

**THE PRESENCE OF BEECH WITH OAKLIKE BARK (*FAGUS SYLVATICA*
L. VAR. *QUERCOIDES* PERS.) IN BOSNIA AND HERZEGOVINA**

**Prisustvo bukve sa hrastolikom korom (*Fagus sylvatica* L. Var. *Quercoides* pers.)
u Bosni i Hercegovini**

Eldin Selimović¹, Fatima Pustahija¹, Dženan Bećirović¹, Adnan Medić², Neđad Bašić¹

ABSTRACT

In this paper is given an overview of the rare occurrence of beech with oaklike bark (*Fagus sylvatica* var. *quercoides*) in Bosnia and Herzegovina, which is recorded for the first time by Karlo Malý in 1934. In addition to basic information about the distribution of this taxon we gave a detailed description of a one its remarkable recent tree from Kreševo area. These unusual phenomena induce scientific interest and require special protection and conservation actions.

Key words: bark, beech, biodiversity, *Fagus sylvatica* var. *quercoides*

In its natural range, beech (*Fagus sylvatica* L.) occupies an area of about 20 million ha (MILESCU ET AL., 1967; VIŠNJIĆ, 2010) and presents one of the economically most important hardwoods of Europe. The large areas of the beech can be found in the countries of Balkan Peninsula, France, Germany, Denmark, Switzerland and Italy (VIŠNJIĆ, 2010). According to FUKAREK (1970), European beech mainly spreads in the areas of moderately oceanic and transitional oceanic-continental climate. Elevation ranges from plains in Scandinavia to the mountains in Albania (2000 m) and Sicily (2100 m). It has very wide amplitude compared to the geological substrate and soil type. This sciophilous species requires moderately both moist and warm habitats, with higher summer rainfalls. In fact, the beech does not fit continental climate with high temperature amplitudes and dry air.

According to FUKAREK (1970), „beech covers the widest distribution area in Bosnia and Herzegovina. Except of the wide belt in the western Bosnia and Herzegovina and the entire lower Herzegovina, which occupies the thermophilic Submediterranean vegetation, and slightly wider belt of lowland and hilly terrains in

¹ Faculty of Forestry University of Sarajevo

² Porodice Ribar 71, 71000 Sarajevo, Bosnia and Herzegovina

the northern and north-eastern Bosnia, which occupies hygrophilous and moderately thermophilic vegetation of subpannonian formations, all the rest area could be considered as a unique connected areal of beech distribution. Deep river valleys and karst fields are excluded within this area, as well as areas of high mountain peaks where no beech in large numbers“. Areal of beech forest is much narrower than the geographic distribution of the species. The same author states that the beech forest descends almost to the shores of the river Sava in northern Bosnia (150 m), while the upper limit, related to some western and southern Bosnian and Herzegovinian mountains, can be found above 1900 m.

According to MATIĆ ET AL. (1971), from the total forest area of 2.5 million ha in Bosnia and Herzegovina, the pure beech forest occupy 13.3%, beech-fir-spruce forests 22.45%, and coppice forests and thickets of beech 12.6%, which makes about 48.35% of the total forest area in B&H. The analysis of recently digitized maps of real forest vegetation of B&H (Figure 1; SELIMOVIĆ and VOJNIKVIĆ, in preparation, according STEFANOVIĆ ET AL., 1983), it was possible to estimate then state presence of beech forests in the B&H total forests: beech forests occupy the largest area (742,712 ha, 29.51%), followed by beech-fir-spruce forests (68,365 ha, 18.61%), beech-fir forests (198,734 ha, 7.90%), subalpine beech forests (31,500 ha, 1.25%), and thermophilous beech forests (16,831 ha, 0.67%).

Within the natural range of beech is very rare to find individuals who, by their morphological characteristics, deviate from the usual descriptions of this species. Karlo MALÝ (1934) first gave a description of beech with oaklike bark (*Fagus sylvatica* L. var. *quercoides* Pers.) in Bosnia and Herzegovina. Additionally, JANJIC (1998) wrote about another unusual form of beech in B&H, *F. sylvatica* f. *pseudograndidentata* Janjic et Ballian, with coarsely toothed leaves and no other morphological differences in comparison to common beech. The same author states that this phenomenon is described in a number of similar forms of European beech, but none are identical to those tree individual.

In this paper we discuss more about beech with oaklike bark, for the first time found in B&H on pass Makljen (1060 m), between Vitez and Stambulčić, on the northern slopes of Mt. Jahorina (MALÝ, 1934). At that time this unusual phenomenon has been known in Germany, Poland, Austria, Italy, and Croatia. The same author suggests that this type of individual bark beech development is equal to bark development in some individuals of fir (*Abies alba* L.), field maple (*Acer campestre* L.) and field elm (*Ulmus minor* Mill.). Several individuals of *Fagus sylvatica* L. var. *quercoides* in B&H were recorded later: on Mt. Jahorina (on the road from Bistrica to Prača spring), on the road Trebovac-Bitovinja in Crna rijeka area (mixed forest Blinje) and on the slopes of the Mt. Bitovnje (MALÝ, 1940; FUKAREK, 1965).

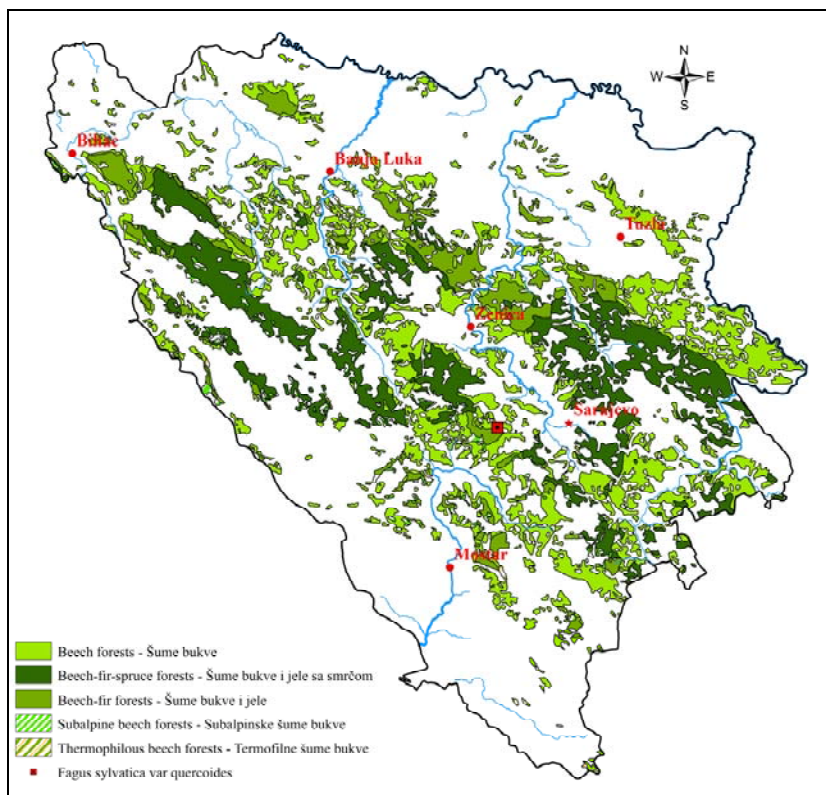


Figure 1. The map of real forest vegetation of neutrophilic and acidophilic beech forests in B&H (digitalized and modified by SELIMOVIĆ and VOJNIKVIĆ, in preparation, according STEFANOVIĆ et al., 1983)

Slika 1. Karta realne šumske vegetacije neutrofilnih i acidofilnih šuma bukve u BiH (digitalizirali i modifikovali SELIMOVIĆ i VOJNIKVIĆ, u pripremi, prema STEFANOVIĆ i sar., 1983)

In the mid-twentieth century were find some other examples of *F. sylvatica* var. *quercooides* in the Balkans: in Serbia (TUČOVIĆ AND JOVANOVIĆ, 1956) and FYR Macedonia (NIKOLOVSKI AND MIRČEVSKI, 1969), described as a variety of Moesian beech (*F. moesiaca* (Malý) Czezzott), which taxonomical status is still discutable (FUKAREK, 1959; TUTIN, 1964; DENK, 1999).

Describing the unusual form of European beech with cuboid furrowed bark (*cortice tessellato – sulcata*) from the Gottingen area in Germany, PERSOON (1800) gave to these forms taxonomic status of variety *Fagus sylvatica* var. *quercooides*, with a remark that it is a very rare appearance. FUKAREK (1965) wrote that first discovered *F. sylvatica* var. *quercooides* tree in B&H on pass Makljen is cut down. Also, he suggests that this phenomenon is not a permanent form of beech, and could not be included in the group of forms or varieties. He attributed *lussu* label to the scientific name of the beech, which in the botany means „play of nature“. According database of The Plant List, *F. sylvatica* var. *quercooides* is classified among the 44, to date described, synonyms for *F. sylvatica* (THE PLANT LIST, 2010). Some researches in

Germany have shown that individuals grown from the seed of *F. sylvatica* var. *quercoides* have a normal smooth bark (MALÝ, 1934), which indicate that this phenomenon probably is not an inherited trait (FUKAREK, 1965). MALÝ (1934) conveys the opinion that formation of this kind beech's bark is maybe pathological phenomenon, which usually occurs in older trees on the side facing to the Sun. There are several hypotheses about the causes of bark splitting of *F. sylvatica* var. *quercoides*, but it is most likely some genetic aberration (TRINAJSTIĆ, 2003). All of the above indicate to the still poorly understood taxonomic status of this taxon.

During filed investigations in the area of Kreševo, Central Bosnia (Management unit „Crna rijeka Fojnička“, Forest Management Area „Fojničko“, department 49, section "b", altitude 903 m, 2012. year), we recorded one tree of *F. sylvatica* var. *quercoides* (Figure 2). Subsequent consultation of literature sources showed that MALÝ (1940) found one unusual beech tree on the same locality (Blinja). In an effort to point out the presence of such rare occurrences within Bosnian forest ecosystems, we consider it necessary to pay attention to the necessity of the protection and conservation of these and similar natural phenomena.

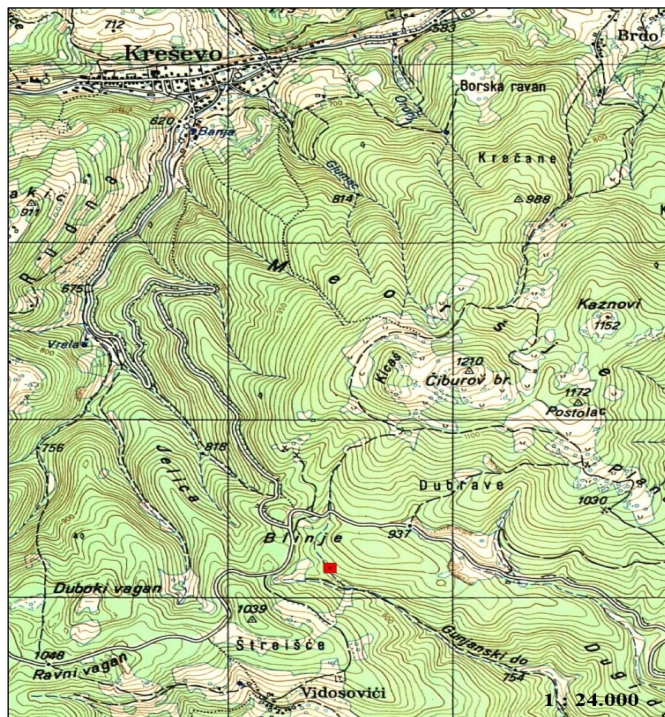


Figure 2. Accurate position of beech with oaklike bark (*F. sylvatica* var. *quercoides*) individual in the Kreševo area (red square)

Slika 2. Tačna pozicija stabla bukve sa hrastolikom korom (*F. sylvatica* var. *quercoides*) u okolini Kreševa (crveni kvadrat)

Found remarkable beech tree has two trunks, with almost equal thickness, that grow from the common stump. The breast height of the one trunk is 58.90 cm, and of the other 57.07 cm. At a height of 3.4 m trunks again bring closer and intertwine forming a common canopy, whose highest branches ending at the height of 23.30 m (Figures 3a and b). The canopy is very extensive, and many branches are in relation to the trunk under unusual very obtuse angles (Figure 3b). Cracked bark is visible from the root collar along the trunk; including apex branches in the canopy (Figs 3a, c and d). Longitudinal cracks are deeper than the transversal, and formed bark plates are longer than wider (Figure 3c).



Figure 3. *Fagus sylvatica* var. *quercoides*, a) habitus, b) canopy, c) bark, d) trunk (Photos: E. Selimović)

Slika 3. *Fagus sylvatica* var. *quercoides*, a) habitus, b) krošnja, c) kora, d) stablo (Slike: E. Selimović)

Tree age is not directly estimated, but based on the diameter at breast height and age of the surrounding beech trees it can be concluded that the observed tree age is about 110 years. Accurately positioning of *F. sylvatica* var. *quercoides* tree on a topographic map was done by ArcGis 10-Esri, in order to monitor and protect it.

Remarkably rare individuals are potential indicators of forest ecosystems' preservation, and it would be desirable to further investigate the observed individual (anatomically, histologically, cytogenetically and physiologically). Therefore, the experts responsible for forest management must continually educate and propose

appropriate preservation and protection actions for the conservation of rare and endangered species and individuals.

References - Literatura

- DENK, T. (1999): The taxonomy of *Fagus* in western Eurasia. 2: *Fagus sylvatica* subsp. *sylvatica*. Feddes Repertorium 110: 381–412.
- FUKAREK, P. (1959): Pregled dendroflora Bosne i Hercegovine. Narodni šumar, Sarajevo **13**: 263–286.
- FUKAREK, P. (1965): Rijetko šumsko drveće republike. Narodni šumar, Sarajevo, **XIX**: 125–134.
- FUKAREK, P. (1970): Areali rasprostranjenosti bukve, jele i smrče na području Bosne i Hercegovine. Radovi ANU Bosne i Hercegovine, Odjeljenje prirodnih i matematičkih nauka, Sarajevo, **11**: 231–256.
- JANJIĆ, N. (1998): Nove mutagene forme jele (*Abies alba* Mill.) i bukve (*Fagus sylvatica* L.) iz centralne Bosne. Radovi Šumarskog Fakulteta Univerziteta u Sarajevu, Sarajevo, **1**: 37–40.
- MALÝ, K. (1934): *Fagus sylvatica* L. lus. *quercoides* (Pers.) A. et G. Glasnik Zemaljskog muzeja Bosne i Hercegovine, Sarajevo, **XLVI**: 29–36.
- MALÝ, K. (1940): Bilješke za floru Bosne i Hercegovine. Glasnik Zemaljskog muzeja Bosne i Hercegovine, Sarajevo, **LII**: 34.
- MATIĆ, V, DRINIĆ, P, STEFANOVIĆ, V, ČIRIĆ, M, BEUS, V, BOZALO, G, GOLIC, S, HAMZIĆ, U, MARKOVIĆ, LJ, PETROVIĆ, M, SUBOTIĆ, M, TALOVIĆ, N, TRAVAR, J. (1971): Stanje šuma u SR Bosni i Hercegovini, prema inventuri na velikim površinama u 1964–1968 godini. Šumarski fakultet i institut za šumarstvo, Sarajevo. Posebna izdanja 7, Sarajevo.
- MILESCU, I, ALEXE, A, NIKOVESCU, H, SUCIU, P. (1967). *Fagul. (Beech)*. - Editura Agro-Silvica, Bucuresti pp. 581.
- NIKOLOVSKI, T, MIRČEVSKI, S. (1969): Balkanska bukva s hrastolikom korom (*Fagus moesiaca* (Maly) Dom. var. *quereoides* V. N.) u Makedoniji. Šumarski list, Zagreb, **3-4**: 104–108.
- PERSOON, CH. (1800): An account of a remarkable variety of the beech, *Fagus sylvatica*. Transactions of the Linnean Society of London, London, **5**: 232–233.
- STEFANOVIĆ, V, BEUS, V, BURLICA, Č, DIZDAREVIĆ, H, VUKOREP, I. (1983): Ekološko-vegetacijska rejonizacija Bosne i Hercegovine. Šumarski fakultet u Sarajevu, posebna izdanja 17, Sarajevo.
- THE PLANT LIST (2010): Version 1. Published on the Internet; <http://www.theplantlist.org/> (Accessed: 04.10.2013).
- TRINAJSTIĆ, I. (2003). Taksonomija, morfologija i rasprostranjenost obične bukve. In: Matić S. (ed), Obična bukva u Hrvatskoj. Akademija šumarskih znanosti. Zagreb.
- TUCOVIĆ, A, JOVANOVIĆ, M. (1965): Prilog proučavanju varijabiliteta bukve u Srbiji. Zbornik radova Instituta za šumarstvo i drvnu industriju **V**: 115–122.

- TUTIN, TG. (1968). Genus *Fagus*. In: Tutin TG. et al. (Eds.), *Flora Europaea*, Cambridge **1**: 61.
- VIŠNJIĆ, Č. (2010): Varijabilnost nekih morfoloških svojstava 16 provenijencija evropske bukve (*Fagus sylvatica* L.). *Radovi Šumarskog Fakulteta, Univerzitet u Sarajevu, Sarajevo*, **2**: 55–70.

SAŽETAK

Opisom rijetke pojave bukve sa hrastolikom korom (*Fagus sylvatica* var. *quercoides*) se ukazuje na biološku raznolikost i potrebu zaštite rijetkih i neobičnih individua drvenastih vrsta u BH šumama. S obzirom da o ovakvim pojavama nema dovoljno naučno utemeljenih informacija, svaka individua predstavlja jedinstven izvor podataka. Naime, od izuzetne je važnosti, prilikom redovnih gospodarskih aktivnosti u šumama, obratiti pažnju na morfološki interesantna i neobična stabla, evidentirati ih i zaštititi, te podatke proslijediti relevantnim naučnim institucijama.