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BARK BEETLES AND THEIR PREDATORIES WITH PARASITES OF ORIENTAL SPRUCE (*Picea orientalis* (L.) LINK) FORESTS IN TURKEY

ABSTRACT

In this study, the bark beetle species which they are destructively effected on the Oriental spruce regions are determined between 2005-2006. In addition, predatory and parasite species that attack the bark beetles are introduced. As a result of this study, 23 species harmful bark beetles that bound to 6 tribus and 2 sub-family of the Scolytidae family is identified. Accordingly, 84 predatory species from 21 families under 4 groups, and 23 parasite species from 5 families under 1 group are detected. These predatory and parasite species are very important as a starting point for the biological fighting against the bark beetles.

Keywords: Bark Beetles, Predators, Parasites, *Picea orientalis*, Turkey

TÜRKİYE DOĞU LADİNİ ORMANLARININ KABUK BÖCEKLERİ ve BUNLARIN YIRTICILARI İLE PARAZİTLERİ

ÖZET

Bu çalışmada, 2005-2006 yılları arasında bölgede yapılan araştırmalarla Doğu ladini'nde tespit edilen kabuk böceği türleri tanıtılmıştır. Ayrıca kabuk böceklerine arız olan yırtıcı ve parazit türleri de verilmiştir. Çalışmamız sonucunda Doğu ladini'nde zararlı olan Scolytidae familyasından 2 alt familya ve 6 tribusa bağlı 23 tür kabuk böceği, 4 takımdan 21 familyaya mensup 84 yırtıcı ve 1 takımdan 5 familyaya mensup 23 parazit türü saptanmıştır. Yırtıcı ve parazit türlerinin belirlenmesi, kabuk böceklerine karşı biyolojik mücadelede kullanılabilmesi açısından önem taşımaktadır.

Anahtar Kelimeler: Kabuk Böcekleri, Yırtıcılar, Parazitler, Doğu Ladini, Türkiye

1. INTRODUCTION (GİRİŞ)

Oriental spruce (*Picea orientalis* (L.) Link.) extends from Ordu in Turkey through the North East Black Sea Mountains to the Caucasus Mountains. This species makes optimum growth in such a climate conditions that have heavy precipitation whole year and having higher relative humidity. This species is semi-tolerant to the shade. Contrary, it is able to growth semi-drought condition. However the long drought summer conditions influences its growth inversely because of its roots system which are spreaded nearest to the soil surface [1]. It can also be damaged markedly by the abiotic factors such as storm, wind, snow and toxic gases [2]. Therefore, this species can grow in wide range from humid zones through the arid zones. Accordingly it can be attacked by various species of beetles. In addition, because of the heavy pasturage, illegal cutting and also precipitous land structure, the appropriate silvicultural applications cannot be performed as required, in the areas. These undesirable situations cause population increase of the insects and becoming the dangerous epidemic condition on the areas [3].

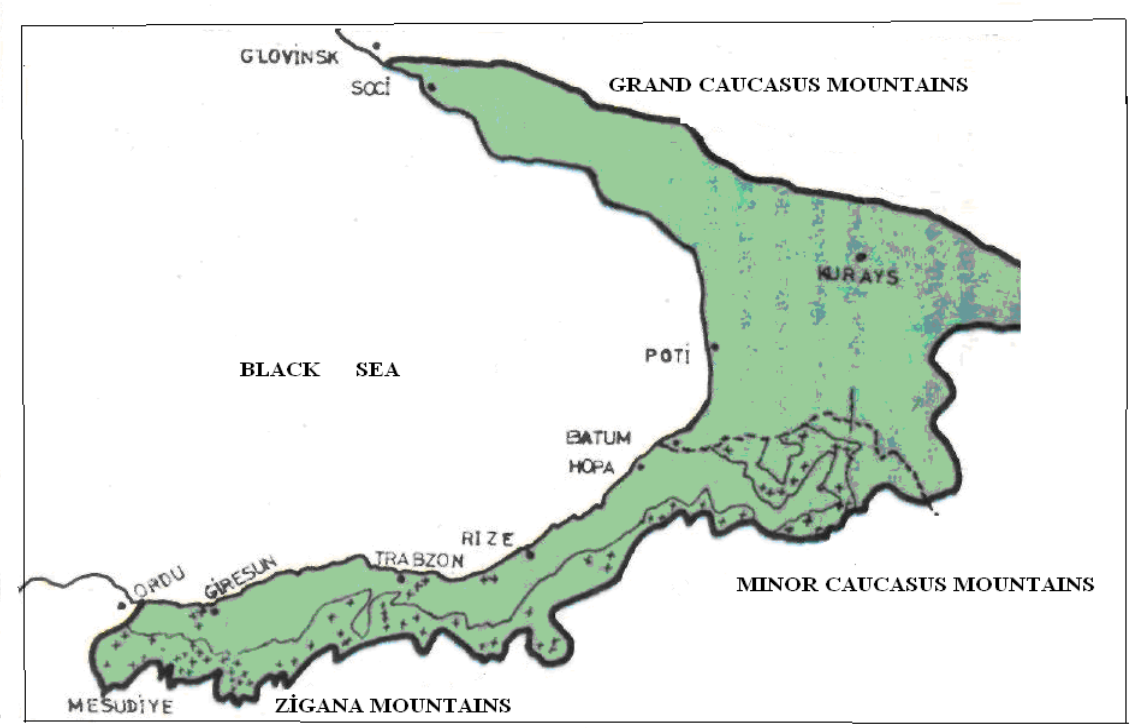

Figure 1. Natural Distribution of Oriental spruce (*Picea orientalis* (L.) Link.)
(Şekil 1. Doğu ladininin doğal yayılışı)

In this study, the bark beetle species which were detected in the region. Not being provided a complete success in the mechanical and chemical methods implemented against the bark beetles for years in Turkey. Recently, the bio-technical and biological methods have been come into prominence, because of the precipitous land structure in the region. The reason is that the mechanical methods of insect control is difficult and the chemical methods may cause the unrecoverable ecological and the environment problems [4]. The best solution for decreasing the harmful insects population is the biological control by using their predators – natural enemies. In this study, in addition to the bark beetles determination, their predatory and parasite species were introduced.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

In this study, the bark beetles species which harmful on oriental spruce and determined in the studies by ourselves so far, were introduced. At different oriental spruce stands in the East Blacksea Region, upright and flat trap trees prepared. Nevertheless; broken, overthrown and illegally cutted trees used as material. The harmful insects and predatories or parasites found in the urinary system of the insects, were collected for identification.

Determining of predatory and parasite species is important. Because this results can be used in biological control against the bark beetles.

3. MATERIAL AND METHOD (MATERYAL VE METOT)

3.1. Material (Materyal)

The members of Scolytidae family which causes damages in the Oriental spruce stands and which spread over the Eastern Black Sea Region, and their predatory and parasite species natural enemies, constitute the materials of this study.

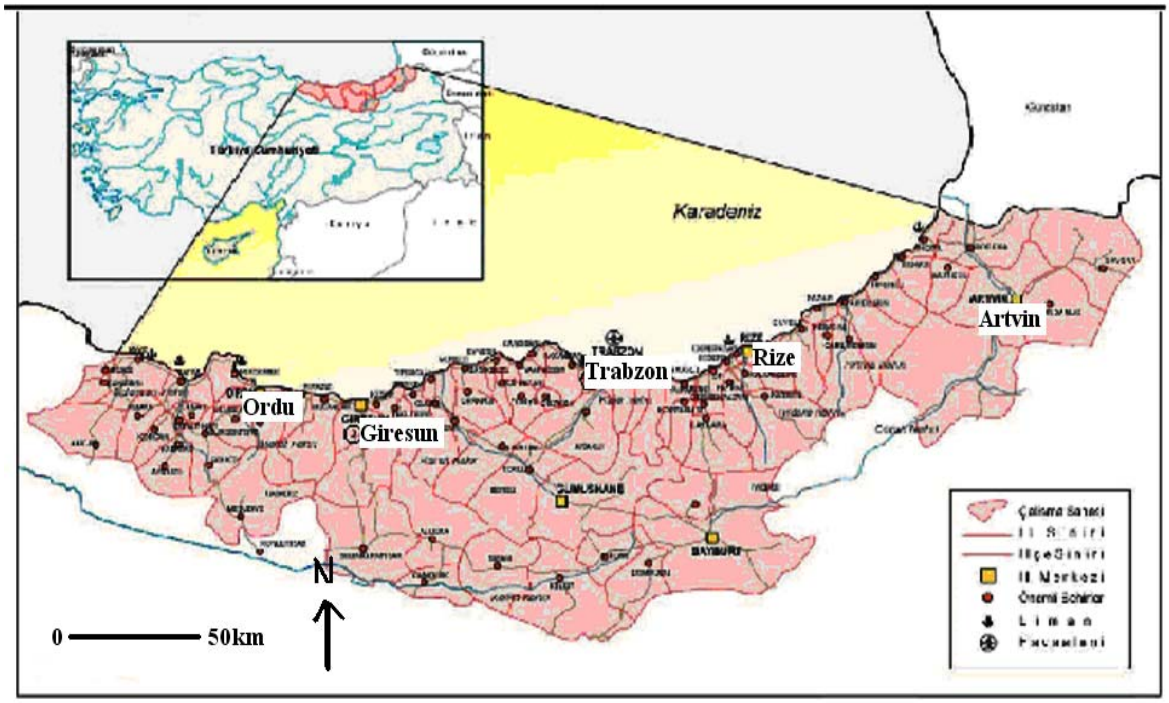

Figure 2. The study area in Eastern Black Sea Region, and its location in Turkey
(Şekil 2. Doğu Karadeniz Bölümünde Araştırma Alanı ve Türkiye'deki Yeri)

3.2. Method (Metot)

Depending on the flying times of the insects vertical and horizontal trap trees were prepared in the experimental areas taken from the Oriental spruce stands of Trabzon-Maçka-Meryemana, Çatak and Hamsiköy, Giresun-Kulakkaya, Ordu-Çambaşı, Artvin-Atilla, Saçinka, Tütüncüler, Taşlıca, Madenler, Ortaköy, Zeytinlik, Merkez regions, Kafkasör location, Ardanuç-Tepedüzü, Şavşat-Karagöl, Tepebaşı, Veliköy, Meydancık, Borçka-Karagöl, Camili, Karşıköy, Balcı, Yusufeli-Öğdem, Dereiçi, Altıparmak, Murgul-Taraklı, Başköy, Topraklı and Taraklı. This study was realized in 2005-2006 years (Fig.2).

While some parts of the vertical trap trees were constituted the trees which were still withering due to the insect damage, the other part of the vertical trap trees were also constituted the trees which were accelerated to wither by means of being tightened to about 1-2 m upper part from the root neck. Trees which were cut during the production works in the forest and then left onto the ground, and stems that have been fallen over, broken due to the abiotic reasons such as storms, snow, winds, etc., and also trees that were cut illegally and then left in the forest were taken advantage as horizontal trap trees. In addition to these, researches were performed in pure and mixed forests, in stocks in and out of the forest, in forestry lands in which production is performed, in zones comprised of trees fallen down due to the storms and snow, on the old trees which cannot be taken away although it had completed its physiological life, and also on the trees that cannot be taken out of the forest after cutting.

The insects that were detected they were harmful in the land, and predatory and parasite species which we're seen in their reproduction systems were taken into the small tubes and plastic boxes, and therefore they were collected by this way. Small holes were opened on the boxes and on the covers of the boxes by means of awl so that it was tried to prevent any damp and mildew that could occur in them. The materials with insects in which larva and pupa were detected were brought to the lab, and were put into the glass and organtine cages, and finally the matures were provided to obtain. During this event, the predatory and parasite species obtained were also collected in order to detect.

In the classification of the bark beetles and their predatory species which were detected as harmful on the Oriental spruces, it was taken advantage of the studies of Brauns (1964), Berland (1947), Essig (1958), Freude, Harde and Lohse (1964–1983) and Grüne (1979) [5]. Furthermore, individuals and institutions specialized in their subject were contacted, and the detections of the samples were performed by sending them to the considered experts and institutions, or performed also in situ. In both denomination of the species and in the determination of their families in which they are included, the letters/reports that declared the identification and its result found by the experts and institutions were the baselines.

4. DISCUSSION (TARTIŞMA)

The systematic classification of the sub families, tribuses and types of 23 Scolytidae species which detected as harmful in the Oriental spruce stands were mainly based on the classification that that developed by Postner (1974),Schedl (1980) and Selmi (1998) but the species are arranged in alphabetical order.The list of detected harmful bark beetles, their predatories and parasites given in table list part of manuscript (Table 1,2,3 and 4).

Table 1. Symbols of localities
(Tablo 1. Lokalitelerin sembolleri)

Province	District	Symbol of Locality
ARTVİN	Ardanuç	1a
	Borçka	1b
	Merkez	1c
	Murgul	1d
	Şavşat	1e
	Yusufeli	1f
GiRESUN	Bulancak	2a
	Dereli	2b
	Espiye	2c
	Merkez	2d
ORDU	Merkez	3a
	Mesudiye	3b
	Ünye	3c
RİZE	Ardeşen	4a
	Fındıklı	4b
	İkizdere	4c
	Pazar	4d
	Çamlıhemşin	4e
TRABZON	Maçka	5a
	Merkez	5b
	Sürmene	5c
	Of	5d

Number of Localities: Artvin; 1, Giresun; 2, Ordu; 3, Rize; 4, Trabzon; 5

Table 2. The list of detected harmful bark beetle species and their localities
(Tablo 2. Tespit edilen zararlı kabuk böceği türleri listesi ve lokaliteleri)

	Ordo	Family	Subfamily	Tribus	Species	Locality
1	Col.	Scolyt.	Hyles.	Hylas.	*Hylastes angustatus*	5a
2					*Hylastes ater*	1b,1e,3a,5a
3					*Hylastes cunicularis*	1b,1e,5a
4					*Hylurgops glabratus*	1a,1c,1e,5a
5					*Hylurgops palliatus*	1a,1b,1c,1e, 2a, 2d,3a,5a
6					*Blastophagus (Tomicus) minor*	5a
7					*Blastophagus (Tomicus) piniperda*	1e,5a
8					*Dendroctonus micans*	1a,1b,1c,1d,1e, 1f,2a,2b,2c,2d, 4b,4d
9			Ipinae	Crypturgini	*Crypturgus pusillus*	1a,1b,1e,1f,2d, 3a,3b,5a
10				Cryphalini	*Cryphalus abietis*	1a,1b,1e,1f,2d, 3a,3b,5a
11					*Cryphalus piceae*	1a,1b,1c,1d,1e, 3a,5a
12				Pityophthorini	*Pityophthorus pityographus*	1b,1c,1e,1f,5a, 5c
13					*Pityophthorus pubescens*	1e
14				Ipini	*Pityogenes bidentatus*	1a,1b,1c,1e,2a, 2b,2d,3a,3b,3c, 4b,4d,5a,5c
15					*Pityogenes bistridentatus*	1e
16					*Pityogenes chalcographus*	1b,5b
17					*Pityogenes quadridens*	1e
18					*Pityokteines spinidens*	1a,1b,1c,1d,1e, 1f,2d,5a,5c
19					*Orthotomicus erosus*	1a,1d,1f,3b,4a, 4c,4d,5a,5b
20					*Ips acuminatus*	1a,1b,1e,1f,5a
21					*Ips sexdentatus*	1a,1b,1c,1e,1f, 2c,2d,3a,3b,4a, 4b,4c,4d,4e,5a, 5c
22					*Ips typographus*	1a,1b,1c,1d,1e, 1f
23				Xyloterini	*Xyloterus lineatus*	1a,1b,1c,1e,1f, 2a,2d,3a,5a,5c, 5d

Table 3. List of detected predatory species.
(Tablo 3. Tespit edilen predatör türlerinin listesi)

	Species	Ordo	Family	Host insect	Locality
1	*Litargus connexus* (Geoffr.)	Coleoptera	Mycetophagidae	*Hylastes ater* *Orthotomicus erosus* *Ips sexdentatus*	5a
2	*Trigoderma versicolor* (Creutz)		Dermestidae	*Dendroctonus micans*	1f
3	*Nathrenus verbasci* (Linnaeus)			*Pityokteines spinidens*	5b
4	*Calyptomerus alpestris* (Redt.)		Clambidae	*Pityophthorus pityographus*	1c
5	*Rhizophagus grandis* (Gyll.)		Rhizophagidae	*Dendroctonus micans* *Ips typographus*	1a,1b,1c, 1d,1e,1f,
6	*Rhizophagus depressus* (F.)			*Pityogenes bidentatus* *Orthotomicus erosus* *Ips acuminatus* *Ips sexdentatus*	1e,5a
7	*Rhizophagus dispar* (Payk.)			*Hylurgops palliatus* *Dendroctonus micans* *Pityogenes bidentatus* *Pityokteines spinidens* *Orthotomicus erosus*	1a,1b,1c, 1e,2a,3a, 3b,3c,4a, 4b,5a,5c
8	*Rhizophagus ferruqineus* (Payk.)			*Ips sexdentatus*	3a
9	*Thanasimus formicarius* (L.)		Cleridae	*Hylurgops palliatus* *Dendroctonus micans* *Cryphalus abietis* *Cryphalus piceae* *Pityophthorus pityogrophus* *Pityogenes bidentatus* *Pityokteines spinidens* *Orthotomicus erosus* *Ips acuminatus* *Ips sexdentatus* *Ips typographus*	1a,1b,1c, 1e,1f,2a, 2b,2c,2d, 3a,3b,3c, 5a,5c
10	*Clerus mutillarius* (F.)			*Pityokteines spinidens*	1e
11	*Nemosoma elongatum* (L.)		Ostomidae	*Hylurgops palliatus* *Dendroctonus micans* *Cryphalus piceae* *Pityophthorus pityogrophus* *Pityogenes bidentatus* *Pityogenes bistridentatus* *Pityokteines spinidens* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1c,1e, 5a,5b
12	*Temnochila coerulea* O.			*Cryphalus piceae* *Pityophthorus pityogrophus* *Orthotomicus erosus* *Ips acuminatus* *Ips sexdentatus*	1a,1c,1e
13	*Thymalus limbatus* (F.)			*Hylurgops palliatus* *Cryphalus abietis* *Pityogenes bidentatus* *Ips typographus*	1f,2d
14	*Ostoma ferruginea* (L.)			*Hylurgops palliatus*	1c,2b

15	*Cylister oblongum* (F.)		Histeridae	*Orthotomicus erosus* *Ips sexdentatus*	1e,1f,5a, 5c
16	*Cylister lineare* (Er.)			*Ips sexdentatus*	5a
17	*Plegaderus otti* (Mars)			*Hylastes ater* *Pityophthorus pityographus* *Orthotomicus erosus* *Ips sexdentatus*	1b,1c,1f, 5a
18	*Paromalus parallelepipedus* (Hrbst.)			*Orthotomicus erosus* *Ips sexdentatus*	1e,3c,5a
19	*Epuraea abietina* (Sahl.)		Nitidulidae	*Hylurgops palliatus* *Dendroctonus micans* *Pityogenes bidentatus* *Ips sexdentatus* *Ips typographus*	1c,1e,1f
20	*Epuraea pusilla* (Illig.)			*Hylurgops palliatus* *Ips sexdentatus* *Ips typographus*	1a,5a,5c
21	*Pityophagus ferrugineus* (L.)			*Ips sexdentatus*	3a
22	*Ipidia quadrimaculata* (Q.)			*Ips sexdentatus*	
23	*Glishrochilus quadripunctatus* (L.)			*Ips sexdentatus*	1e,5a
24	*Aulonium ruficorne* (Ol.)		Colydiidae	*Crypturgus pusillus* *Pityogenes bidentatus* *Orthotomicus erosus* *Ips acuminatus* *Ips sexdentatus*	1a,1e,1f, 5a
25	*Colydium elongatum* (F.)			*Cryphalus piceae* *Orthotomicus erosus* *Ips typographus*	1a,1c,1e
26	*Ditoma crenata* (F.)			*Pityophthorus pityographus* *Pityogenes bidentatus* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1b,1e, 1f,2d,3a
27	*Cerylon impressum* (F.)			*Hylastes ater* *Hylurgops palliatus* *Pityophthorus pityographus*	1b,2d,5a
28	*Endophloeus markovichianus* (Pill.)			*Hylurgops palliatus* *Ips sexdentatus*	1a,5c
29	*Penthelipsa inexpecta* (Duv.)			*Hylastes ater* *Hylurgops palliatus* *Dendroctonus micans* *Ips sexdentatus* *Orthotomicus erosus*	1b,2d,5a
30	*Silvanus bidentatus* (F.)		Cucujidae	*Hylurgops palliatus* *Crypturgus pusillus* *Cryphalus piceae* *Pityokteines spinidens* *Orthotomicus erosus*	1a,1c,1e, 5a
31	*Pediacus dermestoides* (F.)			*Hylurgops palliatus* *Pityogenes bidentatus*	2d,3a,5a
32	*Cryptolestes alternans* (Er.)			*Crypturgus pusillus* *Cryphalus piceae* *Pityophthorus pityographus* *Pityogenes bidentatus*	1a,1e,5a

33	*Laemophloeus testaceus* (F.)			*Pityogenes bidentatus* *Orthotomicus erosus*	5a
34	*Hypophloeus unicolor* (Piller and Mitterp.)		Tenebrionidae	*Ips sexdentatus*	1b,2a,2c, 2d
35	*Paraphloeus longulus* (Gyll.)			*Orthotomicus erosus* *Ips acuminatus* *Ips sexdentatus* *Ips typographus*	1a,1e,5a
36	*Paraphloeus fraxini* (Kug.)			*Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1e,1f
37	*Paraphloeus linearis* (Fabr.)			*Dendroctonus micans* *Crypturgus pusillus* *Cryphalus piceae* *Pityophthorus pityographus* *Pityogenes bidentatus* *Pityokteines spinidens* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1c,1e, 5a
38	*Menephilus cylindricus* (Hrbst.)			*Ips sexdentatus*	1e
39	*Hoplocephala haemorrhoidalis* (Fabr.)			*Dendroctonus micans*	2b
40	*Dromius quadrimaculatus* (L.)		Carabidae	*Dendroctonus micans*	1e
41	*Cis hispidus* (Gyll.)		Cisidae	*Pityophthorus pityographus*	5a
42	*Anisotoma humeralis* (F.)		Liodidae	*Ips sexdentatus*	5c
43	*Agathidium nigripenne* (F.)			*Hylurgops palliatus* *Ips sexdentatus*	3c,5a
44	*Agathidium seminulum* (L.)			*Hylurgops palliatus* *Pityogenes bidentatus* *Ips sexdentatus* *Ips typographus*	1b,2d,3a, 5a,5c
45	*Rhinosimus ruficollis* (L.)		Pythidae	*Ips sexdentatus*	3c
46	*Platichna scutellaris* (Charp.)		Erotylidae	*Hylurgops palliatus*	3a
47	*Megalelophorus aquaticus* (L.)		Hydraenidae	*Pityogenes bidentatus*	5a
48	*Goerius olens* (Müll.)		Staphylinidae	*Ips sexdentatus*	1e,2b,3a, 5a
49	*Staphylinus caesareus* (Ced.)			*Ips sexdentatus*	5a
50	*Megarthrus depressus* (Payk.)			*Hylurgops palliatus*	5a
51	Omalium rivulare (Payk.)			*Hylurgops palliatus* *Pityophthorus pityographus*	1d,2d,3a
52	*Omalium exiguum* (Gyll.)			*Hylurgops palliatus*	5a
53	*Stenus scrutator* (Er.)			*Orthotomicus erosus*	1e
54	*Paedoris litoralis* (Grav.)			*Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1b,1e,5a
55	*Stilicus mixtus* (Lohse)			*Ips sexdentatus*	5a
56	*Scopaeus bicolor* (Baudi)			*Hylurgops palliatus*	5a

57	*Achenium depressum* (Grav.)			*Ips sexdentatus*	5a
58	*Metoponcus brevicornis* (Er.)			*Pityokteines spinidens* *Ips sexdentatus*	1b,1c,5a
59	*Nudobius umbratus* (Motsch.)			*Pityophthorus pityogrophus* *Pityogenes bidentatus* *Pityokteines spinidens* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1b,1c, 1e,2b,2d, 3a,3c,4c, 5a
60	*Nudobius* sp.			*Ips typographus*	1e
61	*Playtdracus chalcocephalus* (F.)			*Ips sexdentatus*	5a
62	*Microsaurus lateralis* (Grav.)			*Dendroctonus micans* *Pityogenes bidentatus* *Ips sexdentatus* *Ips typographus*	1a,1b,1e, 5a,5c
63	*Microsaurus vexans* (Epph.)			*Ips sexdentatus* *Ips typographus*	1e,3c
64	*Microsaurus* sp.			*Hylurgops palliatus* *Ips typographus*	1e
65	*Quedius curtipennis* (Bernh.)			*Ips sexdentatus*	3a
66	*Raphirus* sp.			*Ips sexdentatus*	3a
67	*Bryocharis cingulata* (Mannh.)			*Hylurgops palliatus*	5a
68	*Conosoma littoreum* (L.)			*Ips typographus*	1e
69	*Conosoma immaculatum* (Steph.)			*Ips sexdentatus*	3a
70	*Drymoporus elongatus* (Gyll.)			*Hylurgops palliatus*	1a
71	*Tachinus laticollis* (Grav.)			*Hylurgops palliatus*	2d,5a
72	*Placusa complanata* (Er.)			*Hylurgops palliatus* *Dendroctonus micans* *Crypturgus pusillus* *Pityogenes bidentatus* *Pityokteines spinidens* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1c,1e, 2d,3a,5a
73	*Baptolinus affinis* (Payk.)			*Hylurgops palliatus* *Dendroctonus micans* *Pityophthorus pityogrophus* *Crypturgus pusillus* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1b,1e,1f, 2d, 3a,5a
74	*Homalota plana* (Gyll.)			*Pityophthorus pityogrophus*	1c
75	*Bolitochora lucida* (Grav.)			*Hylurgops palliatus*	1f
76	*Formica rufa* (L.)	Hymenoptera	Formicidae	*Dendroctonus micans* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	1a,1c,1e, 3a
77	*Myrmica ruginodis* (Nyl.)				1b
78	*Raphidia ophiopsis* (L.)	Raphidioptera	Raphidiidae	*Hylurgops palliatus* *Dendroctonus micans* *Crypturgus pusillus*	1a,1e,1f, 5a

				Cryphalus piceae *Pityophthorus pityographus* *Pityogenes bidentatus* *Orthotomicus erosus* *Ips sexdentatus* *Ips typographus* *Tetropium castaneum*	
79	*Lyctocoris campestris* (Fall.)	Heteroptera	Anthocoridae	*Cryphalus abietis* *Pityophthorus pityographus* *Pityogenes bidentatus* *Pityokteines spinidens*	1f
80	*Scoloposcelis angusta* (Reitt.)			*Cryphalus abietis* *Pityophthorus pityographus*	1b
81	*Exochomus illaesicollis* (Roubal)	Coleoptera	Coccinellidae	*Dendroctonus micans*	1c

Table 4. List of detected parasit species
(Tablo 4. Tespit edilen parazit türlerinin listesi)

Ordo		Family	Species	Host insect	Locality
1	Hymenoptera	Pteromalidae	*Pteromalus lanceolatus* (Ratz.)	*Ips sexdentatus*	5a
2			*Rhopalicus suspencus* (Ratz.)	*Orthotomicus erosus* *Ips sexdentatus* *Ips typographus*	5a
3			*Rhopalicus tutela* (Walker)	*Dendroctonus micans* *Pissodes notatus* *Pityokteines curvidens*	1e
4			*Entedon pineterum* (Ratz.)	*Ips sexdentatus*	5a
5			*Roptrocerus brevicornis* (Thorns.)	*Crypturgus pusillus* *Pityophthorus pityographus* *Pityogenes bidentatus* *Orthotomicus erosus*	1f
6			*Roptrocerus* sp.	*Hylurgops palliates* *Crypturgus pusillus* *Cryphalus piceae* *Pityophthorus pityographus* *Pityokteines spinidens* *Ips typographus*	1f
7			*Dinotiscus eupterus* (Walk.)	*Cryphalus abietis* *Cryphalus piceae* *Pityophthorus pityographus*	1f
8			*Macromesus ampfiretus* (Walk.)	*Cryphalus abietis*	1f
9			*Macromesus* sp.	*Cryphalus abietis* *Pityogenes bidentatus*	1c
10		Torymidae	*Monodontomerus opsoletus* (Fabr.)	*Pityogenes bidentatus*	1a
11		Pteromalidae	*Dibrachys boarmiae* (Walk.)	*Hylastes ater*	1c
12		Cleonymidae	*Cheiropachys colon* (L.)	*Ips sexdentatus*	1a, 5a
13		Ichneumonidae	*Endasys* sp.	*Pityophthorus pityographus*	1f
14			*Megastylus* sp.	*Pityogenes bidentatus*	1f
15		Bethylidae	*Scleroderma* sp.	*Dendroctonus micans*	1b
16		Braconidae	*Coeloides bostrichorum* (Gir.)	*Pityokteines curvidens*	1a,1e
17			*Coeloides abdominalis* (Zett.)	*Ips sexdentatus*	1e,5a
18			*Dendroster middendorffii* (Ratz.)	*Ips sexdentatus*	1e,1f,2d, 5a
19			*Dendroster middendorffii* (Ratz.var Schmitscheki F.)	*Ips sexdentatus*	5a
20			*Dendroster protuberans* (Nees.)	*Dryocoestes minör* *Ips sexdentatus*	5a
21			*Calyptrus atricornis* (Ratz.)	*Ips sexdentatus*	1c
22			*Meteorus* sp.	*Cryphalus piceae* *Ips typographus*	1c
23			*Meteorus varinervis* (Tobias)	*Cryphalus piceae* *Pityophthorus pityographus*	1c

Only 12 species among the species detected in the Eastern Black Sea Region of natural overspread zone of the Oriental spruce; ***Hylurgops glabratus, H. palliatus, Hylastes cunicularius, Dendroctonus micans, Crypturgus pusillus, Pityophthorus pityographus, Pityogenes chacographus, Pityogenes bidentatus, Ips sexdentatus, Ips typographus, Pityokteines spinidens*** and ***Orthotomicus erosus*** prefer primarily the Oriental spruce. Also, these species can appear on the other conifer species.

While the species such as ***Cryphalus piceae*** (Ratz.) and ***Pityokteines spinidens*** (Reitt.) develop generally onto the upper parts of the trees, and also into the thinner parts of the boughs and stems, and also onto ruins of thinner boughs and lines of the trees, in the case of their epidemical condition they can settle onto thicker parts of the stems. For ***Hylastes ater*** (Payk.), they can also develop onto the parts that the roots grew through the surface of the ground and onto the wood stocks adjacent to the root neck and they do not spread over the other parts of the stem. ***Ips sexdentatus*** (Boern.), generally prefers to develop onto the old trees more, and while they cause various damages over the crusty/barked parts of these trees, ***Ips acuminatus*** (Gyll.) which is one an other species of bark beetles prefers to develop onto the thinner crusty materials, and they cause various damages over the younger trees and also over specially thinner boughs of old trees. ***Ips typographus*** (L.) seems to prefer to develop onto the thinner crusty trees. The bark beetle species do not also cause any damage to the spruces that are physiologically deficient. The first coming species cause more damages onto the tree and just practically taking the role for preparing for the subsequently coming species. For ***Hylastes ater*** (Payk) and ***H. cunicularis*** Erich., it is sufficient that thicker ancillary roots of the spruces which have appeared onto the surface of the ground are caused to damage by means of storms, winds or other reasons, that is, it is not mostly necessary for an other insect are coming there [6].

Cryphalus abietis (Ratz.) and especially ***C. piceae*** (Ratz.) does not cause to die by itself [7]. However, they weaken the trees by means of the destructions that they cause, and therefore, create very convenient occasion for reproduction of the other bark beetles. Some of the insects such as ***Crypturgus*** species occupy the reproduction zone of some of the harmful bark beetles such as ***I. sexdentatus***, and then prevent their development, and finally cause their death. Hence, there are harmful effects of ***Crypturgus*** species in terms of forestry on one side, but on the other side the benefits of it are also present. ***Pityogenes bidentatus*** (Hrbst.), provided that the climate conditions are suitable, can grow in large numbers in terms of population in a short time, and they cause serious harms in the younger spruces which are in the stage of culture and trellis. Because of their shapes which can turn into black color within the wood later on ***X. lineatus***, is considered to be important in terms of forestry, because it reduces the technical and sale value of the wood. Toper Kaygın [8]conducted a study on ***Abies bornmülleriana*** Mattf. in Western Blacksea Region and found that ***Thanasimus formicarius***(L.) was feed on ***Xyloterus lineatus*** (Oliv.), ***Pityokteines curvidens(***Germ.***)*** and ***Cryphalus piceae*** (Ratz.). ***Raphidia ophiopsis*** L. was also found under the bark of fir trees in the same study site[8].

As a result, the predatory species of bark beetles that are the most effective and also dense in terms of the population can be arranged as the followings with regard to importance order: ***Thanasimus formicarius,Rhizophagus depressus*** (F.), ***R. grandis*** (Gyll.), ***R. dispar*** (Payk.), ***Silvanus bidentatus*** (Fabr.), ***Paraphloeus longulus***

Gyll., *Raphidia ophiopsis* L., *Formica rufa* L., *Nemosoma elongatum* (L.) ve *Paraphloeus linearis* Fabr. In practice, these bark beetles should be accentuated in terms of controlling the population of their natural parasites.

5. CONCLUSIONS (SONUÇLAR)

As a result, it was detected 23 species of bark beetles related to the member of Scolytidae family bound to 6 tribus and also 2 sub family; and also detected 86 predatory species from 23 families related to the member of 5 groups, 23 parasite species from 5 families related to the member of 1 groups that can have harmful effects in the Eastern Forestry lands in the Eastern Black Sea region.

Being detected the predatory and parasite species is important in terms of its usage in the biological contestation against the bark beetles. The most important consideration in the biological contestation is being known the most effective predatory and parasite species of the harmful beetles. In a probable biological fight thought to be implemented against the bark beetles, it will be useful to consider the predatory and parasite species determined by means of this study. In order to be able to obtain successful results from the biological contestation programs, it is required that the appropriate predatory and parasite species against the harmful species should be chosen and then they should be applied. Otherwise, the errors that can occur related with this issue can cause failure, therefore, will cause the loss of effort, labor, time and also money.

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