

**THE NEW FORM OF COMMON SILVER FIR (*Abies alba* Mill.)
FROM NORTHERN BOSNIA
Nova forma obične jele (*Abies alba* Mill.) iz sjeverne Bosne**

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Abstract

This paper is dealing with a new form of European Silver Fir, which is probably a result of mutagenous process in earliest phase of development of individual, in zygote, or maybe at gamete phases.

Key words: *Abies alba* f. *dichotoma*, mutagenous form.

1. Introduction

Occurrence that some individuals of certain plant species is drastically different from others in one or more morphological characteristics is extremely rare in nature, although one may find such cases in frame of the whole population. These phenomena are often understood as consequences of strong mutations, which can be generative or somatic origin. Phenomenon demonstrating characteristics that are completely new and without a filogenetical background is not uncommon.

In former Yugoslavia a pyramidal Silver Fir (*Abies alba* Mill. var. *pyramidalis* Carr.), described by Tošić (1963) and Matović et al. (1996) was the best known variety. Vidaković (1982) confirmed that this variety has also been presented in Slovenia, locality Rakitna.

Besides the changes caused by hereditary factors, there are those caused by mutagenous impacts of viruses - known as virosis. Although virosis are not hereditary they can repress development of normal plant characteristics and consequences are plant bizarre forms.

European Silver Fir is characterised by very small number of known forms in relation to small morphological variability (Vidaković, 1982; Jovanović, 2000), in contrast to Norway Spruce or some other tree species. According to Vidaković (1982) only 29 varieties, forms and cultivares of European Silver Fir are known, and Krüssman (1983) noted 21 cultivares.

Mutagenous forms were usually described in horticulture guides. In current horticulture practice artificial creations of new cultivars are common and these are based on mutations induced by some mechanical or chemical impacts.

Mutagenous forms survive in nature rarely without a help of man, and their conservation and reproduction is possible only in vegetative or heterovegetative ways.

2. Field study

In northern Bosnia, southern from the town Tešanj (on slopes of mountain Crni vrh nearby Mekiš village), in silver fir stand at 290 meters a.s.l., there is one aberrant tree. It is characterised by phenomenon of dichotomy at lateral branches, till the trunk is monopodial. Its height is 20 m, breast diameter 26 cm and is positioned in upper floor of the stand. Occurrence of dichotomy was observed both on lower already dead branches and on upper young and still alive once (Photo 1). This indicate that phenomenon was not a consequence of tree position in the stand. Occurrence of forming only two buds at lateral shoots in last vegetation period was registered at analysed samples. Such a phenomenon in European Silver Fir has not been described in known literature.

Branche samples for study were collected from all parts of crown during winter 2001/2002 and part of the material was deposited in Herbarium of the Land's Museum B&H (SARA) in Sarajevo.

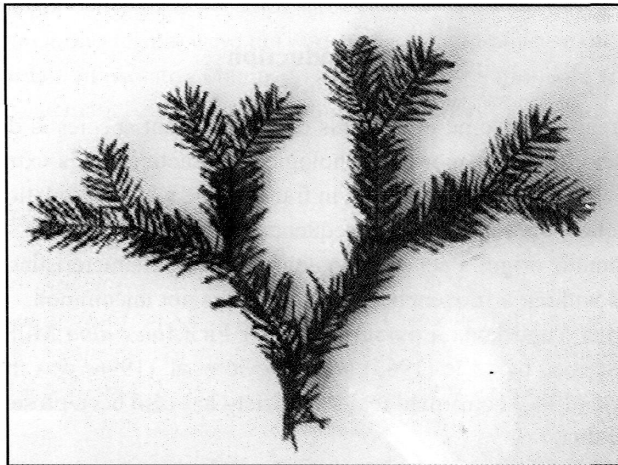


Photo 1: Dichotomy phenomenon of silver fir (Photo: D.Ballian)

3. Discussion

This new form of silver fir probably represents a mutation occurred in the earliest phases of individual development - in zygote or maybe in gamete phases. Its characteristics may be interesting for horticulture and may be reproduced heterovegetatively. Hybridisation could also give interesting results since the tree fructification has been regular and rich.

Abies alba Miller f. *dichotoma*, Ballian, f. nov.

Rami inde a stipite dichotomice ramificantur; senescentes vero sic dictam 'tum huc-tum illuc' (cic-cak) formam retinent.

In exceptis casibus ramificatio sicuti in normali typo esse postest. Arbor unica, probabiliter forma mutagena.

Habitat: in septentrionalibus Bosnae occidentalis: Tešanj, Crni vrh, 310 m. s. m. penes vicum Mekiš. Associationis Abieti Fagetum crescens in crasso colluviali agro serpentine quoque territorii.

Leg: D. Ballian, september 2000. Holotypus: SARA

Forma decora, magni momenti in horticultura.

4. Conclusion

Described is a new form of european silver fir observed in northern part of Bosnia and represented only with one individual tree. It is likely that this very tree is of a mutagenous origin. The form *Abies alba* Miller *f. dichotoma* Ballian is characterised by dichotomy of lateral branches. The cause of this phenomenon is possibly zygote or gamete mutation in earliest phases of individual development. New form could be reproduced heterovegetatively and thus to find its place in contemporary horticultural practice.

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Sažetak

U šumama jele, na padinama Crnog vrha u okolini Tešnja, otkrivena je i opisana jedna nova forma ove vrste koju karakterizira dihotomost bočnih grana. Pojava je vrlo vjerojatno mutagenog porijekla, a zastupljena je samo sa jednim primjerkom i opisana je kao *Abies alba* Miller, *forma dichotoma*, Ballian. Vjerojatno se radi o zigotnoj ili gametnoj mutaciji koja se desila u najranijoj fazi razvitka individue. Ova forma bi se mogla heterovegetativno umnožavati i mogla bi naći svoje mjesto u hortikulturi.

**GLJIVE PRAŠUMSKIH REZERVATA "RAVNA VALA" NA IGMANU
I "TRSTIONICA" PORED KAKNJA - PRVI PRILOG**
**Fungi of primary forests "Ravna vala" on mountain Igman and
"Trstionica" near Kakanj - first contribution**

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Abstract

Results of fungi survey of primary forests "Ravna vala" on mountain Igman near Sarajevo and "Trstionica" near Kakanj realised during 2001-2003 are presented. This is a first report on this topic showing that virgin forests are good reservoir of fungal diversity. Some very rare species may be found here.

Key words: fungi, mushrooms, primary forest.

1. Uvod

Prašume imaju izuzetan naučni, edukativni i kulturološki značaj, ali i sa stanovišta zaštite biodiverziteta. U Bosni i Hercegovini ima šest ovakvih rezervata. Pored naše najveće prašume "Perućica" (1434 ha), i slijedeće po veličini prašume "Lom" (300 ha) pored Bosanskog Petrovca, postoji i nekoliko manjih: "Janj" pored Šipova, "Plješevica" pored Bihaća, "Trstionica" pored Kakanja i "Ravna vala" na Igmanu pored Sarajeva. Imponuje shvatanje nekih preduzeća šumarstva u BiH da se naslijede našeg najvrijednijeg prirodnog resursa sačuva u izvornom obliku. U ovom prilogu daju se rezultati istraživanja terikolnih i lignikolnih gljiva u prašumama "Ravna vala" na Igmanu i "Trstionica" pored Kakanja utvrđenih u periodu od 2001. do 2003. godine.

2. Objekti i metod rada

2.1 Opće karakteristike prašume "Ravna vala" Igman

Ova prašuma se nalazi u odjelu 106., g.j. "Igman", na nadmorskoj visini 1280-1450 m i na površini 45 ha. Podloga je krečnjačko-dolomitska sa karakteristikama karsita na kojoj su razvijena vrlo heterogena zemljišta (crnice, smeđe-krečnjačko zemljište, luvisol i dr.). Klima je planinska umjerenog alpskog tipa, sa jakom zimom i svježim ljetom. Prosječna godišnja temperatura je oko 6 °C, a prosječne godišnje padavine su oko 1600 mm i one su manje-više ravnomjerno raspoređene tokom godine. Šume pripadaju zajednici *Abieti-Fagetum dinaricum* Tregubov (Beus & Vojniković, 2002). Glavne šumske vrste su jela i bukva, ali se u primjesi javljaju smrča, javor i drugi lišćari. Ukup-

na zaliha je 667 m³ od čega jele 521 m³, bukve 101 m³, smrče 8 m³ i javora 37 m³.

2.2 Opće karakteristike prašume "Trstionica" pored Kaknja

Prašuma se nalazi u odjelu 52. g.j. "Gornja Trstionica-Bukovica" na nadmorskoj visini 1005-1112 m i na površini 32,5 ha. Podlogu čine krečnjaci i verfenski sedimenti (glinci i kvarcni pješčari) sa distričnim kambisolom na kiselim silikatnim stijenama. Klima je umjereno planinska. Prosječna godišnja temperatura je 7,1 °C, a prosječne godišnje padavine su oko 800 mm i ravnomjerno su raspoređene tokom godine (50% padavina je u vegetacionom periodu). Šume pripadaju zajednici *Piceo-Abieti-Fagetum*. Glavne šumske vrste su jela (III bonitet) i bukva (III bonitet), a u primjesi se javljaju i smrča, javor i drugi lišćari. Ukupna zaliha prema totalnom promjeru iz 2001. godine je 671 m³, od čega jele 325 m³, bukve 332 m³, smrče 10 m³, javora 0,7 m³ i ostalih lišćara 3,3 m³.

Tabela 1.: Vrste gljiva prašumskih rezervata "Ravna vala" i "Trstionica"
Table 1.: Fungi of primary forests "Ravna vala" Igman and "Trstionica" Kakanj

Vrsta	Ravna vala	Trstionica	Vrsta	Ravna vala	Trstionica
<i>Amanita citrina</i>	+	+	<i>Lactarius piperatus</i>	+	
<i>Amanita muscaria</i>	+	+	<i>Lactarius salmonicolor</i>	+	+
<i>Amanita pantherina</i>	+		<i>Lactarius scrobiculatus</i>	+++	+++
<i>Amanita rubescens</i>	+		<i>Lactarius vellereus</i>	+++	+++
<i>Amanita vaginata</i>	+	+	<i>Lycoperdon echinatum</i>	+	
<i>Armillaria mellea</i>	+	+	<i>Lycoperdon perlatum</i>	+++	+++
<i>Boletus calopus</i>	+		<i>Lycoperdon pyriforme</i>	++	++
<i>Bjerkandera adusta</i>	+		<i>Marasmius alliaceus</i>	++	++
<i>Bondarzewia montana</i>	+	+	<i>Meripilus giganteus</i>	+	+
<i>Calocera viscosa</i>	+	+	<i>Mycena haematopus</i>	+	
<i>Cantharellus cibarius</i>	+	+	<i>Oudemansiella mucida</i>	+	+
<i>Climacocystis borealis</i>	+		<i>Oudemansiella radicata</i>	++	+
<i>Clitocybe gibba</i>	+	+	<i>Panelus serotinus</i>	+	
<i>Coprinus atramentarius</i>	+	+	<i>Peziza micropus</i>	+	
<i>Coprinus comatus</i>	+		<i>Phallus impudicus</i>	+	+
<i>Cortinarius traganus</i>	+		<i>Phellinus hartigi</i>	+	+
<i>Cortinarius varius</i>	+		<i>Pholiota adiposa</i>	++	++
<i>Craterellus cornucopioides</i>	+	+	<i>Pholiota aurivella</i>	+	+
<i>Crepidotus mollis</i>	+++	+++	<i>Pholiota squarrosa</i>	+	+
<i>Diatrype disciformis</i>	+	+	<i>Pleurotus ostreatus</i>	+	+
<i>Fomes fomentarius</i>	++	++	<i>Polyporus brumalis</i>	+	
<i>Fomes ignarius</i>	+		<i>Polyporus squamosus</i>	+	+
<i>Fomitopsis pinicola</i>	+++	+++	<i>Polyporus tuberaster</i>	+	
<i>Ganoderma applanatum</i>	++	++	<i>Polyporus varius</i>	+	
<i>Ganoderma lucidum</i>	+		<i>Pseudohydnum gelatinosum</i>	++	++
<i>Geastrum lageniforme</i>	++		<i>Ramaria aurea</i>	+	+
<i>Gloephyllum septarium</i>	+	++	<i>Ramaria botrytis</i>	+	
<i>Hericium coralloides</i>	+++	+++	<i>Ramaria formosa</i>	+	
<i>Heterobasidion annosum</i>	+		<i>Russula cyanoxantha</i>	+	
<i>Hydnum repandum</i>	++	+	<i>Russula emetica</i>	+	+
<i>Hygrophorus eburneus</i>	+		<i>Russula integra</i>	+	
<i>Hygrophorus pudorinus</i>	+		<i>Schizophyllum commune</i>	+++	+++
<i>Hymenochaete cruenta</i>	+	+	<i>Sowerbyella unicolor</i>		+
<i>Hypholoma capnoides</i>	+		<i>Sparassis nemeci</i>		+
<i>Hypholoma fasciculare</i>	++	++	<i>Stereum hirsutum</i>		++
<i>Hypoxylon fragiforme</i>		+	<i>Trametes gibbosa</i>	++	++
<i>Ischnoderma abietinum</i>	+		<i>Trametes hirsuta</i>	+	+
<i>Ischnoderma resinosum</i>	+	+	<i>Trametes versicolor</i>	++	++
<i>Laccaria amethystina</i>	++	++	<i>Tremiscus helvelloides</i>	+	+
<i>Lactarius aspidius</i>	+		<i>Tricholomopsis rutilans</i>	+	
<i>Lactarius fulvissimus</i>	+		<i>Xylaria hypoxylon</i>	+	+
<i>Lactarius glutinopallens</i>	+	+	<i>Xylaria longipes</i>	+	+

Intenzitet plodonošenja: "+" pojedinačno; "++" dobro; "+++” bogato.

2.3 Prikupljanje i determinacija gljiva

Gljive su sakupljane tokom cijele godine i za poznate vrste determinacija je vršena odmah na terenu, s tim što su neke anatomsko-histološke karakteristike utvrđivane naknadno u laboratoriji. Za nepoznate vrste gljiva determinacija je vršena u laboratoriji nakon mikroskopske analize uzoraka. Za ovu namjenu korištena je naročito slijedeća literatura: Dennis, R.W.G. (1978): British Ascomycetes; Ellis, M.B. and Ellis, J.P. (1990): Fungi without gills; Hansen, L. and Knudsen, H., Ed. (1992): Nordic Macromycetes; i Ryvarden, L. and Gilbertson R.L. (1993): European Polypores.

3. Rezultati rada

Tokom ovih istraživanja prikupljene i determinisane vrste gljiva date su u tabeli 1.

4. Diskusija i zaključak

Utvrđen je vrlo izražen diverzitet gljiva u prašumama. Konstatovane su neke vrste koje se ne sreću, ili su vrlo rijetke, u gospodarskim šumama BiH, kao, naprimjer: *Bondarzewia montana* (Quel.) Singer, *Ganoderma lucidum* (Curtis: Fr.) Karst., *Geastrum lageniforme* Vitt., *Hymenochaete cruenta* (Pers.: Fr.) Donk, *Ischnoderma benzoinum* (Wahl.: Fr.) Karst., *Ischnoderma resinolum* (Schradl.: Fr.) Karst., *Meripilus giganteus* (Pers.: Fr.) Karst., *Sowerbiella unicolor* (Sowerby: Fr.) Nannfeldt, *Sparassia nemeci* Pilát, i trebalo bi ih zaštititi. Neke gljive vrlo bogato plodonose (*Fomes fomentarius* (L.: Fr.) Kickx, *Fomitopsis pinicola* (Swartz: Fr.) Karst., naprimjer) i pravi su čistači šuma. Međutim, utvrđene su i gljive koje ukazuju na aktivnost ljudi (lovaca) u prošlosti, što je znak da ovi rezervati prirode još uvijek nemaju potpunu zaštitu od čovjeka. *Coprinus atramentarius* (Bull.: Fr.) Fr. u prašumi "Trstionica" se, naprimjer, nije očekivao. Istraživanje gljiva koje naseljavaju odgovarajuća staništa značajno je ne samo radi poznavanja biodiverziteta, nego one mogu biti i indikatori stanišnih promjena (processa acidifikacije ili eutrofizacije, naprimjer). Osim toga ovi organizmi mogu biti korisni parametri za klasifikaciju tipova šuma (Ayer et al. 2003).

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Summary

There are six primary forests in Bosnia Herzegovina. Beside the largest "Perucica" (1434 ha) and "Lom" (300 ha), there are some smaller ones: "Janj" (next to town Sipovo), "Pljesevica" (next to town Bihac), "Trstionica" (next to town Kakanj) and "Ravna vala" on mountain Igman (next to the city of Sarajevo) each having about 40 ha.

Fungi survey of mixed silver fir, spruce and beech primary forests "Ravna vala" and "Trstionica" were carried out during 2001-2003, and this is a first report on this topic showing that virgin forests are good reservoir of fungal diversity. Some very rare fungi like: *Bondarzewia montana* (Quel.) Singer, *Ganoderma lucidum* (Curtis: Fr.) Karst., *Geastrum lageniforme* Vitt., *Hymenochaete cruenta* (Pers.: Fr.) Donk, *Ischnoderma benzoinum* (Wahl.: Fr.) Karst., *Ischnoderma resinosum* (Schradl.: Fr.) Karst., *Meripilus giganteus* (Pers.: Fr.) Karst., *Sowerbiella unicolor* (Sowerby: Fr.) Nannfeldt and *Sparassis nemeci* Pilát, that are not common in managed forest, were found here and it is suggested they to be protected.