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**BARK BEETLES (SCOLYTIDAE, COLEOPTERA)
OF BEECH (FAGUS MOESIACA DOMIN, MALY/CZECZOTT.)
IN MT. KOMOVI AREA - MONTENEGRO**

SUMMARY

Researches on fauna of bark beetles (*Scolytidae*, *Coleoptera*) of beech (*Fagus moesiaca* Domin, Maly/Czczott.) in the area of Komovi have been carried out during 2010 and 2011 at ten localities. These are the first researches of bark beetles on beech in the area of Komovi and 11 species of bark beetles are registered. From the total number of registered species of bark beetles, species *Dryocoetes villosus*, *Xyloterus signatus*, *Taphrorychus hirtellus*, *Xyleborus saxeseni* are new for fauna of Montenegro. All registered species have primary, secondary and tertiary importance. Species *Scolytus intricatus*, with its additional nutrition has a primary importance, while species of genera *Xyloterus* and *Xyleborus* that live in symbiosis with *Ambrosia* fungi reduce aesthetic and technical quality of tree.

Keywords: Bark beetles, Beech, Mt. Komovi, Montenegro

INTRODUCTION

Komovi are located in the east part of Montenegro in direction to west-east, in the area of 68 km². There are situated between mountain rivers Drcka and Kraštica on the north, Tara and Veruša on the west, Kutska river and Zlorječica on the east and mountain ranges of Prokletije on the south. Contrary to remarkable tops, in the area of Komovi, there are lot of rivers and corrugated valleys that dissected relief and made it diverse and, in landscape-aesthetic view, very interesting. Geomorphological characteristics are expressed in forms originated by erosive processes, especially glacial ones that comprising Komovi and other mountains of northern Montenegro. Presence and distribution of vegetative cover is stipulated by geographic position, relief, pedological ground and other ecological factors within vegetation factors, current as well as historical.

Belt of mountain beech forest (*Fagetum moesiacae montanum*) on Komovi is located vertically above beech forests to 1800 m asl on all exposures, moderate slopes and different geological substrats, from sedimentary carbonate to volcanic siliceous rocks. Spruce-fir forests (*Abieti-Picetum abietalis*) are significantly presented on Komovi. Within this belt there is bigger number of communities comprising ones with unfavorable conditions of habitat. There is

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penetration of beeches and firs forests, making continuity between oak-beech and spruce-fir forests, as well as with mesophilic beech-fir forests. Forests of white bark pine (*Pinetum heldreichii continentale*) on Komovi are situated on steep slope of south exposures from 1500 to 1700 m asl. Into this belt there is penetration of elements of beech and spruce forests. Considering wide distribution of beech in Montenegro, with a share more than 50% in the total forest fund, it is clear that it is situated in very different ecological conditions, actually in separated phytocenoses, where it is presented in clean mixed communities.

By 1838 it was considered existence of only one species of beech at whole European continent. Velanovsky in act „Flora Bulgarica“ 1893 induces new variety of European beech (*Fagus sylvatica* var. *macrophylla*) (Jovanović & Cvjetičanin, 2005). Domin in his study shows morphological characteristics of beech from the Balkan and classifies it in the variety of European beech (*Fagus sylvatica* var. *moesiaca*), but he induces that, by some characteristics, it is close to Caucasus beech (*Fagus orientalis* Lipsky). Czeottowa from 1933 – 1936 in her papers on beech concludes that beech from the Balkan, by characteristics of leaves, is somewhere between European and Caucasus beech, while by fruits is more similar to European beech. That's why, at the beginning, she induces it as subspecies of European beeches (*Fagus sylvatica* ssp. *moesiaca*) and later assigns as single species with name moesian beech (*Fagus moesiaca*) (Jovanović & Cvjetičanin, 2005). Areal of moesian beech on the Balkan Peninsula is between European beech (*Fagus sylvatica* L.) with areal on the west and Caucasus beech (*Fagus orientalis* Lipsky) with east areal.

Moesian beech (*Fagus moesiaca*) is deciduous tree with height to 30 (45) m, diameter to 2 m and age to 300 years. Treetop is thick, round in solitary and reduced in community.

During research on entomofauna of beech in Serbia (Mihajlović, 2003) it has been registered five species of bark beetles that live at beech as following ones: *Ernoporus fagi*, *Taphrorychus bicolor*, *Xyleborus dryographus*, *Xyleborus monographus* and *Xyleborus saxaseni*. In their researches Mirić & Petrović (2005) induce following species of bark beetles that are trophically related to beech: *Xyloterus domesticus*, *Xyloterus signatus*, *Anisandrus dispar*, *Xyleborus monographus*, *Xyleborus dryographus* and *Xyleborus saxaseni*. During research on bark beetles in the area of Durmitor (Spaić & Stevanović, 1991) on beech following species have been registered: *Scolytus intricatus*, *Xyloterus domesticus*, *Ernoporus fagi* and *Taphrorychus bicolor*.

MATERIAL AND METHODS

Researches on fauna of bark beetles on beech were carried out in 2010 and 2011 at the area of Mt. Komovi area. Material was collected by route method by direct chopping of tree bark (collecting was done by brush or exhauster), by collecting of material for breeding, (branches and parts of tree with visible entrance holes of xylophagous insects). Detailed examination of material was

carried out in laboratory and it was put in photoelectors for breeding. Besides photoelectors, glass cylinders were used for breeding of insects. Material in photoelectors and glass cylinders has been stored all the time during research. This is the first contribution that treats fauna of bark beetles of beech in the area of Komovi.

Collected insects are conserved, prepared and marked by standard methods. Collection of insects is stored by author of this contribution.

Localities where researches were performed:

Štavna 1670 – 1736 asl	Mojan karaula 1450 asl
Varda 1520 – 1782 asl	Trešnjevnik 1320- 1600 asl
Mojanska rijeka 1322 - 1891 asl	Vučji potok 1273 asl
Surdup 1325 – 1745 asl	Katun Margarita 1450-1890 asl
Bijeje Vode 1695 – 1820 asl	Katun Carine 1320 -1765 asl

RESULTS AND DISCUSSION

Subfamilia: *SCOLYTINAE*

Genus: *Scolytus* Geoffroy 1762

Scolytus intricatus Ratzeburg, 1837 – Species is registered in trunk at the locality of Varda in 07/07/2011 2♀ and 1♂. During previous researches species have been registered on beech in Montenegro (Spaić & Stevanović, 1991).

It has two generation per year and belongs to the secondary species, but additional feeding is performed in the base of small branches and buds that causes their drying and points to the primary importance of this species.

Distribution: Caucasus, Europe (Stark, 1952).

Solytus carpini Ratzeburg, 1837 – Species is registered in lower part of trunk at the locality of Mojanska Rijeka in 24/07/2011 2 ♀. During previous researches it has been registered in Montenegro, on *Carpinus orientalis* and *Quercus spp.* (Spaić & Stevanović, 1991). It has one generation per year, it attacks trees in drying phase or dried trees, mostly solitary, that points to the secondary importance of this species.

Distribution: Central and South Europe, Crimea, Caucasus, Ukraine (Stark, 1952).

Subfamilia: *IPINAE*

Genus: *Dryocoetes* Eichhoff, 1864

Dryocoetes villosus Fabricius, 1792 – Species is obtained by breeding from branch of bigger diameter from the locality of Vučji potok in 01/04/2011 1♀ and 1♂. By these researches the species is registered for the first time in Montenegro. It has two generations per year, attacks dried branches and trees and it belongs to the secondary species.

Distribution: Europe, Crimea, Caucasus (Karaman, 1971).

Genus: *Xyloterus* Erichson, 1836

Xyloterus domesticus Linnaeus, 1758 – Individuals are registered in branches, in the bottom of Katun Carine in 21/03/2011 2♀ and 1♂. During previous researches the species has been registered on beech in Montenegro (Spaić & Stevanović 1991). It lives in symbiotic relationship with ambrosia fungi (Csóka & Kovács, 1999), corridor system leans on a tree that reduces its technical quality if staple is still on depositary. It has two generations per year, enters in freshly abated trees or branches in drying phases.

Distribution: Europe (Karaman, 1971).

Xyloterus signatus Fabricius, 1787 – Individuals are bred from branches of bigger diameter collected in the bottom of Katun Margarita in 08/08/2011 2♀ and 1♂. By these researches the species is registered for the first time in Montenegro. Maternal corridor delves deeply into a tree and species lives in a symbiotic relationship with ambrosia fungi (Mirić & Petrović, 2005) what classifies it in the group of species that reduce technical quality of a tree.

Distribution: Europe, Asia, Caucasus, Siberia (Karaman, 1971).

Genus: *Ernopocerus* Balachowsky, 1949

Ernoporus fagi Fabricius, 1778 – Species is obtained by breeding from branch in the locality of Trešnjevik in 01/08/2010 2♂ and 1♀ and at the locality of Mojan karaula in 12/07/2011 1♀. During previous researches the species has been registered on beech in Montenegro (Spaić & Stevanović 1991). It attacks abated trees and dry branches that classifies it in order of tertiary species.

Distribution: Europe, Crimea, Caucasus (Stark, 1952).

Genus: *Taphrorychus* Eichhoff, 1874

Taphrorychus bicolor Herbst, 1793 – Individuals of this species are bred from branches from the locality of Bijele Vode 08/05 and 10/05/2011 2♀ and 1♂. During previous researches it has been registered on beech in Montenegro (Spaić & Stevanović 1991). As it attacks abated trees and extinct branches, it belongs to tertiary species and it hasn't economic importance. Trapping studies in Hesse, Germany, on dominated stands of a beech (*Fagus sylvatica*) were indicated that *Taphrorychus bicolor* had the highest abundance. Although this species sometimes has mass reproduction, there were no signs of attack on standing beech trees (Simon, 1995).

Distribution: Europe, Crimea, Caucasus (Stark, 1952).

Taphrorychus hirtellus Eichhoff, 1879 – We registered one specimen (♀) in branch, at the locality of Trešnjevik in 12/07/2011. This is the first finding for Montenegro. It attacks abated or dried trees and branches whose maternal corridor is located shallow under bark. It belongs to the group of tertiary species and it hasn't economic importance.

Distribution: Europe, Asia Minor (Karaman, 1971).

Genus *Xyleborus* Eichhoff, 1864

Xyleborus monographus Fabricius, 1792 – The species is bred from the part of trunk that is collected at the locality of Trešnjevik in 12/08/2011, 2♀. It is registered in Montenegro, at the locality of Herceg Novi (Novak, 1952). The species enters in a tree stripped of its bark and in a tree non-stripped of its bark, it often attacks a tree in shadow, and besides fresh chucks, it habits physiologically weakened trees. Incoming corridor of female could be deep from 5 to 15 cm in radial direction while maternal corridor, in the same plane but in different directions, could be long up to 12 cm (Mirić & Petrović, 2005). It belongs to the group of the secondary xylophagous that lives in symbiosis with ambrosia fungi and represents one of the most common and most dangerous instigator of whimsicality on a tree (Mirić & Petrović, 2005).

Distribution: Central and South Europe, Asia Minor and Central Africa (Karaman 1971; Selmi, 1998).

Xyleborus dryographus Ratzeburg, 1837 – Individuals of this species are registered on trunk, at the locality of Surdup 05/08/2010 2♀. By previous researches it has been registered in Montenegro, at the locality of Herceg Novi (Novak, 1952). Corridor system is typically laddered and it is laid in one plane, but section and depth of the corridor are smaller than corridor of *Xyleborus monographus* along with it is often present in the same material (Mirić & Petrović 2005). Imagines and larvae have symbiotic relationship with fungi species *Ophiostoma* (Gebhardt et al, 2002, 2004). The species attacks abated trees or trees in drying phase.

Distribution: Central and South Europe, Asia Minor, North Africa (Karaman, 1971).

Xyleborus saxeseni Ratzeburg, 1837 – Individuals of this species are registered in trunks stocked at the locality of Štavna in 05/05/2010, 3♀. By these researches the species is registered for the first time in Montenegro. *Xyleborus saxeseni* is polyphagous secondary xylophagous that attacks almost all our deciduous and coniferous species. It lives in symbiosis with ambrosia fungi and causes whimsicality of a tree. Although it penetrates shallow, anyhow, it could reduce quality of veneer chucks (Mirić & Petrović 2005).

Distribution: Europe, Siberia, Japan, Canary Islands and North America (Mirić & Petrović 2005).

DISCUSSION

Researches on bark beetles fauna (*Scolytidae*, *Coleoptera*) of beech (*Fagus moesiaca* Domin, Maly/Czeczott.) in the area of Komovi have been performed during 2010 and 2011 at ten localities. These are the first researches of bark beetles on beech in the area of Komovi and 11 species of bark beetles are registered. From the total number of registered insects, species *Dryocoetes*

villosus, *Xyloterus signatus*, *Taphrorychus hirtellus*, *Xyleborus saxeseni* are registered for the first time in Montenegro. Species *Scolytus intricatus*, although it is secondary, because of additional feeding in the base of young branches and buds causing their drying, points to the primary importance of this species. Species *Scolytus carpini* and *Dryocoetes villosus* enter into dried branches or parts of a tree and they have the secondary importance. Species *Xyloterus domesticus* and *Xyloterus signatus* grow only in a tree with a percentage of humidity because they are related to symbiotic Ambrosia fungi that can't grow in dry tree (Csóka & Kovács, 1999; Mirić & Petrović 2005). Because of symbiotic relationship with Ambrosia fungi, *Xyloterus domesticus* and *Xyloterus signatus* belong to the group of species that reduce technical and aesthetic quality of a tree. Also, species *Xyleborus monographus*, *Xyleborus dryographus* and *Xyleborus saxeseni* live in symbiosis with ambrosia fungi (Gebhardt et al 2002, 2004; Mirić & Petrović 2005) and that's why attacked and destroyed tree has lower economic value, and assortments and products of this kind of tree are classified into lower classes.

Species *Ernoporus fagi*, *Taphrorychus bicolor* and *Taphrorychus hirtellus* enter into dried trees or dried branches that appoints on their tertiary importance. Researches of abundance of *Taphrorychus bicolor* in Germany by pheromone traps showed that, although, abundance in some period is increased, there is no attacks of healthy trees (Simon, 1995). During research, registered species of bark beetles haven't been registered with significant abundance and they haven't caused damages. It is especially related to *Scolytus intricatus* that becomes the primary one in additional nutrition and to bark beetles of genera *Xyloterus* and *Xyleborus* that have influence on economic value of stored tree. It doesn't mean that in the future they will react in the same way and that's why it is necessary further study and continual following of their abundance.

CONCLUSIONS

Researches on bark beetles fauna (*Scolytidae*, *Coleoptera*) of beech (*Fagus moesiaca*) in the area of Komovi have been performed during 2010 and 2011 at ten localities.

These are the first researches of bark beetles on beech in the area of Komova and 11 species of bark beetles are registered.

From the total number of registered insects, four species *Dryocoetes villosus*, *Xyloterus signatus*, *Taphrorychus hirtellus*, *Xyleborus saxeseni* are new for fauna of Montenegro.

Species *Scolytus intricatus* because of additional feeding has primary importance while species of genus *Xyloterus* (*Xyloterus domesticus* and *Xyloterus signatus*) and genus *Xyleborus* (*Xyleborus monographus*, *Xyleborus dryographus* and *Xyleborus saxeseni*), because they live in symbiosis with Ambrosia fungi, reduce quality as well as economic value of a tree.

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**SIPCI (SCOLYTIDAE, COLEOPTERA)
BUKVE (FAGUS MOESIACA DOMIN, MALY/CZECZOTT.)
NA PODRUČJU KOMOVA – CRNA GORA**

Istraživanja faune sipaca (Scolytidae, Coleoptera) bukve (*Fagus moesiaca* Domin, Maly/Czeczott.) na području Komova su obavljena tokom 2010 i 2011 godine na deset lokaliteta. Ovo su prva istraživanja sipaca na bukvi na području Komova tokom kojih je konstatovano 11 vrsta sipaca. Od ukupnog broja konstatovanih insekata, vrste *Dryocoetes villosus*, *Xyloterus signatus*, *Taphrorychus hirtellus*, *Xyleborus saxeseni* se prvi put konstatuju u Crnoj Gori. Sve konstatovane vrste imaju primarni, sekundarni i tercijerni značaj. Vrsta *Scolytus intricatus*, svojom dopunskom ishranom ima primarni značaj, dok vrste rodova *Xyloterus* i *Xyleborus* koje žive u simbiozi sa Ambrozija gljivama umanjuju estetski i tehnički kvalitet drveta.

Ključne riječi: sipci, bukva, Komovi, Crna Gora