

***Quercus frainetto* TEN. on the eastern margin of the Slovenský kras Mts. (Slovakia)**

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ABSTRACT: The *Quercus frainetto* TEN. was registered on the territory of Slovakia within a framework of a complex research of oak distribution. One of its habitats is the locality Debraď on the northern margin of the Slovenský kras Mts. The oak occurs in the *Fageto - Quercetum* group of forest types, in the forest type 2310 - Beech-oak heavy soils with *Carex montana*.

KEYWORDS: *Quercus frainetto*, Debraď locality, Slovakia

Introduction

Quercus frainetto TEN., as stated in POŽGAJ (1986), is a representative of submediterranean dendroflora. It was first determined by TENORE {sensu SCHWARZ (1936) 1813, sensu MOGGI (1972) 1815, syn. *Farnetto* sensu ELWES & HENRY (1971) 1819, sensu SCHWARZ (1936) 1831, sensu MÁTYÁS (1970) corr. 1831, corr. 1835-1836}, according to Flora Europaea (TUTIN 1964) it was described as early as in 1813 in Prodrromus Fl. Nap. supp. 2, 72. The type specimen comes from Calabria and is kept in the Herbarium des Naturhistorischen Museums, Wien. Its area was determined by KRÜSSMANN (1968) and confirmed by POŽGAJ (1986). An extended description was given by SCHWARZ (1936). Its occurrence in the Western Carpathian (Západné Karpaty) mountains seems to suggest its distribution from the south. In Slovakia and

Hungary its occurrence is in the similar biocenoses (SOÓ & JÁVORKA 1951; MÁTYÁS 1970; SOÓ 1970; JÁVORKA & CSAPODY 1979, POŽGAJ 1986). A more detailed survey of *Q. frainetto* is given in the paper by POŽGAJ (1986).

The *Quercus frainetto* is a very rare species in Slovakia. Its autochthoneity in this area used to be questioned: it is rather difficult to prove the genuinness of woody species in stands where man-controlled forest growing has been under way for the recent 200 years. This is also the reason for disagreement among specialists as far as the genuinness of *Q. frainetto* in Slovakia is concerned. Of these, e. g. MICHALKO (1980) supports the idea that *Q. frainetto* was introduced into the region of present-day Slovakia (in particular the locality Ižkovce and Debrad'), ascribing its existence to the millennial symbols (celebrations of the 1000-year anniversary of the Greater Hungary Kingdom in and round 1900). However, this is debatable, as the species had not yet been recognized at that time. MAGIC (1974, 1975) includes it among the autochthonous woody species of Slovakia, similarly as POŽGAJ (1981,1986), POŽGAJ & HORVÁTHOVÁ (1986). HORVÁTHOVÁ (1981), describing the locality Ipeľský Sokolec, does not take an unequivocal attitude to the problem of the origin of the above species. POŽGAJ (1986) characterizes its occurrence on the territory of Slovakia as patchy or scattered (disjunctive): it was noted in approximately 12 Slovakian sites. The stands of *Q. frainetto* reach a tree-like growth and are similar to other domestic oaks at the close stands. Its occurrence is connected with warm habitats of the first and second forest vegetation zones. One of such habitats is also the locality Debrad'.

Methods

The described locality, given the working name Debrad', is situated in the forest to the right of the road Hatiny - Debrad' about 2 km from Hatiny on a sloping ridge leading down to the river Bodva. It occupies SE exposition at an altitude of 270 m, with a slope of 10-15°. The classification of the site was done according to ZLATNÍK (1959), forest type sensu HANČINSKÝ (1972), soil type sensu ÚHÚL Zvolen (1975). The phytography was made in 1984 in the area of the richest occurrence of *Q. frainetto*. Plant names are used in accordance with ČERVENKA & al. (1986) and DOSTÁL (1954). Soil profile was uncovered to 700 mm depth in order to characterize the soil type (see Results and Discussion). Soil acidity was measured in five places: in the middle of the area and in its four corners (ph in 1984, 1987, 1988). Herbarium specimens were taken from *Q. frainetto* and are stored in the author's herbarium. Tree height was measured with Blumeleiß method, perimeter with a tape, and age using the Pressler borer.

Results and discussion

Quercus frainetto stand at the locality Debrad' includes oak trees of different ages, vertically spaced, with uneven canopy and light gaps in places. The stand as a whole originated by 80 to 90 % from seedlings, including *Q. frainetto* itself. The dominant species here is oak (*Q. dalechampii* TEN., *Q. frainetto*, *Q. robur* L.) with admixed common hornbeam (*Carpinus betulus* L.) (Tab. 1); close to the above locality occurs another oak species, *Q. virgiliana* TEN.

Tab. 1. Woody plant layers.

Vertical spacing	Species	%
1 (overgrowing)	<i>Q. dalechampii</i> TEN.	5
	<i>Q. frainetto</i> TEN.	5
2 (level)	<i>Q. dalechampii</i>	15
	<i>Q. frainetto</i>	10
	<i>Q. robur</i> L.	10
	<i>Carpinus betulus</i> L.	10
3 (ingrowing)	<i>Q. dalechampii</i>	10
	<i>Q. frainetto</i>	5
	<i>Q. robur</i>	5
	<i>Carpinus betulus</i>	5
4 (suppressed + young)	<i>Q. dalechampii</i>	10
	<i>Q. frainetto</i>	5
	<i>Carpinus betulus</i>	5
5 ₁₊₂ (Zlatník 1959)	<i>Q. frainetto</i>	1
	<i>Cornus mas</i> L.	1
	<i>Ligustrum vulgare</i> L.	1-2
	<i>Prunus spinosa</i> L.	1-2
	<i>Crataegus monogyna</i> JACQ.	+1
	<i>Rosa canina</i> L.	+1
	<i>Corylus avellana</i> L.	1
	<i>Viburnum opulus</i> L.	+
	<i>Rubus caesius</i> L.	-
	<i>Acer campestre</i> L.	+
	<i>Carpinus betulus</i>	1
<i>Swida sanguinea</i> (L.) OPIZ	1	

Based on massive appearance of grass species of mesotrophic character (*Carex montana*, *Melica uniflora*, *Poa nemoralis*), massive occurrence of thermophilous species of eutrophic character (*Betonica officinalis*, *Origanum vulgare*, *Lathyrus niger*, *Melittis melissophyllum*), rare occurrence of beech-forest accompanying herbal species and massive occurrence of mesotrophic species (Tab. 2), the stand can be classified as belonging to *Fageto - Quercetum* forest type group, to forest type 2310 – Beech-oak heavy soils with *Carex montana*, to phytocenoses of the type *Carex pilosa*, *C. montana*, *Melittis melissophyllum*.

As can be seen from Tab. 3, the most frequent oak at the site is *Q. dalechampii* (44 %), followed by *Q. frainetto* (28%) and *Q. robur* (28%). Concerning tree height, *Q. frainetto* and *Q. dalechampii* ranked first. The age of the tallest trees ranged between 65 and 70 years. The biggest diameters were those of *Q. frainetto* tree No.4: 529 mm at d_{1,3} m; tree No.3: 369 mm; followed by *Q. dalechampii* tree No. 50: 353 mm.

Q. frainetto (see photo) was represented in all categories of tree height: in 1987 seedlings were noted as well. Close to our locality *Q. virgiliana* was documented as well at the main canopy species (2). A similar occurrence had been noted at Ipeľský Sokolec where HORVÁTHOVÁ (1981) found *Q. frainetto* and POŽGAJ (unpublished) found *Q. virgiliana* growing nearby. This could be a pure coincidence but the similarity of the occurrence and of habitats seems to disprove it. If the occurrence of *Q. frainetto* at the given locality is simply registered and its origin due to introduction admitted, almost everything in the behavior of the above oak species is explainable (natural reproduction, presence of various age categories etc.), yet in both cases it would be difficult to explain the natural presence of *Q. virgiliana*. There does not seem to be too much agreement to presume origin of the oak seed at Debrad' and Ipeľský Sokolec. *Q. virgiliana* stand at Debrad' is 30 years old, the tallest *Q. frainetto* specimens are 65 to 70 years old, which points at a different time horizon of the origin of the given population, and thus gives more weight to the idea of autochthoneity. It is also difficult to understand the connection of *Q. frainetto* occurrence at Debrad' with the millenial celebrations 1900, as suggested by MICHALKO (1978, 1980).

Concerning soil conditions at the locality Debrad', suffice it to say that it is medium deep brown forest soil (sensu ÚHÚL Zvolen 1975) on limestone. Stratigraphically it looks as follows:

	25 mm
A	
	90 mm
B	
	400 mm
B / C	

- A0 - A01 non-decomposed dropping,
 A02 semi-decomposed dropping,
 A03 sketchy presence of surface soil.

A-horizon is formed by loamy-clayey to clayey soil, moist, with 20 % minute skelet, small-grain to grainy composition, loose.

B-horizon is composed of clayey moist soil with 30 % skelet, small-grain to grainy, with an admixture of loess, mild-to-medium mellow.

B/C-horizon is one with a marked admixture of skelet, compact. Significant root system is to the depth of 400 mm.

ph-measurements were done in five places of the monitored area in three years (1984, 1987, 1988):

In 1984 the ph ranged between	4.5 and 6.6	making the mean	5.92
1987	5.4	6.5	6.26
1988	6.0	6.6	6.36

Total mean was 6.18. According to the soil reaction (ŠÁLY 1957) the soil can be classified as mildly acid, only partially (in 3 cases) reaching neutral reaction.

Tab. 2. Herbal synusia.

Taxon	Quantity (ZLATNÍK 1959)
<i>Brachypodium pinnatum</i> (L.) P. BEAUV.	+
<i>Carex digitata</i> L.	1
<i>Carex montana</i> L.	1 - 2 ²
<i>Festuca ovina</i> L.	–
<i>Melica uniflora</i> RETZ.	1
<i>Poa nemoralis</i> L.	1
<i>Agrimonia eupatoria</i> L.	+ ¹
<i>Asperula odorata</i> L. (<i>Galium odoratum</i> (L.) SCOP.)	+ ¹
<i>Betonica officinalis</i> L.	1 - 2
<i>Calamintha clinopodium</i> SPENNER	+
<i>Campanula rapunculoides</i> L.	+ ¹
<i>Cephalanthera rubra</i> (L.) L. C. RICH.	+ ¹
<i>Chrysanthemum corymbosum</i> L. (sensu DOSTÁL 1954)	1
<i>Euphorbia cyparissias</i> L.	1
<i>Fragaria moschata</i> DUCH.	1 - 2
<i>Galium mollugo</i> L.	+
<i>Galium schultesii</i> VEST	–
<i>Hieracium murorum</i> L.	1
<i>Hieracium sabaudum</i> L.	–
<i>Hypericum perforatum</i> L.	+
<i>Lathyrus niger</i> (L.) BERNH.	+ ¹
<i>Lembotropis nigricans</i> GRISEB.	–
<i>Melittis melissophyllum</i> L.	1
<i>Origanum vulgare</i> L.	1
<i>Pulmonaria officinalis</i> L.	1 - 2
<i>Taraxacum officinale</i> WEB. in WIGGERS	–
<i>Veronica officinalis</i> L.	1
<i>Vicia cassubica</i> L.	1 - 2
<i>Viola reichenbachiana</i> JORDAN ex BOREAU	1



Fig. 1. *Quercus frainetto* TEN. – leaves and fruits, tree No. 4, locality Debrad'.

Tab. 3. Basic data on oaks at the locality Debrad' in 1984

Tree No.	Oak species	Height [in m]	Diameter [at d _{1,3 m} mm]	Age years
1	<i>Q. frainetto</i>	18	287	–
2	<i>Q. frainetto</i>	9	140	–
3	<i>Q. frainetto</i>	19	369	–
4	<i>Q. frainetto</i>	17	529	65
5	<i>Q. robur</i>	8	130	–
6	<i>Q. robur</i>	8	108	–
7	<i>Q. dalechampii</i>	13	271	–
8	<i>Q. dalechampii</i>	16	220	65
9	<i>Q. dalechampii</i>	10	143	–
10	<i>Q. dalechampii</i>	4	60	–
11	<i>Q. frainetto</i>	8	118	–
12	<i>Q. dalechampii</i>	8	92	–
13	<i>Q. dalechampii</i>	8.5	92	–
14	<i>Q. dalechampii</i>	8.5	115	–
15	<i>Q. frainetto</i>	8.5	102	–
16	<i>Q. frainetto</i>	15.5	223	–
17	<i>Q. dalechampii</i>	7	67	–
18	<i>Q. frainetto</i>	8	54	–
19	<i>Q. frainetto</i>	12.5	124	–
20	<i>Q. robur</i>	15	166	43
21	<i>Q. robur</i>	10.5	83	–
22	<i>Q. frainetto</i>	15	172	–
23	<i>Q. frainetto</i>	8	67	–
24	<i>Q. dalechampii</i>	17	232	–
25	<i>Q. robur</i>	13	162	–
26	<i>Q. robur</i>	14	99	–
27	<i>Q. dalechampii</i>	12	99	–
28	<i>Q. dalechampii</i>	13.5	102	–
29	<i>Q. dalechampii</i>	20	210	–
30	<i>Q. dalechampii</i> x	9	89	–
31	<i>Q. robur</i>	10	166	–
32	<i>Q. dalechampii</i>	9	156	–
33	<i>Q. frainetto</i>	12	210	–
34	<i>Q. robur</i>	8.5	76	–
35	<i>Q. robur</i>	13.5	102	–
36	<i>Q. robur</i>	12	111	–
37	<i>Q. dalechampii</i>	10	86	–
38	<i>Q. frainetto</i>	15.5	242	68
39	<i>Q. robur</i>	4.5	67	–
40	<i>Q. dalechampii</i>	17	239	–
41	<i>Q. frainetto</i>	4	51	–
42	<i>Q. dalechampii</i>	8	76	–
43	<i>Q. dalechampii</i>	14	153	–
44	<i>Q. dalechampii</i>	15	143	–
45	<i>Q. robur</i>	12.5	121	–
46	<i>Q. dalechampii</i>	4.5	76	–
47	<i>Q. robur</i>	13	194	–
48	<i>Q. robur</i>	10	83	–
49	<i>Q. dalechampii</i>	13.5	210	–
50	<i>Q. dalechampii</i>	18	363	–

Conclusion

The paper analyzes the locality Debrad' with *Quercus frainetto* in 1984. The representation of the autochthonous oaks of Slovakia numbering 50 oak trees at the above area was found to be as follows: *Q. dalechampii* 44%, *Q. frainetto* 28%, *Q. robur* 28%, *Q. frainetto* (tree No. 4) including seedlings. Close to the tested area another representative of *Dascia* KY. section, *Q. virgiliana* TEN. was noted too, which makes an analogy with *Q. frainetto* occurrence at Ipel'ský Sokolec. The coenose belongs to *Fageto-Quercetum* forest type group, to forest type 2310 – Beech-oak heavy soils with *Carex montana*, to phytocenoses of type *Carex pilosa*, *C. montana*, *Melittis melissophyllum* on brown forest soil covering limestone substratum.

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