 7, rare in 6 and 8 [D: r]. 180-990 m. (G: as *L. niger* (L.) Bernh.)

**L. pratensis** L. [1, 2, 3, 5, 6, 8]. Scattered in 2, 8 and 9 [A, C: r, D: c]. (660) 1000-1550 m

**L. vernus** (L.) Bernh. [1, 4, 7, 8]. Rare [C, D: vr]. 640-1220 m

**Oleaceae**

**Fraxinus ornus** L. [1, 3, 4, 5, 6 (G), 7 (G), 8]. Rare in 1, and 5, scattered in 3 and 6, common elsewhere [A, B: vr, C: c, D: c!]. (180) 500-1200 (1520) m

**Onagraceae**

**Circaea lutetiana** L. [(1: E), (3: Z), 6, 7, 8]. Rare [A, D: vr]. Also in wet places. 490-1650 m

**Epilobium angustifolium** L. [1, 2, 3 (Z, V), 4, 5, 6]. Common in 5, scattered in 2 and 4, rare elsewhere [A, B: s, C: d, D: vr]. 1040-1680 m

**E. lanceolatum** Sebast. & Mauri [3, 5, (6: G), 7, 8, 9]. Rare in 3 and 5, common in 7, 8 and 9 [B, C: vr, D: c]. (390) 600-1000 (1420) m

**E. montanum** L. [(1: E), 2, 3 (Z, S, V, R), 4, 5, 6 (G), 7, 8]. Scattered in 7 and 8, common elsewhere. Generally, much more often in the western than in the eastern Rodopi [A, B: vc, C: c, D: s]. (540) 1000-1500 (1850) m

**Oxalidaceae**

**Oxalis acetosella** L. [(1: Z, E), 2, 3 (Z, P, S, V, R), 4, 5, 6 (Z, G)]. Common in 3, rare in 2 and 6, scattered elsewhere [A: vc, B: r, C: D: vr]. (1000) 1200-1900 m

**Papaveraceae**

**Corydalis cava** subsp. *marschalliana* (Willd.) Hayek [(1: E), 4, 6, 8]. Rare. Usually in good quality stands. 890-1500 m. (E: as *C. bulbosa* subsp. *marschalliana* (Pallas) Chater)

**C. solida** subsp. *incisa* Lidén [(1: E), 6, 8]. Rare. Usually in good quality stands and in depressions. 740-1210 m. (E: as *C. solida* (L.) Swartz subsp. *solida*)

**Chelidonium majus** L. [7]. Rare. 370-670 m
Polygonaceae

*Rumex acetosella* subsp. *acetoselloides* (Balansa) Den Nijs [1 (E), 3, 4, 5, 6, 7]. Scattered in 5, rare elsewhere. Its occurrence is related with the grazing of cattle. 740-1460 m (E: as *R. acetosella* L.)

Primulaceae

*Cyclamen hederifolium* Aiton [7]. Rare, 500 m

*Lysimachia punctata* L. [1, 3, 4, 5, 6, 7, 8]. Common in 7, scattered in 3 and 8, rare elsewhere [A: C: r, B: vr, D: c]. (410) 600-1100 (1370) m

*Primula acaulis* (L.) subsp. *acaulis* [7]. Rare [D: vr]. 400-630 m

*P. elatior* (L.) subsp. *elatior* [(1: E), 3 (S, R), 6]. Rare. Known in Greece only from Elatia and the Virgin Forest of Frakto. In 6 it was found only in one locality (41°21'08"N, 24°45'53"E). 1570-1820 m. (S: as *P. elatior*, E: as *P. elatior* subsp. *intricata* (Gren. & Gordon) Lüdi)

*P. veris* subsp. *columnae* (Ten.) Maire & Petitm. [1, 2, 3, 4, 5, 6 (G), 7 (G), 8, 9]. Common [A: s, B: c, C: D: vc]. (180) 700-1400 (1690) m. (G: as *P. veris* subsp. *columnae* (Ten.) Lüdi).

Taxonomy following Wisskirchen & Haeupler (1998: 391)

*Soldanella rhodopaea* F. K. Mey. [(1: E), 3 (V, R), 5, 6]. Rare. The locality in 5 (41°25'16"N, 24°38'47"E) is new for this rare endemic species. In 6 it is scattered in the Preserved Monument of Nature (also recorded by Sfikas 1995) [A: r]. 1110-1780 m

Pyrolaceae

*Monotropa hypopitys* L. [1 (E), 2, 3 (R), 4, 5, 6 (G), 7 (G), 8]. Rare in 8, common elsewhere, but in 7 less frequent than in the other areas [A: s, B, C: ve, D: c]. (180) 1000-1700 m. Few specimens have the characteristics of *M. hypopitys* var. *glabra* Roth [1, 3, 4, 5, 6]

*Orthilia secunda* (L.) House [(1: E), 2, 3 (S, V, R), 4, 5, 6 (Z, G), 7]. Scattered in 3 and 4, rare in 7 (found only in one locality in its northwestern part), common elsewhere [A, C: s, B: c!, D: vr]. (970) 1200-1500 (1830) m. (S: as *Pyrola secunda* L.)

*Pyrola chlorantha* Sw. [1, 2, 3 (R), 5, 6]. Rare [B: vr!, D: vr]. 1200-1750 m

*P. media* Sw. [5, 6]. Rare [B: vr]. 1130-1550. New record for the Greek flora. In total, eight localities have been found (two in 5 and six in 6)

*P. minor* L. [1 (E), 2, 3 (V, R), 5, 6]. Rare [A: vr, B: r!]. 1170-1840 m

Ranunculaceae

*Aconitum lycoctonum* subsp. *neapolitanum* (Ten.) Nyman [3 (R)]. Rare. 1690-1700 m

*Actaea spicata* L. [1 (E), 3 (Z, S, R), 4, 6 (G), 8]. Rare [A: r!, B, C: vr]. 900-1700 m

*Anemone nemorosa* L. [3 (V, R), 4, 5, 6 (Z, G)]. Scattered in 3 and 5, rare in 4 and 6 [A: s!, B, D: vr, C: r]. 950-1780 m

*A. ranunculoides* L. [(3: Z)]. Recorded by Zoller & al. (1977) from the Frakto Virgin Forest, but neither found by us nor by Eleftheriadou & Raus (1996). However, its presence is possible, because it was found by Eleftheriadou (1992) in 1 (though not in beech forest). 1650 m

*Clematis vitalba* L. [1, 2, 3, 4, 6, 7, 8]. Scattered in 4 and 7, rare elsewhere [B: vr, C: s!, D: r]. 460-1320 m

*Helleborus cyclophyllus* (A. Braun) Boiss. [1 (E)]. Rare. It was found only in the southeastern part of 1 [C: vr]. 1110-1240 m. – Taxonomy according to Mathew (1989)

*Ranunculus platanifolius* L. [1, (3: Z)]. Rare. 1580-1750 m

*R. repens* L. [1, 3, 4]. It rarely enters into beech forests in wet places or along rivulets. 1190-1350 m

*Thalictrum aquilegiifolium* L. [(3: R), 5, 6 (Z, G)]. It rarely enters into forests [A, B, C: vr]. 1190-1600 m

Rosaceae

*Aremonia agrimonoides* (L.) DC. subsp. *agrimonoides* [1 (Z, E), 2, 3 (Z, S, V, R), 4, 5, 6 (G), 7 (G), 8, 9]. Scattered in 8, common elsewhere. More common in the western than in the
eastern Rodopi [A, B, C: vc, D: c]. (180) 900-1600 (1850) m. (Z, G, S, V: as A. agrimonioides (L.) DC.)


Fragaria vesca L. [1, 2, 3 (V), 4, 5, 6 (Z, G), 7, 8]. Scattered in 7, rare in 8, common elsewhere.

More common in the western than in the eastern Rodopi [A: c, B, C: vc, D: s]. (450) 1000-1500 (1780) m

Malus sylvestris Mill. [1, 3, 5, 6, 7]. Rare, mainly juvenile plants [B, C, D: vr]. 460-1230 m

Geum urbanum L. [1 (Z), 3, 4, 5, 6, 7, 8, 9]. Rare [A, C, D: r; B: vr]. 630-1530 m

Potentilla geoides M. Bieb. subsp. geoides [7, 8]. It rarely enters into thermophilous forests [D: vr]. 700-840 m

P. microntha DC. [1, 2, 3, 4, 5, 6 (G), 7 (G), 8, 9]. Common [A: s, B, C, D: vc]. (180) 700-1400 (1780) m

Prunus avium L. [1, 2, 3 (R), 4, 5, 6, 7, 8, 9]. Rare in 2, scattered in 1, 3 and 6, common elsewhere. Usually juvenile plants [A: vr; B: s, C, D: c]. (390) 600-1300 (1680) m

P. cerasifera Ehrh. [1, 3, 4, 5, 6, 7, 8]. Rare [B, D: vr; C: r]. 550-1440 m

Rosa arvensis Savi [1, 3, 4, 6, 7, 8, 9]. Rare in 4, common in 7, rare elsewhere [A, B: vr, C: s, D: c]. (390) 600-1200 (1460) m

R. canina L. [1, 2, 3 (R), 4, 5, 6, 7, 8]. Scattered in 3, common in 1, 4, 5 and 6, rare elsewhere [A: r; B, C: c, D: s]. (610) 1000-1700 m

R. holodua Crep. [1, 4, 5, 7]. It enters rarely beech forests [A, C, D: vr]. 720-1480 m

R. pendulina L. [1, 3 (V), 4, 5, 6, 7]. Common in 3 and 6, scattered in 4 and 5, rare in 1 and 7 [A, D: r; B: c; C: s]. 970-1400 (1680) m

R. pulverulenta M. Bieb. [1, 2, 3, 4, 5, 6]. Rare [B, C: vr]. 500-1470 m

Sorbus aria (L.) Crantz subsp. aria [1 (E), 3, 6, 7]. Rare [B, C, D: vr]. 1020-1490 m. (E: as S. graeca (Spach) Kotschy)

S. aucuparia L. subsp. aucuparia [1 (Z), 3 (Z, V, R), 6]. Rare in 1 and 6 (in locally scattered), common in 3 [A, C, B, D: vr]. (1050) 1300-1800 m. (Z, S, V: as S. aucuparia)

S. domestica L. [1, 3, 4, 6, 7 (G), 8, 9]. Scattered in 7, rare elsewhere [A, C: vr, D: r]. 700-1450 m

S. torminalis (L.) Crantz [1, 3, 4, 6, 7 (G), 8, 9]. Rare in 4 and 6, scattered in 3, 4 and 6, common elsewhere [B: vr; C: s, D: c]. (180) 400-1100 (1330) m

Spiraea chamaedryfolia L. [3, 6, 7]. Recently recorded for Greece by Arbatzis & Vidakis (1996), further records from Rodopi by Athanasiadis & al. (2000) including our findings [B, C, D: vr]. 700-1340 m

Rubiaceae

Cruciata glabra (L.) Ehrend. [1 (E), 2, 3, 4, 5, 6, 7, 8]. Common in 3 and 5, scattered in 1, 4 and 6, rare elsewhere [A: vr; B: s; C, D: r]. (450) 1000-1700 m

C. laevis Oiz [2, 5, 8, 9]. Rare [B, D: vr]. 660-1250 m

Galium agrophyllum Krendl [1, 2, 3, 4, 5, 6, 7, 8]. Common in 5, 7 and 8, scattered in 6 and rare elsewhere [A, C: vr; B: r; D: c]. 460-1530 m. – Taxonomy according to Krendl (1988)
G. aparine L. [1, 4, 5, 7, 8, 9]. Scattered in 9, rare elsewhere [B, C, D: vr]. 630-1380 m
G. exaltatum Krendl [1, 4, 5, 6, 7, 8, 9]. Common in 8, scattered in 6 and 7, rare elsewhere [B: r, C: vr, D: s]. 550-1300 (1520) m. – Taxonomy according to Krendl (1988)
G. hellenicum Krendl [1, 2, 3, 4, 5, 6, 7, 8, 9]. Common in 2, 6 and 9, scattered elsewhere [A: vr, B, D: s, C: c]. 380) 750-1510 m. – Taxonomy according to Krendl (1988)
G. odoratum (L.) Scop. [1 (Z, E), 3 (Z, S, V, R), 5, 6 (Z, G), 8]. Rare but locally scattered (1, 3, 6) [A: vc, B, D: vr]. (870) 1200-1840 m

Salicaceae
Populus tremula L. [1 (E), 3, 4, 5, 6, 7, 8]. Rare. Mainly in the higher tree layer or juvenile plants with little chance of establishing [B, C: r, D: vr]. (650) 1100-1450 m
Salix caprea L. subsp. caprea [1 (E), 3 (R), 5, 6]. It rarely enters into beech forests [B: vr]. 1370-1680 m. (E, R: as S. caprea L.)

Scrophulariaceae
Digitalis viridiflora Lindl. [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 1, 2 and 3, common elsewhere [A: r, B, D: c, C: s]. (460) 700-1400 (1580) m
Lathraea rhodopea Dingler [3 (R), 6, 7, 8]. Rare. 710-1750 m. Our findings were already reported by Eleftheriadou & al. (1998)
Scrophularia nodosa L. [1 (Z), 3 (Z, S), 5, 6]. Rare [A: s, B: vr]. 1070-1820 m
S. scopoli Hoppe var. scopoli [1, 2, 3 (R), 4, 5, 6, 7, 8]. Scattered in 8, rare elsewhere [A: s, B, C: D: vr]. (550) 900-1790 m
Verbascum glabratum Friv. subsp. glabratum [1, 4, 5, 6, 7, 8]. Rare [A, B: vr, C: D: r]. (460) 700-1470 m
Veronica chamaedrys L. subsp. chamaedrys [1 (Z), 2, 3 (Z, V, R), 4, 5, 6 (G), 7 (G), 8, 9]. Common [A: s, B, C: c, D: vc]. (180) 600-1500 (1750) m. The record of V. vindobonensis (M. A. Fisch.) M. A. Fisch. (as V. chamaedrys subsp. vindobonensis M. A. Fisch.) by Gamisans & Hebrard (1980) is probably erroneous. (Z, G, V: as V. chamaedrys L.)
V. montana L. [1]. Rare, found mainly in mesophilous forests. 1530-1750 m
V. officinalis L. [1 (Z), 3 (V, R), 4, 5, 6 (G), 7, 8]. Rare in 7 and 8, scattered in 3 and 4, common elsewhere [A, B: c, C, D: r]. (600) 1100-1500 (1770) m
V. urticifolia Jacq. [1, 2, 3 (Z)]. Rare [A, B: vr]. 1040-1650 m

Solanaceae
Atropa bella-donna L. [6, 8]. It rarely enters into beech forests. 970-1130 m
Solanum dulcamara L. [(1: E), 4, 7]. Rare [A, C, D: vr]. 630-1470 m

Thymeleaceae
Daphne mezereum L. [3 (V, R), 5, 6 (Z)]. Rare [A, B: vr]. 1370-1780 m

Tiliaceae
Tilia cordata Mill. [(1: E), 5, 6]. Rare [B, D: vr]. 950-1220 m
T. tomentosa Moench [7, 8]. Rare [D: vr]. 400-760 m

Ulmaceae
Ulmus glabra Huds. [3, 4, 5, 7, 8]. Rare [A, C, D: vr]. 680-1200 m

Umbelliferae
Aegopodium podagraria L. [1 (E), 3, 4, 5, 6, 7]. Scattered in 3, rare elsewhere [A, B: vr, C, D: r]. (400) 700-1400 (1780) m
Chaerophyllum aureum L. [1 (E), 3, 4, 6]. Rare [B, C, D: vr]. 1100-1510 m
C. hirsutum L. [1 (E), 3 (E), 5]. Rare [B, C: vr]. 1190-1700 m
C. temulum L. [7]. Rare. 490-710 m

Heracleum spondylium subsp. ternatum (Velen.) Brummitt [1, 3, 4, 5, 6 (G), (7: G), 8]. Scattered in 3, rare elsewhere [A, B, D: vr, C: s]. (180) 700-1540 m

Physospermum cornubiense (L.) DC. [1, 3, 4, 6, 7, 8]. Scattered in 4, 7 and 8, rare elsewhere. (450) 700-1310 m

Sanicula europaea L. [1 (Z), 3 (Z), 4, 5, 6 (Z, G), 7 (G), 8]. Scattered in 3 and 7, common in 4, rare elsewhere [A: s, B: vr, C: c, D: r]. (180) 600-1650 m

Urostylidaceae

Heracleum sphondylium subsp. ternatum (Velen.) Brummitt [1, 3, 4, 5, 6 (G), (7: G), 8]. Scattered in 3, rare elsewhere [A, B, D: vr, C: s]. (180) 700-1540 m

Physospermum cornubiense (L.) DC. [1, 3, 4, 6, 7, 8]. Scattered in 4, 7 and 8, rare elsewhere. (450) 700-1310 m

Sanicula europaea L. [1 (Z), 3 (Z), 4, 5, 6 (Z, G), 7 (G), 8]. Scattered in 3 and 7, common in 4, rare elsewhere [A: s, B: vr, C: c, D: r]. (180) 600-1650 m

Urticaceae

Viola alba subsp. thessala (Boiss. & Spruner) Hayek [1, 2, 3, 4, 5, 6, 7, 8, 9]. Common in 7, 8 and 9, rare elsewhere [C: s, D: c]. 390-1200 (1510) m. – Taxonomy according Livaniou-Tiniakou (1991)

V. macedonica Boiss. & Heldr. subsp. macedonica [(1: E), (3: R), 6]. Rare. 1370-1790 m. A record of V. tricolor L. by Gamisans & Hebrard (1980) from Drymos (6) may refer to this taxon. (E: as V. tricolor L. subsp. tricolor, R: as V. macedonica Boiss. & Heldr.) – Taxonomy according to Erben (1985)

V. reichenbachiana Boreau [1 (Z), 4, 5, 6, 7]. 450-1500 m

V. riviniana Rchb. [1, 3, 5, 6 (G), (7: G), 8]. 740-1370 m. Most of the specimens of the above two taxa had no flowers, so that it was impossible to determine with certainty to which taxon they belong. Both are common in all areas of the Rodopi except for areas 2 and 9, where they are scattered. Our impression is that both occur almost with the same frequency

V. sieheana W. Becker [5, 6, 7, 8, 9]. Common in 9, scattered in 7 and 8, rare in 5 and 6 [B: vr, D: s]. 380-900 (1310) m

Vitaceae

Vitis vinifera subsp. sylvestris (C. C. Gmel.) Hegi [7]. Rare [D: vr]. 640-750 m

Monocotyledoneae

Amaryllidaceae

Galanthus elwesii Hook. f. subsp. elwesii [(1: E)]. 1300-1450 m

Araceae

Arum orientale M. Bieber. subsp. orientale [3, 5, 7, 8, 9]. Rare [D: r]. 370-1300 m. The record of A. maculatum L. for 7 (Gamisans & Hebrard 1980) may refer to A. orientale. – Taxonomy according to Boyce (1994)

Cyperaceae

Cyperus depauperata With. [8]. Rare [D:vr]. 800-990 m

C. digitata L. [1 (E), 2, 3 (V, R), 4, 5, 6, 7, 8]. Scattered in 8, common elsewhere [A: s, B, C, D: vr]. (380) 700-1500 (1750) m

C. flacca Schreb. subsp. flacca [1, 3, 4, 6]. Scattered in 1 and 4, rare in 3 and 6 [C: s, D: vr]. 680-1460 m

C. flava L. [3]. Found in a wet place in beech forest. 1350 m

C. halleriana Asso [1, 4]. Rare [C: vr]. 1200-1360 m

C. ovalis Gooden. [1 (E), 4, 5]. Rare [A, B: vr]. 1440-1460 m

C. guestphalica (Rchb.) O. Lang [1, 3, 4, 5, 6, 7, 8]. Rare [A, B, C, D: vr]. 630-1520 m. – Taxonomy according to Loos (1996)
C. remota L. [(1: E), 3]. Found in a wet place in beech forest. 1190-1520 m
C. sylvatica Huds. subsp. sylvatica [1 (E), 3, 4]. Rare [B, C: vr], 1190-1500 m

Dioscoreaceae

Tamus communis L. [4, 7 (G)]. Scattered in 7, rare in 4 [C: vr, D: r']. 180-870 m

Gramineae

Aira elegantissima Schur [9]. Common. It enters into bad quality and disturbed thermophilous forests [D: vr]. 700-860 m
Anthoxanthum odoratum L. [8, 9]. Rare in 8, common in 9. It enters into bad quality thermophilous forests [D: vr]. 490-710 m
Bellardiochloa variegata (Lam.) Kerguélen [5, 6]. Rare [B, D: vr]. 1100-1450 m
Brachypodium pinnatum (L.) P. Beauv. [1, 2, 3, 4, 6, 7, 8, 9]. Rare in 7 and 8, common elsewhere [A: vr, B: s, C: vc, D: r]. (450) 1000-1550 m
B. sylvaticum (Huds.) P. Beauv. subsp. sylvaticum [(1: E), 2, 3, 4, 6, 7, 8, 9]. Common in 7, scattered in 8 and 9, rare elsewhere [B: vr, C: r, D: s]. 410-1000 (1480) m
Bromus benekenii (Lange) Trimen [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 1, 3 and 4, rare elsewhere [A: r, B, D: vr, C: c]. (390) 1000-1580 m
B. ramosus Huds. [3]. Rare [C: vr]. 1190-1360 m
Calamagrostis arundinacea (L.) Roth [1, 2, 3 (Z, S, V), 4, 5, 6 (G), 7, 8]. Rare in 8, common elsewhere. Less frequent in the eastern than in the western Rodopi [A: vc, B, C: vc!, D: c]. (630) 1000-1850 m
Dactylis glomerata L. s.l. [up to four subspecies in Greece] [1, 2, 3 (V), 4, 5, 6, 7 (G), 8, 9]. Common [A: r, B: s, C: c!]. (180) 600-1500 (1710) m
Danthonia decumbens (L.) DC. [5, 6]. Rare [B: vr]. 1330-1460 m
Deschampsia flexuosa (L.) Trin. [1, 2, 3 (Z), 4, 5, 6 (Z, G), 7, 8, 9]. Scattered in 4 and 9, common elsewhere [A: vr, B: vc!, C: s, D: c]. (450) 800-1650 m. (Z: as Avenella flexuosa (L.) Drejer)
F. cyllenica Boiss. & Heldr. [6]. Rare in beech forests [B: vr]. 1650 m
Festuca drymeja Mert. & W. D. J. Koch [6, 8]. Rare but locally (Reserved Monument of Nature in 6) scattered [A: r, B, D: vr]. 830-1480 m
F. gigantea (L.) Vill. [3, 4 (P)]. In a wet place in beech forest. 1190-1500 m
F. heterophylla Lam. [2, 3, 4, 5, 6 (G), 7 (G), 8, 9]. Common in 3 and 9, scattered elsewhere. The absence of this taxon in Elatia (1) is remarkable (also not found by Eleftheriadou 1992) [A, B: r!, C: s, D: c]. (180) 700-1500 m
F. oviniformis Vetter [2, 3, 5, 6]. Rare [B, D: vr]. 1180-1470 m
F. rubra subsp. thessalica Markgr.-Dann. [2, 3, 5, 6]. Rare. Some incomplete specimens have also been collected in 1 and 4. In 5 more common and may be scattered. Usually in acido-philous forests. 1250-1460 m
F. valesiaca Gaudin [1, 3, 4, 5, 6, 7, 9]. Rare [B: vr, C, D: r]. 550-1400 m
Hordeum vulgare L. [1, 3 (Z, V), R]. Rare [A: vr!, B: vr]. 1490-1820 m. (S: as Elymus europaeus L.)
Melica uniflora Retz. [1 (E), 2, 4, 5, 6, 7 (G), 8, 9]. Common in 2, scattered in 7, 8 and 9, rare elsewhere [A, B: vr, C: r, D: s']. (180) 400-1300 (1490) m
Milium effusum L. [1, 3 (S, V, R), 5, 6 (Z, G), 7, 8]. Common in 8, rare elsewhere [A: c, B: vr, C: r]. It occurs usually in good quality stands. (460) 700-1850 m
Poa bulbosa cf. subsp. pseudoconcinna (Schur) Domin [7, 8, 9]. Rare in 7, scattered in 8, common in 9. It occurs in disturbed thermophilous forests [D: r]. The subspecies could not be determined with certainty, because all specimens have proliferating spikelets
P. nemoralis L. [1 (Z), 2, 3 (Z, V, R), 4, 5, 6 (G), 7, 8, 9]. Common [A, B, C, D: vc]. More frequent in thermophilous than in mesophilian forests. (180) 700-1400 (1780) m
P. pratensis subsp. angustifolia (L.) Gaudin [1, 2, 3, 4, 5, 6]. Rare in 2, common in 5, scattered elsewhere. Two incomplete specimens found in 7 and 9 may belong to this taxon [A: s, B, C:
Iridaceae

Crocus pulchellus Herb. [6]. Rare, but perhaps undercollected. 1330 m

C. veluchensis Herb. [4, 5]. Rare, but perhaps undercollected. 1350-1380 m

Juncaceae

Luzula forsteri (Sm.) DC. [6, 7 (G), 8, 9]. Rare in 6, common elsewhere [D: vc]. (180) 400-900 (1100) m

L. luzulina (Vill.) Dalla Torre & Sarnth. [1, (3: R), 4, 5, 6 (Z, G)]. Common in 5, rare elsewhere [A, B: r, D: vr]. (950) 1200-1750 m

L. luzuloides (Lam.) Dandy & Wilmott subsp. luzuloides [1 (Z), 2, 3 (Z, S, V, R), 4, 5, 6 (Z, G), 7, 8]. Common. Less common in the eastern than in the western Rodopi. Three specimens [1, 8] belong to L. luzuloides subsp. cuprina (Asch. & Graebn.) Chrtk & Kaísa. This subspecies, appears to be rare but some plants have characteristics intermediate between both subspecies. (Z, S: as L. albida (Hoffm.) DC., G: as L. nemorosa (Pollich) E. Mey., V: L. luzuloides)

L. multiflora (Ehrh.) Lej. subsp. multiflora [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 5, rare elsewhere [A, C: vr, B, D: r]. (730) 1000-1580 m. Most specimens have more or less fimbriate-ciliate bractlets and therefore, according to Kirschner (1993), belong to L. taurica (V. I. Krecz.) Novikov. Nevertheless, the differences between both taxa are very subtle

L. sylvatica (Huds.) Gaudin [3 (Z, S, V), 6 (Z)]. Scattered in 3, rare in 6 [A: c, B: vr]. (1130) 1400-1850 m

Liliaceae

Erythronium dens-canis L. [4, 8]. Rare. 700-1350 m

Fritillaria pontica Wahlenb. [8]. Rare, but perhaps undercollected. 810 m

Lilium martagon L. [1 (E), 3, 4, 5, 6, 7]. Rare [V, D: vr, C:s]. 950-1520 m

Ornithogalum nutans L. [8]. Rare. 700-1010 m

Paris quadrifolia L. [1 (E), 3 (R), 5, 6 (Z, G)]. Rare. 1040-1700 m

Polygonatum multiflorum (L.) All. [6 (Z), 8]. Rare [A, D: vr]. 550-1400 m

P. odoratum (Mill.) Druce [3, 4, 6]. Rare [A: vr, C:r!, D: vr]. 950-1250 m

P. verticillatum (L.) All. [1 (E), 3 (Z, P, S, V, R), 6 (G)]. Scattered in 3, rare in 1 and 6 [A: c, B: vr]. 1300-1850 m

Ruscus aculeatus L. [7, 8]. Rare [D: vr]. 400-640 m

Scilla bifolia L. s.l. [1, 3, 4, 5, 6, 7, 8]. Rare but locally scattered. 660-1350 m

Veratrum album L. [(3: Z), 5, 6 (Z)]. Rarely in beech forests, at wet places. 1300-1580 m

Orchidaceae

Cephalanthera damasonium (Mill.) Druce [1, 3, 4]. Common in 1 and 4, rare in 3 [A, B: vr, C: c]. (810) 1100-1550 m

C. longifolia (L.) Fritsch [1 (E), 3, 4, 6, 7, 8]. Scattered in 4, rare elsewhere [C: r!, D: vr]. (390) 710-1310 m

C. rubra (L.) Rich. [1, 2, 3, 4, 6, 8]. Common in 4, scattered in 1 and 3, rare elsewhere [A, B, D: vr, C: vc]. (680) 1000-1520 m

Corallorhiza trifida Châtel. [1 (E), 2, 3 (V), 4, 5, 6 (Z)]. Common in 1 and 2, rare in 3 and 4, scattered in 5 and 6 [A: r, B: c, C: s, D: vr]. (1030) 1200-1500 (1770) m

Epipactis greuteri H. Baumann & Künkele [1, 2, 3, 4, 5, 6, 7, 8]. Scattered in 1, 3 and 4, rare elsewhere [A, B, D: vr, C: c]. (630) 1000-1400 (1520) m. Known in Greece only from few localities in the Pindus Mts and included in the Red Data Book of Greece. This is the first record from NE Greece

E. helleborine (L.) Crantz [1, 2, 3, 4, 5, 6 (G), 7, 8, 9]. Scattered in 2, 5 and 7, rare in 8 and 9, common elsewhere [A: r, B, D: s, C: vc]. (460) 1000-1400 (1570) m. (G: as E. latifolia All.)
4.2. Taxa randomly appearing in the Rodopi beech forest

Cupressaceae: Juniperus communis subsp. nana (Willd.) Syme [(3: R)] 1700 m (as J. communis subsp. alpina (Suter) Ėcklak.). Betulaceae: Alnus glutinosa (L.) Gaertn. [8] 550 m. Boraginaceae: Myosotis scorpioides L. [(3: Z)] 1580 m, Symphytum bulbosum K. F. Schimp. [(6: G)] 1190 m (this record may refer to S. tuberosum L., because specimens without flowers and rhizome may be misidentified). Campanulaceae: Campanula spathulata subsp. spruneriana (Hampe) Hayek [(6: G)] 1310 m (the presence of the taxon has not been confirmed for Rodopi so far). Caprifoliaceae: Sambucus ebulus L. [(1: E)] 1390 m. Caryophyllaceae: Cerastium brachypetalum subsp. roeseri (Boiss. & Heldr.) Nyman [9] 740-860 m, Minuartia garckeana (Boiss.) Mattf. [8] 740-850 m, M. verna (L.) Hiern subsp. verna [(1:E)] 1450 m, Silene dioica (L.) Clairv. [(3: Z)] 1580 m (as Melandrium dioicum (L.) Coss. & Germ., only record for Greece and not confirmed yet), S. lanchenfeldiana Baumg. [(3: R)] 1750 m, Stellaria media (L.) Vill. [8] 810 m. Cistaceae: Helianthemum nummularianum (L.) Mill. subsp. nummularianum [(1, 2)] 1240-1360 m. Compositae: Anthemis cretica subsp. columnae (Ten.) Franzén [8] 760-850 m, Carline vulgaris L. subsp. vulgaris [(1: E)] 1310 m, Centaurea affinis Friv. subsp. affinis [(3: R)] 1600 m, C. stenolepis A. Kern. subsp. stenolepis [(1)] 1110 m, Circium ligulare Boiss. [(3: R)] 1700 m, Hieracium cymosum subsp. sabiniun (Seb.) Nägeli & Peter [(1: E)] 1700 m, H. macranthum (Ten.) Ten. subsp. macranthum [9] 740 m, Inula conyzae (Griess.) Meikle [(3: R)] 1600 m, Leontodon eichoraceus (Ten.) Sanguin. [(1: E)] 710-740 m, L. hispidus var. glabratuus (W. D. J. Koch) Bisch. [(3: R)] 1600 m, L. hispidus L. var. hispidus [(3: R)] 1600 m, Leucanthemum praecox (Horvátic) Horvátic [(1: E)] 1500 m (as L. vulgaris Lam.), Petasites albus (L.) Gaertn. [6] 1140 m, Petasites kabikianus Berch. [(3: R)] 1680-1700 m, Senecio cacaliaster subsp. hercynicus (Herborg) Oberprieler × (S. oovus (Gaertn. & al.) Willd. subsp. oovus [(3: R)] 1600 m (taxononomy and nomenclature following Eleftheriadou & Raus 1996), S. viscosus L. [(3: R)] 1180-1600 m, Telekia speciosa (Schreb.) Baumg. [(1: E), (3: R)] 1350-1680 m, Tussilago farfara L. [(3: R)] 1710 m. Crassulaceae: Sedum album L. [(1: E)] 1350 m, S. cf. griesebachii Boiss. & Heldr. [(1: E)] 1280 m (as S. laticanonis Boiss. & Heldr.), S. hispanicum L. [(1, 6)] 1260-1280 m. Cruciferae: Allaria petiolarata (B. Biib.) Cavara & Grande [(1: E)] 1060-1470 m, Alyssum murale Waldst. & Kit. s. str. [(1: E)] 1350 m (as A. murale Waldst. & Kit.), Arabis recta Vill. [(3: R)] 700 m (taxonomy according to Tutin & al. 1993), A. sagittata (Bertol.) DC. [(1, 7)] 760-1360 m, Berteroa incubata (L.) DC. [(3: R)] 1280 m, Cardamine graeca L. [(8: R)] 700 m, C. hirsuta L. [(7: R)] 640-680 m, Erysimum cuspidatum (Bieb.) DC. [(8: R)] 760-910 m, Thlaspi perfoliatum L. [(1: E)] 1380 m. Eriaceae: Bruckenthalia spinulifolia (Salisb.) Rchb. [(1: E)] 6090-1480 m. Euphorbiaceae: Euphorbia cyparissias L. [(3: R)] 1710 m, E. stricta L. [(7, 5)] 910-1380 m. Fagaceae: Castanea sativa Mill. [(1: E)] 700-750 m. Geraniaceae: Geranium lucidum L. [(8, 9)] 700-930 m. Labiatae: Galeopsis ladanum L. [(1: E)] 1280-1400 m, Origanum vulgare L. s.l. [(1, 2, 3, 9)] 740-1480 m, Satureja subsp. meridionalis (Nyman) Greuter & Burdet [(3: R)] 1750 m, S. bulgarica (Velen.) K. Malý [(1: E)] 1350 m (as Micromeria dalmatica subsp. bulgarica (Velen.) Guine), S. graveolens (M. Biib.) Caruel [(6, 8)] 770-1100 m, Scutellaria albida L. s.l. [(7, 9)] 700 m, Stachys officinalis (L.) Trevis. [(1: E), (3)] 1400-1480 m, S. symphyae Hausskn. [(2)] 1310 m. Léguminosae: Galega officinalis L. [(7)] 910 m, Genista lydia Boiss. [6] 1210-1220 m, Lotus corniculatus L. [(1: E), (3: R)] 1410-1500 m, Trifolium alpestre L. var. alpestre [(3: R)] 1250-1400 m, T. arvense L. var. arvense [(3: R)] 860 m, T. aurem Pollich subsp. aurem [(3: R)] 1280-1700 m, T.

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