

# **Sweet chestnut (*Castanea sativa*) -natural characteristics and technical properties**

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## 1 Sažetak

Pitomi kesten (*Castanea sativa*) je vrsta iz porodica bukava (*Fagacea*). Autohtona je za područja Europe (jug i jugoistok), te za područja Male Azije. Pitomi kesten nudi mogućnosti dobijanja velikog broja proizvoda, jer se može iskoristiti gotovo sve – plod, list, drvo. Plod ima visoku nutritivnu vrijednost, te ga koriste i životinje i ljudi. Drvo ima primjenu u „manjim radovima“ i estetskom uređivanju. Upravo potrebe, osobine i svojstva pitomog kestena, su cilj rada. U samoj Bosni i Hercegovini, pitomi kesten je alohtona vrsta, ali se u pojedinim dijelovima dobro prilagodio orografskim, edafskim, klimatskim i biljnogeografskim karakteristikama, gdje ga prate brojne biljne vrste s kojim formira složene zajednice.

**Ključne riječi:** Pitomi kesten (*Castanea sativa*), svojstva, proizvodi, šumske zajednice, očuvanje.

## 1 Summary

Sweet chestnut (*Castanea sativa*) is a species coming from the Fagacea family. It is native to areas of Europe (south and southeast), and Asia Minor. Sweet chestnut offers possibilities of having a large range of products, and everything can be used – fruits, leafs, wood. Fruit has a high nutritive value and is used by animals and humans. Wood has application in „small works“ and esthetics. Needs, characteristics and properties of sweet chestnut are objectives of this paper. In Bosnia and Hercegovina itself, sweet chestnut, is an alien species, but, in some areas, has adopted very well to topographic, edaphic, climatic and phytogeographical characteristics, where is followed by numerous plant species with whom forms complex communities.

**Key words:** Sweet chestnut (*Castanea sativa*), properties, products, forest communities, preservation.

## 2 Nature of Sweet chestnut

In Bosnia and Herzegovina communities of sweet chestnut expand between 150 and 700 m.a.s.l., and most of it between 300 and 600 m.a.s.l. As for ecological characteristics, sweet chestnut forms stable forest communities.

In the last few decades, human neglect is causing severe loss of valuable biotope by intensive exploitation, grazing, different diseases and parasites and even soil erosions. Forest communities of sweet chestnut, although small in surface, are still present in Bosnia and Herzegovina.

When we talk about origin of sweet chestnut in BiH, opinion which prevails is the one claiming that findings of sweet chestnut, in these areas, are part of one unique, autochthonous, range spanning from Slovenia over Croatia and BiH. Largest and most important finding of sweet chestnut in BiH is in northwest of the country, where, according to the data from 1967., this type of forest is expanding over 6.850 ha, or 89% of all surface in entire country.



Figure 1 Sweet chestnut in Europe

### 2.1 General characteristics

Genus of *Castanea* Mill covers nine species which are spread in northern hemisphere with temperate climate. Forests of chestnut are covering surface of some 2 millions ha of European soil, with France and Italy being richest countries regarding chestnut, where is concentrated 80% of entire surface of chestnut forests. Italy alone has 800 000 ha under chestnut forests, which is over one hundred times larger of the surface in BiH (7 000 ha). Sweet chestnut itself is a species highly significant from biological, sociological and economical aspect, because it represents wood of high quality in natural habitat and it gives fruits which in many lands represents basic resource of rural economy (eg. marron). It goes up to 20-30 meters in height and reaches 500 years of age. Treetop is wide and dense, ball-sized, crust cracks in length in older age, having brown and grey color. Leafs are long (8-23 cm in length and 4-8 cm wide), boldly toothed, shining from front and being hairy from back. Sweet chestnut flourishes in June, after getting leaves. Fruit has a brown color. There are three fruits in a single cupule. Cupule is ball-shaped, densely covered in spikes which falls together with the fruit and cracks in four parts. Chestnut can give over 200 kg of fruit annually.

## 2.2 Characteristics in BiH

Ecological characteristics and demands of sweet chestnut aren't different from those we encounter in other parts. Species suits warm climate, vegetation period of 6-7 months, mild autumn. Chestnut grows on various soils, except limestone, those too heavy, impenetrable and too wet soils. Best suited are soils created on silicate base, acidic soils by nature (pH 4,5-6). Concretely gneiss, porphyry, sandstone, flysch, slate and marl.

In BiH we're talking about three different locations where sweet chestnut resides – **Herzegovinian locality** (south slopes of Bitovnia, valley of the river Rama, nearby of the Jablanica lake, towns Konjic and Jablanica), **area of northwestern Bosnia from the river Una to the border with Republic of Croatia** (Cazin, Velika Kladuša, Vrnograč, Bužim, Bosanska Krupa), **eastern Bosnia** between Srebrenica, Bratunac and Sasa mine.



Figure 2 Locations of sweet chestnut in BiH

## 2.3. Technical properties

The wood of the sweet chestnut is fairly dense and hard. It is generally described as strong and elastic. It does not shrink considerably and is stable once dry. The heartwood of the sweet chestnut has a good natural durability. It has a high content of tannic acid and is proven being very durable under water. Density is 0.62 g/cm<sup>3</sup>.

It has to be dried slowly because it has a tendency to crack and warp. Easy to work with most tools and machines, but care must be taken in nailing and screwing the wood.

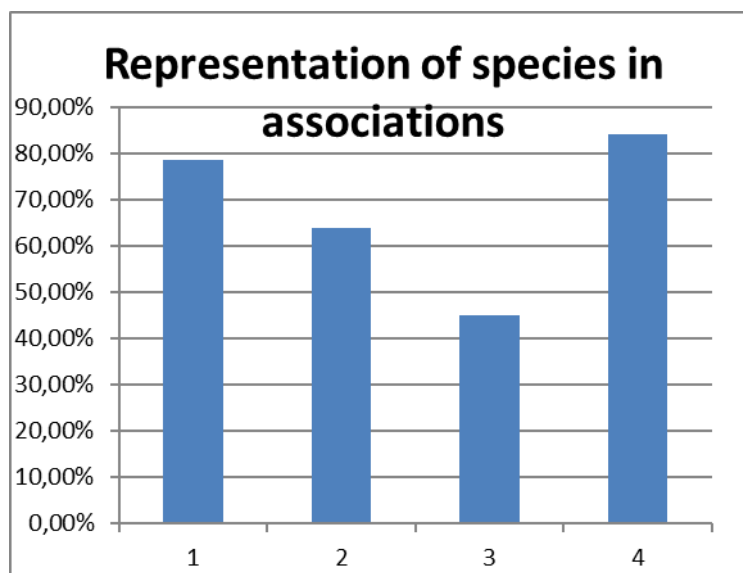
It is used in making caskets, barrels, poles, posts, stairs, flooring, parquet, furniture, carving, playing grounds, and it found its applications in engineering.

## 3. Researches over years on sweet chestnut

Researches over sweet chestnut are containing various actions and can be looked from phytocenological, genetics, entomological and phytopathological, and others points of view. Those which include its ecology and communities whose part it is, are belonging to phytocenological researches, done within researches of chestnut forest during last decades, and results were published by scientists Wraber, Sučić, Glišić etc. Original phytocenological data is collected from entire area of BiH, with an accent on main areas of dispersion which are Bosanska Krajina, Srebrenica and Herzegovina, and then analyzed. It's been established that in four associations, we find 195 plant species which build ecosystem together with sweet chestnut, therefore contribute to biodiversity. Associations are: 1. *Querceto-Carpinetum „croaticum“*, 2. *Luzuleto nemorosae-Fagetum*, 3. *Querceto-Castanetum „hercegovinicum“*, 4. *Querceto-Castanetum „croaticum“*

## 4. Results

Of all species, 56 of them can be found in all four associations (26,53%). *Querceto-Carpinetum* „croaticum“ has 154 species represented (78,57%), *Luzuleto nemorosae-Fagetum* -125 species (63,77%), *Querceto-Castanetum* „hercegovinicum“ – 88 species (44,98%), *Querceto-Castanetum* „croaticum“ 165 species (84,18%).



1. *Querceto-Carpinetum* „croaticum“, 2. *Luzuleto nemorosae-Fagetum*, 3. *Querceto-Castanetum* „hercegovinicum“, 4. *Querceto-Castanetum* „croaticum“

## 5. Sustainability

Sustainability is a term being more often heard in circles dealing in preservation of nature. In today's time it's a great challenge, and yet, a way is trying to be found to exploit forest resources but not to do great harm to nature. There is a series of international mechanisms dealing with that specific problematic and it's not being focused on one particular area, but rather regional and global measures. Speaking of BiH, forests of sweet chestnut are in set of forests labeled with FSC certificate which guarantees preservation of natural fond on area of exploitation, which is for sure great and positive step towards contribution to preservation and sustainability of nature.

## 6. Conclusion

Sweet chestnut represents highly adaptable species which dwelt on different climatic and geographical terrains. From the phyto-sociological aspect, chestnut is a species which builds wide, complex communities with other plant species. Although chestnut alone can be same from genetic aspect, like in BiH, plant communities that it builds can differ a lot one from another, also seen on example of mountainous terrain in BiH. Even though not officially endangered species, lately sweet chestnut is under attack of pests and diseases, specially crust cancer caused by fungus *Endothia parasitica*. Diseases must be contained and chestnut must be protected, because in that way we're protecting ecosystem which chestnut is very important factor. Survival of biodiversity is guaranteed and that's the goal of our activities in whole.