



New Findings of Serbian Spruce (*Picea Omorika* (Panč.) Purk.) In Bosnia and Herzegovina

DALIBOR BALLIAN

University of Sarajevo
Faculty of Forestry
Zagrebačka 20, 71000 Sarajevo
balliandalibor9@gmail.com

SULEJMAN SINANOVIĆ

University of Sarajevo
Faculty of Forestry
Zagrebačka 20, 71000 Sarajevo
Bosnia and Herzegovina

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Tertiary endemic species in the flora of Bosnia and Herzegovina include the Serbian spruce (*Picea omorika* (**Panč.**) **Purk.**). The species was named in honour of Josif Pančić, who discovered it in 1875 at Zaovine and who confirmed it as a new species based on samples previously collected and analysed. The Serbian spruce was subsequently also discovered in Bosnia and Herzegovina by several authorities, among whom Fukarek described it in greatest detail in several of his works. After the great fires of 1946/47 numerous populations of Serbian spruce were destroyed and apparently permanently lost from their sites in Bosnia and Herzegovina, predominantly from the Srebrenica area. Following their destruction, no care or attention was given to these sites or their subsequent fate until a few years ago, when it was announced that the population of Serbian spruce was showing signs of renewal.

During recent research concerning yew in the canyon of the River Drina between the confluence of the River Žepa and Crni potok, just above Crni potok, two new, or rather old, stands of Serbian spruce were found, Grad and Borov vrh, which expand our knowledge of the current distribution of this species in Bosnia and Herzegovina and elsewhere. These locations were registered in 1935 by Gjorgjević, but were deleted from the register by Fukarek after the fires. Today, following natural rejuvenation, these are fifty year old specimens of considerable size and great vitality.

Keywords: Serbian spruce, Bosnia and Herzegovina, endemic species, newly found localities

INTRODUCTION

Dr. Josif Pančić, a Serbian scientist in the field of botany, with understanding, knowledge and great love for the world of plants in Serbia, collected material from every genus and species of tree in Serbia. Among this material were some branchlets of which the morphology did not conform to any known species at the time. This prompted Dr Pančić to think it was a new taxon, and to begin searching for the species. He began his search for this important and very interesting species (Pančić 1874, 1884) in 1875, and found it in the village of Zaovine on the western slopes of Mt. Tara. He determined that the material he had collected was from a new species of spruce, and described it accordingly. Believing that the material exhibited certain specific features, he sent samples for further identification, from which it was confirmed that this was indeed an altogether new species.

The Serbian spruce was subsequently found by several authorities (Beck 1903, Adamović 1909, Gjorgjević 1935, Maly 1934, Tregubov 1934, 1941, Plavšić 1931, 1936, 1937), all of whom describe its locations and populations, but it was Fukarek (1935, 1941, 1950, 1951, 1957) who wrote about it in greatest detail in several of his works. The research conducted in Bosnia and Hercegovina has in turn revealed that the Serbian spruce is of wider distribution than only the locations in Serbia. The state of the spruce was greatly affected by the major fires during the years 1946 and 1947. After their destruction in these fires, numerous populations were deleted from the register, as reported by Fukarek (1951) in a paper that served as a report on the situation at the time. No further attention was given to the locations destroyed by the fires, which were left to natural progression, as they were of no interest to forestry production, being in extreme sites. During the inventory of forests conducted between 1964 and 1968 some of the participants surveying the area referred to the rejuvenation of Serbian spruce (Personal Contact Beus V.) but no scientific importance was given to this. For this reason, only a few natural populations were noted in the literature as stated by Vidaković (1991), and some locations are not mentioned in any works. The properties of Serbian spruce in the area of Srebrenica are noted in the works by Wettstein (1890) and Plavšić (1937). In further notes regarding the populations above Crni potok, one authority mentioned only one population whereas another lists five populations of Serbian spruce (Grad, Crvene stijene, Borov vrh, Crni potok and Mećavna dolina). After the fires and the inspection of the locations by Fukarek (1951), he deleted these populations from the list, stating that they had been consumed by the fire and that severe drought had caused some trees in the area to become desiccated. Due to its rarity, vulnerability and poor natural regeneration the Serbian spruce was placed on the endangered species list

and as such was included by Šilić (1996) on the List of plant species for the Red List of Bosnia and Herzegovina. Modern biochemical research conducted on Serbian spruce from twelve natural populations reveals its extremely interesting structure with high inbreeding rates (Ballian 2014; Jukić 2014). All this points to very poor vitality due to the very high level of correlations between individual units and the appearance of depression which greatly diminishes seed vitality and makes further natural propagation extremely difficult. This paper aims to demonstrate that if favourable conditions are created, in this case by fire, the Serbian spruce can renew itself, albeit not to the same extent as before.

MATERIALS AND METHODS

During the inspection the structure of the population was established, being its structural diversity and select area of occupancy, and the number of individuals in the population was estimated. Photographic identification was carried out on site and coordinates noted.

RESULTS AND DISCUSSION

On 25 June 2015, while traversing the canyon of river Drina and Crni potok near the village of Luke, between the confluence of the River Žepa and Crni potok where they join the River Drina, a population of Serbian spruce was found in the middle of a very inaccessible canyon-side cliff at Grad, at an altitude of 620 to 1120 m, on very steep terrain with a partly south-east exposure. There had been very little previous mention of this population (Wettstein 1890, Plavšić 1937), which was destroyed in the fires of 1946 and 1947 and was consequently deleted from the register.

The current situation is that in the central part of the Grad population (44°00'29" - 19°13'14") consists of densely packed Serbian spruce dominating the plant community, while on the periphery the individual trees are more widely dispersed (Fig. 1). The population itself covers an area of 3ha, with 950-1,000 fertile trees that have already started to bear cones. However, there is no open area in which a new generation could develop.

After further investigation upstream of Crni potok, below Borov vrh (44°01'01" - 19°11'42"), another population of Serbian spruce was found, covering a smaller area of only 2ha, and also growing in the middle of an extremely steep canyon-side at an altitude of 850 to 1090 m, with a partly northern exposure. This fairly dense population was also known previously, per Wettstein (1890) and Plavšić (1937), and was completely destroyed by the fires of 1946 and 1947 (Fukarek 1951). Here too the spruce are densely packed in the central part of the population, dominating the plant community, but are much sparser at the periphery (Fig. 1).



Fig. 1. Part of the population of Serbian spruce on location Grad (Photo: D. Ballian)

This population has about 750 to 800 fertile trees that have also started to bear cones.

The discovery of these new/old locations of Serbian spruce at Grad and Borov vrh in Bosnia and Herzegovina demonstrates that this species has not disappeared from the areas affected by the fires that originally destroyed it, but has instead renewed itself from the individual trees that survived the fires thanks to their location on remote cliffs where the fire could not reach them. As the Serbian spruce regenerates best in the open areas, it is evident that it must have renewed itself rapidly after the fires, since it reacts very poorly to competition from other species. We may further surmise that the rejuvenation of these populations was aided by the population of Serbian spruce at Pliština and Šarena Bukva, and it cannot be totally ruled out that seeds were blown over from the nearby National Park Tara in Serbia.

Considering that these stands of Serbian spruce in the Crni potok canyon are very inaccessible and that the area is uninhabited, we hope that this rare and precious endemic species in the flora of Bosnia and Herzegovina will be preserved for the future. However, the three old populations at Crvene stijene, Crni potok and Mečavna dolina have failed to rejuvenate, as other vegetation has overtaken the sites and only single tree units can be found at these old locations.

CONCLUSION

This study provides further evidence of the current distribution of Serbian spruce in Bosnia and Herzegovina. These rejuvenated old populations display good vitality and assure the survival of Serbian spruce in unchanged conditions for the next few centuries. The renewal of these populations shows that the Serbian spruce can only successfully renew itself in the wild if there is no competition from other plant species. Further research is needed, especially on site, and a detailed revision of all locations should be conducted and a database of these results created via GIS.

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SAŽETAK

NOVO NALAZIŠTE PANČIĆEVE OMORIKE (*PICEA OMORICA* (PANČ.) PURK.) U BOSNI I HERCEGOVINI

Među vrstama u skupini tercijarnih endema u flori Bosne i Hercegovine nalazi se Pančićeve omorika (*Picea omorika* (Panč.) Purk.). Vrsta je dobila naziv u čast Josifa Pančića koji ju je otkrio 1875. godine, na njenom nalazištu u Zaovinama i potvrdio da je na temelju ranije dobivenih uzorka u pitanju nova vrsta. Kasnije se omorika otkriva i u Bosni i Hercegovini, od strane više autora, a najdetaljnije o njoj piše Fukarek u više svojih radova. Nakon velikih požara 1946/47. godine sa liste populacija Pančićeve omorike u Bosni i Hercegovini su brisane brojne populacije koje su stradale, a najviše onih iz područja Srebrenice. Nakon njihovog uništenja nije se obraćala pažnja što se dešava na tim lokalitetima, do unazad nekoliko godina kada se navještavalo da je došlo do obnove omorike na njima.

Prilikom terenskih istraživanja tise u kanjonu rijeke Drine između ušća rijeke Žepe i Crnog potoka, iznad samog ušća Crnog potoka nađena su dva nova (stara) nalazišta omorike, Grad i Borov vrh, čime se proširuje znanje o današnjem rasprostranjenju ove vrste na prostoru Bosne i Hercegovine i općenito. Ta nalazišta je Gjorgjević registrirao još 1935. godine, da bi ih Fukarek nakon požara brisao sa popisa. Sada, nakon prirodne obnove, predstavljaju pedesetogodišnje sastojine veoma dobre strukture sa jako dobrom vitalnošću.