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BARK BEETLES (COLEOPTERA: SCOLYTIDAE) OF MONTENEGRO

SUMMARY

This paper presents registered species of bark beetles (Coleoptera: Scolytidae) in Montenegro based on literature data and author's survey data. Until now, 67 species of bark beetles classified in 29 generas and two subfamilies has been registered in Montenegro. Of the total number of detected species, 42 species are trophically related to coniferous trees and 19 to deciduous trees. Two bark beetles species were found in shrubs, two on vascular plants, one species was registered on evergreen climbing plant, and one in palmas fruit.

Keywords: Bark beetles, Montenegro.

INTRODUCTION

Surveys on fauna of bark beetles in Montenegro date back from the end of 19th and beginning of 20th century. The earliest data are refer to the findings on the coastal part (Pagnetti-Hümmler, 1898; Liebmann 1945). Novak (1952) also reported data on bark beetles of the coastal part and listed ten species in the area of Budva and Herceg Novi. These bark beetles were detected on Sour cherry (*Prunus cerasus)*, European crab apple (*Malus silvestris*), Elm (*Ulmus sp).*, Common fig *(Ficus carica)*, Buy spurge (*Euphorbia characias)*, Aleppo pine *(Pinus halepensis)* and Blackberry (*Rubus fruticosus)*. For species *Xyleborus dispar*, *Xyleborus dryographus* and *Xyleborus monographus*, Novak (1952) are not indicated host plants. In the Northern part (Reserve Crna Poda - Canyon of the Tara river) two speceies were registered under the bark of European black pine (*Pinus nigra*) (Mihajlović & Karadžić,1998). Intensive work on research of family Scolytidae was done in area of Durmitor (Norhern part of Montenegro) from 1981 to 1989 (Spaić & Stevanović, 1991) when 45 species, classified in 23 genera and 2 subfamilies were registered on 16 host plants: Silver fir (*Abies alba)*, Old man's beard (*Clematis vitalba)*, Oriental hornbeam (*Carpinus orientalis*), Common hawthorn (*Crataegus monogyna)*, Wood spurge (*Euphorbia amigdaloides*), Manna ash (*Fraxinus ornus*), Beech (*Fagus moesiaca*),Common juniper *(Juniperus communis)*,Crab apple *(Malus silvestris)*,Oak *(Quercus sp.)*, Spruce *(Picea excelsa)*, Mountain pine (*Pinus mugo)*,European black pine *(Pinus nigra)*, Scots pine *(Pinus silvestris)*, Poplar ***(****Populus sp).*, and Willow (*Salix sp)*. One species (*Cryphalus abietis*) was registered on fungus *Melampsorella caryophyllacearum*. In the southern part of Montenegro, 14 species were detected

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on these host plants: Sweet cherry (*Cerasus avium),* European black pine *(Pinus nigra),*Cypress *(Cupressus sempervirens),* Aleppo pine *(Pinus halepensis),* Spanish broom (*Spartium junceum),* and Stone pine (*Pinus pinea*) (Roganović, 2001; 2007). Surveyes of entomofauna of Cypress (*Cupressus sempervirens)* in central and southern part of Montenegro resulted in detection of two species of Cypress bark beetles (Roganović, 2007). In the continental area of Montenegro, on mountain Komovi, 12 species were registered on Whitebark pine (*Pinus heldreichii*) and 11 species of bark beetles on Beech (*Fagus moesiaca)* (Roganović, 2012). Survey of entomofauna of Downy oak (*Quercus pubescens*) in central and southern part of Montenegro resulted in detection of six species (Roganović, 2012).

MATERIAL AND METHODS

The study period lasted from 2000 to 2012 and included northern, central and southern part of Montenegro. In the Northern part:Durmitor (CN 48, 47, 58, 57), Komovi (DN 83, 82, 93, 92) Prokletije (DN 02, 01, 23, 22) localities in the area of Rožaje (DN 35), Plav (DN 12) and Pljevlja (CN 60). In the Central part: Podgorica (CM 50, 60). In the coastal part: Budva (CM 29, 28), Herceg Novi (CM 00, 90), Ulcinj (CM 55, 54), Petrovac (CM 38, 37) and Bar (CM 46)

In all surveyed localities destroyed and standing trees showing characteristic symptoms of bark beetle attack were checked during the summer months in northern part and during the whole period of the year in central and southern part. Bark was moved from symptomatic trees and adults of bark beetles were collected and placed in the vials. Branches and parts of trees, on which, under the bark, presence of larvae were collected and placed in insectarium where adults were emerged.

Stuff of bark beetles species were done using standard methods (Hoffard, W.H. et al., 1980; Mihajlović, 2008) and proper keys for determination (Stark, 1952; Karaman, 1971, Selmi, 1998).

RESULTS AND DISCUSSION

Table 1: List of Scolytidae species detected in Montenegro*

*Hierarchy of species and nomenclature are given according to Stark (1952) and Karaman (1971)

Species	Literature sources	Author's findings	Host plants
Genus: ***Scolytus*** Geoffroy			
multistriatus (Marsham, 1802)	+		*Ulmus* sp.
intricatus (Ratzeburg, 1837)	+	+	*Crataegus monogyna, Malus silvestris, Cerasus avium, Fagus moesiaca, Quercus pubescens*
mali (Bechstein, 1805)	+		*Malus silvestris*
carpini (Ratzeburg, 1837)	+	+	*Carpinus orientalis, Quercus sp., Fagus moesiaca*

rugulosus (Müller, 1818)	+	+	*Crataegus monogyna, Malus silvestris, Cerasus avium*
Genus: ***Hylesinus*** Fabricius			
oleiperda Fabricius, 1801	+	+	*Fraxinus ornus, Olea europea*
fraxini (Panzer, 1779)	+		*Fraxinus ornus*
Genus: ***Xylechinus*** Ratzeburg			
pilosus (Ratzeburg, 1837)	+		*Picea abies*
Genus: ***Hylastes*** Erichson			
cunicularius Erichson, 1836	+	+	*Picea abies, Abies alba*
opacus Erichson, 1836	+		*Picea abies*
*ater (*Paykull, 1800)	+	+	*Pinus nigra*
linearis Erichson, 1836	+	+	*Pinus heldreichii*
Genus: ***Hylurgops*** Leconte			
palliatus (Gyllenhal, 1813)	+	+	*Picea abies, Abies alba, Pinus nigra, Pinus heldreichii*
Genus: ***Blastophagus*** Eichhoff (= ***Myelophilus*** Eichhoff)			
minor (Hartig, 1834)	+	+	*Pinus nigra, Pinus silvestris, Pinus heldreichii*
piniperda Linnaeus, 1758	+	+	*Pinus nigra, Pinus silvestris, Pinus heldreichii*
Genus: ***Dendroctonus*** Erichson			
micans Kugelmann, 1794	+	+	*Picea abies*
Genus: ***Kissophagus*** Chappuis			
novaki Reitter, 1894	+		*Hedera helix*
Genus: ***Phloeosinus*** Chapuis			
thujae (Perris, 1855)	+	+	*Cupressus sempervirens*
*aubei (*Perris, 1855)	+	+	*Juniperus communis, Cupressus sempervirens*
Genus: ***Hypoborus*** Erichson			
ficus Erichson, 1836	+		*Ficus carica*
Genus: ***Liparthrum*** Aube			
genistae (Aube, 1862)	+	+	*Spartium junceum*
Genus: ***Carphoborus*** Eichhoff			
*minimus (*Fabricius, 1798)	+	+	*Pinus halepensis*
Genus: ***Polygraphus*** Erichson			
poligraphus (Linnaeus, 1758)	+	+	*Picea abies,*
subopacus Thomson, 1871	+		*Picea abies*
Genus: ***Crypturgus*** Erichson			
cribrellus Reitter, 1894	+	+	*Pinus halepensis*
pusillus (Gyllenhal, 1813)	+		*Picea abies*
apfelbecki Eggers, 1940	+		*Picea abies*
numidicus Ferrari, 1867	+	+	*Pinus halepensis*

Genus: ***Coccotrypes*** Eichhoff			
dactiliperda Fabricius	+	+	*Fruit of Phoenix dactylifera*
Genus: ***Thamnurgus*** Eichhoff			
varipes Eichhof	+		*Euphorbia amygdaloides*
euphorbiae Küster, 1845	+		*Euphorbia characias*
Genus: ***Xylocleptes*** Ferrari			
*bispinus (*Duftschmidt,1825)	+	+	*Clematis vitalba*
Genus: ***Dryocoetes*** Eichhoff			
hectographus Reitter, 1913	+	+	*Picea abies*
autographus Ratzeburg, 1837	+	+	*Picea abies, Abies alba*
villosus (Fabricius, 1792)	+	+	*Fagus moesiaca, Quercus pubescens*
Genus: ***Xyloterus*** Erichson			
domesticus (Linnaeus, 1758)	+	+	*Fagus moesiaca, Salix sp.*
signatus (Fabricius, 1792)	+	+	*Fagus moesiaca, Quercus pubescens*
lineatus (Olivier, 1795)	+		*Picea abies, Abies alba*
Genus: ***Cryphalus*** Erichson			
piceae Ratzeburg, 1837	+	+	*Picea abies, Abies alba*
abietis Ratzeburg, 1837	+		*Abies alba, Melampsorella caryophyllacearum*
saltuarius Weise, 1891	+		*Picea abies*
Genus: ***Ernopocerus*** Balachowsky			
fagi Fabricius, 1798	+	+	*Fagus moesiaca*
Genus: ***Trypophloeus*** Faimaire			
granulatus (Ratzeburg,1837)	+		*Populus sp.*
Genus: ***Xyleborus*** Eichhoff			
*dispar (*Fabricius, 1792)	+		*Quercus pubescens*
monographus Fabricius,1792	+	+	*Fagus moesiaca, Quercus pubescens*
dryographus Ratzeburg, 1837	+	+	*Fagus moesiaca*
saxeseni (Ratzeburg, 1834)	+	+	*Fagus moesiaca, Quercus pubescens*
Genus: ***Taphrorychus*** Eichhoff			
bicolor (Herbst, 1793)	+	+	*Fagus moesiaca*
hirtellus (Eichhoff, 1878)	+	+	*Fagus moesiaca*
Genus: ***Pityophthorus*** Eichhoff			
pityographus Ratzeburg,1837	+	+	*Pices abies, Abies alba, Pinus silvestris, Pinus heldreichii*
lichtensteini Ratzeburg, 1837	+	+	*Pinus silvestris, Pinus heldreichii*
henscheli Seitner, 1887	+		*Pinus mugo*
Genus: ***Pityogenes*** Bedel			
chalcographus Linnaeus,1761	+	+	*Picea abies, Abies alba, Pinus silvestris, Pinus mugo, Pinus heldreichii*

quadridens (Hartig, 1834)	+	+	*Pinus nigra,Pinus silvestris, Pinus heldreichii*
bistridentatus (Eichhoff,1878)	+	+	*Pinus nigra, Pinus heldreichii*
calcaratus (Eichhoff, 1878)	+	+	*Pinus halepensis*
bidentatus (Herbst, 1783)	+		*Pinus silvestris*
trepanatus (Nordlinger, 1848)	+	+	*Pinus nigra*
Genus: ***Pityokteines*** Fuchs			
vorontzowi (Jacobson, 1895)	+		*Abies alba*
Genus: ***Ips*** de Geer			
acuminatus (Gyllenhal, 1827)	+	+	*Picea abies, Pinus silvestris*
sexdentatus (Boerner, 1776)	+	+	*Pinus nigra, Pinus silvestris, Pinus heldreichii*
amitinus Eichhoff, 1872	+	+	*Pinus heldreichii*
mannsfeldi (Wachtl, 1879)	+		*Pinus nigra, Pinus silvestris*
typographus (Linnaeus, 1758)	+	+	*Picea abies, Abies alba, Pinus heldreichii*
Genus: ***Orthotomicus*** Ferrari			
erosus (Wollaston, 1857)	+	+	*Pinus pinea*
saturalis (Gyllenchal, 1827)	+	+	*Pinus silvestris*
laricis (Fabricius, 1792)	+		*Pinus nigra*

According to data from the National Forest Inventory (2012) Spruce (*Picea abies*) cover an area of 8.5% under forest vegetation. So far results of surveys in Montenegro showed that the largest number of bark beetles (17 species) are trophically related to Spruce (*Picea abies*). During our surveys, species *Ips acuminatus*, *Ips sexdentatus* and *Ips typographus* were emerged from spruce branches. Spruce branches were collected at the locality Županica (Rožaje) in 07/09/2005 and Mlinski potok (Durmitor) 11/07/2011. As the spruce most common and economically important coniferous the threat by bark beetles is largest. In particular, it should be noted that outbreak species (*Ips typographus* and *Pityogene chalcographus*) primarily attack Spruce in circumstances of forest fires, break from the wind and break from the snow.

For the Whitebark pine (*Pinus heldreichii*) trophically is related 12 species of bark beetles. However, species that are detected and their numbers indicate a low level of vulnerability of Whitebark pine by bark beetles (Roganović, 2011).

For the European black pine (*Pinus nigra*) trophically is related 10 species of bark beetles. As result of research of bark beetles fauna on European black pine (*Pinus nigra)* in the Southern part of Montenegro, following species were registered: *Hylastes ater, Hylurgops palliatus, Pityogenes bistridentatus, Ips sexdentatus* (Roganović, 2007). Species *Hylastes ater* we have detected on locality Budva (City) 28/08/2004, while species *Hylurgops palliatus* we have detected on locality Ulcinj (Velika plaža) in 09/09/2003. Also in the southern part of Montenegro on the Aleppo pine (*Pinus halepensis*) has been detected four species of bark beetles (*Carphoborus minimus, Crypturgus cribrellus,*

Crypturgus numidicus, Pityogenes calcaratus) belonging to the secondary species that don't have economic importance (Roganović, 2007).

In some previous researches in the northern part of Montenegro (Durmitor) six species of bark beetles (*Blastophagus piniperda, Pityogenes quadridens, Pityogenes bistridentatus, Ips mansfeldi, Ips sexdentatus* and *Orthotomicus laricis)* were found on the European black pine *Pinus nigra* (Spaić & Stevanović, 1991) and two species (*Blastophagus minor* and *Ips acuminatus*) at the locality Crna poda (Mihajlović & Karadžić, 1998). During these surveys in the northern part of Montenegro *Pityophthorus lichtensteini* and *Pityogenes chalcographus* were found on *Pinus nigra* in the locality Pljevlja (cyty) in 21/08/2011 and Pljevlja (Mijakovići) in 06/09/2005.

Eleven species (*Blastophagus minor, Blastophagus piniperda, Pityophthorus pityographus, Pityophthorus lichtensteini, Pityogenes chalcographus, Pityogenes quadridens, Pityogenes bidentatus, Ips acuminatus, Ips sexdentatus, Ips mannsfeldi* and *Orthotomicus saturalis)* were registered on Scots pine (*Pinus silvestris*) in Durmitor (Spaić & Stevanović, 1991).

For the Silver fir (*Abies alba*) trophically is related 10 species of bark beetles. By our surveys, species *Pityogenes chalcographus* and *Pityophthorus pityographus* were registered on this species on Durmitor (Crno jezero) 18/07/2004.

When it comes to deciduous trees in Montenegro is dominant Beech (*Fagus moesiaca*) with 19,8% and for this species trophically is related 11 species of bark beetles (NFI, 2012). Species *Scolytus intricatus* because of additional feeding has primary importance while species of genus *Xyloterus (Xyloterus domesticus* i *Xyloterus signatus)* and genus *Xyleborus* (*Xyleborus monographus, Xyleborus dryographus* and *Xyleborus saxaseni*) because of symbiotic relationship with Ambrosia fungi reduce quality and thus and economic value of wood (Mirić & Petrović, 2005; Roganović, 2011).

On Downy Oak (*Quercus pubescens*) detected six species of bark beetles, on Crab apple (*Malus silvestris*) 3 species, on Sweet cherry (*Cerasus avium*), Manna ash (*Fraxinus ornus*) and Cypress (*Cupressus sempervirens*) by two species, on Olive tree (*Olea europea*), Ivy (*Hedera helix*), Common juniper (*Juniperus communis*), Common fig (*Ficus carica*), Spanish broom (*Spartium junceum*), Wood spurge (*Euphorbia amygdaloides)*, Buy spurge (*Euphorbia characias)*, Old man's beard (*Clematis vitalba)*, Willow (*Salix sp.)*, Poplar (*Populus sp*.) and Elm (*Ulmus sp*.) by one species. One species of bark beetles also was detected on fungus *Melampsorella caryophyllacearum* (Spaić & Stevanović, 1991).

During previous research speces *Coccotrypes dactiliperda* was registered on dried herbaceous plants and in palmas fruit (Roganović, 2007).

Hylesinus oleiperda was detected in northern part of Montenegro (Durmitor) (Spaić & Stevanović, 1991) on branches of Manna ash (*Fraxinus ornus)*. As result of our survey it was found in southern part of Country at locality Bar in 04/05/2001 on branches of Olive tree (*Olea europea*).

CONCLUSIONS

The paper presents synthesis of literature data and results of our researches that resulted in the first list of detrmined species of bark beetles (Coleoptera, Scolytidae) in Montenegro.

Based on literature data and our researches 67 species of Scolytidae classified in 29 generas and two subfamilies were registered in Montenegro.

Of the total number of detected species, 42 species are trophically related to coniferous trees and 19 to deciduous trees. Other species of bark beetles were found in shrubs and vascular plants, evergreen climbing plant and one species was registered in palmas fruit.

REFERENCES

Anza, M., Riga, P. and Garbisu, C. (2006): Effects of variety and growth season on the organoleptic and nutritional quality of hydroponically grown tomato. Journal of Food Quality. 29: 16–37.

Balachowsky, A. (1949): Faune de France. Coleoptera – Scolytidae. Paris.

Hoffard, W.H., Robert L., Anderson, R.L & William H.S. (1980): How to collect and prepare forest insects, disease organisms and plant specimens for identification. USDA FOREST SERVICE Southeastern Area, State and Private Forestry 1720 Peachtree Road, N.W. Atlanta, Ga. 30309.

Karaman, Z. (1971): Fauna of Macedonia I. Bark beetles – Scolytoidea (Coleoptera – Insecta). Prirodonaučen muzej. Skopje.

Liebmann, W. (1945): Käferfunde besonders aus dem Mittelmeergebiet und den Südalpen. Museum Naturkunde. Erfurt.

Mihajlović, LJ.(2008): Šumarska entomologija. Univerzitetski udžbenik. Šumarski fakultet Univerziteta u Beogradu.

Mirić, M., Petrović, S.(2005): Ambrosia Wood Borers - Dangerous Pests of Freshly Felled Trunks and Protection Possibility. Prerada drveta No 9-10. Pp 38-46. (In Serbian).

NFI, (2012): National Forest Inventory of Montenegro. Draft. Ministry of Agriculture and rural development. Podgorica. Pp 132.

Novak, P. (1952): Kornjaši jadranskog primorja (*Coleoptera*). Jugoslavenska Akademija Znanosti i Umjetnosti. Zagreb.

Pagnetti – Hümmler, G. (1898): Beitrag zur fauna von Süddalmatien. Illustr. Zitcshr. Entomol.,3:150. Neudamm.

Pfeffer, A. (1955): Fauna ČSR. Kurovci (Scolytidae). Praha.

Roganović, D. (2012): Contribution to knowledge of Downy Oak (*Quercus pubescens* Willd.) entomofauna in Montenegro. Agriculture & Forestry, Vol. 58 (1): 41-52, 2012.

Roganović, D. (2012): Bark Beetles (Scolytidae, Coleoptera) of Beech (Fagus moesiaca Domin, Maly/CZeczott.) in Mt. Komovi area – Montenegro. Agriculture & Forestry 57 (4) Pp 7-14.

Roganović, D. (2011): Contribution to the Study of Bark Beetles Fauna (Scolytidae, Coleoptera) on Whitebark Pine (*Pinus heldreichi* Christ.) on

Mt. Komovi (Montenegro). Nature protection in XXI century. Proceedings of the Conference. Thematic sessions, abstracts, poster presentations. (Book No 2.) 20-23 September, Žabljak Montenegro. Pp 485-489.

Roganović, D.(2007): Insects on Trunk and Branches of Cypress (Cupressus sempervirens L.) in Montenegro. Časopis za Šumarstvo, Preradu drveta, Pejzažnu arhitekturu i Hortikulturu i Ekološki inženjering i zaštitu zemljišnih i vodnih resursa.:59(3-4) 55-71 Beograd.

Roganović, D. (2007): Contribution to the Study of Bark Beetles Fauna (*Coleoptera*, *Scolytidae*) of the Mediterranean part of Montenegro.Glasnik Republičkog Zavoda za zaštitu prirode. No 29-30.149-155 Podgorica.

Roganović, D., Matić, V., Adžiablahović, S. (2001): Conflagration and calamity in community of *Pinus nigra* Arnold in Herceg Novi (Montenegro) on pluvial erosion phenomenon and method of their recovery. International Conference. Forest Research. A challenge for an integrated European approach. Proceedings. Volumen II. 639-642 Thesaloniki. Greece.

Selmi, E. (1998): Türkiye kabuk böcekleri ve savaşi.Istanbul Üniverzitesi Yayin N_o: 4042. Emek Matbaacilik. Istanbul.

Stark, N.V. (1952): Fauna SSSR, žestokrilie - koroedi, 31:1-462 Moskva, Lenjingrad.

Spaić, I. & Stevanović, M. (1991): Scolytidae (Insecta, Coleoptera). CANU. Posebna izdanja: Fauna Durmitora, Sveska 4. pp 161-179. Titograd.

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SIPCI (COLEOPTERA: SCOLYTIDAE) CRNE GORE

SAŽETAK

U radu su predstavljeni rezultati konstatovanih vrsta sipaca (Coleoptera: Scolytidae) u Crnoj Gori, na osnovu literaturnih podataka i sopstvenih istraživanja. Do sada je utvrđeno 67 vrsta sipaca svrstanih u 29 rodova i dvije podfamilije. Od ukupnog broja konstatovanih vrsta, najveći broj (42 vrste) je trofički vezano za četinarske vrste drveća, dok je 19 vrsta vezano za lišćare. Ostale vrste sipaca konstatovane su na žbunastim i vaskularnim vrstama biljaka, jedna je konstatovana na povijuši i jedna vrsta u plodu palme.

Ključne riječi: Sipci, Crna Gora.