Faunistics of Coleoptera in subarctic pine forests in Finnish Lapland

Anna-Liisa Sippola, Juha Siitonen & Reino Kallio

Sippola, A.-L., Siitonen, J. & Kallio, R. 1995: Faunistics of Coleoptera in subarctic pine forests in Finnish Lapland. — Entomol. Fennica 6:201–210.

The beetle fauna of pine forests was surveyed by window flight trapping in four separate study areas in Pallas-Ounastunturi National Park in Enontekiö Lapland (*Le*) and Hammastunturi wilderness area in Inari Lapland (*Li*). The total catch of individuals was 4905, consisting of 195 species. The proportion of species new to the province was 48% in *Le* and 25% in *Li*, respectively. Eleven rare species (known at most from 25 localities in Finland) were found. Rarefaction, diversity analyses and similarity indices showed that species richness, relative abundances of species and species composition did not differ significantly between the study areas.

Anna-Liisa Sippola, & Reino Kallio, Arctic Centre, University of Lapland, P.O. Box 122, FIN-96101 Rovaniemi, Finland
Juha Siitonen, Finnish Forest Research Institute, P. O. Box 18, FIN-01301 Vantaa, Finland

Received 22 March 1994, accepted 25 April 1995

1. Introduction

Almost 15 000 km^2 of pristine areas were protected by the Wilderness Act in Finnish Lapland in 1991 (Suomen säädöskokoelma 62/1991). Over 80% of the area is comprised of barren oroarctic heaths, mires and mountain birch forests. Coniferous forests cover 12% of the total area; most of them (80%) are pine (*Pinus sylvestris*) dominated. Spruce (*Picea abies*) dominated forests are found in southern parts of the wilderness areas, comprising 16% of the forest covered area. Birch (*Betula pubescens*) is present almost everywhere, but it seldom reaches the dimensions that are required for commercial use. The forests are mostly over 200 years old, and they have been largely intact except some small-scale local use. Most of the area, e.g. all the spruce-dominated forests, was set aside from forestry, but in a part of the pine forests (on about 200 km^2) so called natural forest management is allowed (Erämaakomitean mietintö 1988).

Very little is known about the coleopteran fauna in the Finnish wilderness areas. No quantitative data and only a few species lists are available. Some relevant faunistic data can be found in Saalas (1917, 1923), Wegelius (1960) and Biström and Helve (1977). Records from Lapland are included in the lists on the distribution of species of some families: on bark beetles (Scolytidae) by Lekander et al. (1977), longhorn beetles (Cerambycidae) by Silfverberg and Biström (1981) and Chrysomelidae by Silfverberg (1987).

The aim of this study is (1) to provide basic faunistic data on coleopteran species in old,

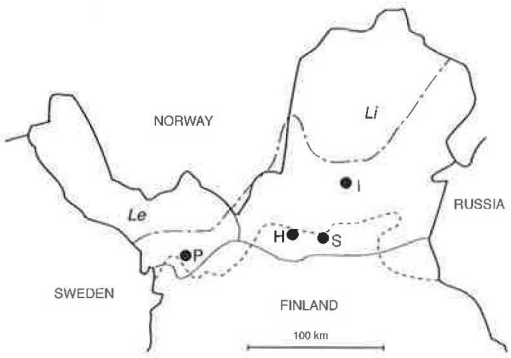

Fig. 1. Location of study areas (P = Pallastunturi, H = Härkäselkä, S = Sotajoki, I = Inari) and the boundaries of the biogeographical provinces (*Le* = Enontekiö Lapland, *Li* = Inari Lapland. Intermittent line = northern limit of pine forest, regularly broken line = northern limit of spruce forest.

subarctic pine forests, and (2) to explore diversity and variation of beetle assemblages between different areas in these forests.

2. Material and methods

2.1. Study areas and sample plots

We studied beetle fauna in four separate areas in Enontekiö Lapland (*Le*) and Inari Lapland (*Li*). Our study areas were located in *Le*: Pallas, uniform grid 757:37; *Li*: Härkäselkä, 759:46, 760:46; *Li*: Sotajoki, 758:47, 759:50; and in *Li*: Inari, 764:49, 764:50 (Fig. 1). All the areas are situated near the northern limit of the spruce forests or north of it, Pallas within the Pallas-Ounastunturi National Park, Härkäselkä and Sotajoki within the Hammastunturi wilderness area, and Inari just outside of it (Fig. 1). Phytogeographically the area belongs to the northern boreal zone (Ahti, Hämet-Ahti and Jalas 1968).

Three sample plots of one hectar were established in each study area, making a total of twelve plots (Table 1). Total volume of living trees and the proportion of each tree species were measured on five relascope sample plots situated within the one hectare plot. Nine of the sample plots represented the most common forest type of the wilderness areas, which is pine-dominated dry forest, characterized by *Vaccinium myrtillus* and *Empetrum nigrum* in the ground layer (*EMT*, Kalela 1961). The second common site type is somewhat dryer with a larger proportion of *Cladonia*-species and *Calluna vulgaris* in the undervegetation (*MCCIT*). Three sample plots represented this site type (Pallas 1 and 2 and Inari 1). Birches were found as admixed trees in most areas, and in Härkäselkä spruces occurred in two sample plots. We tried to find sites with small, medium and large standing tree volume within each area (see Table 1).

2.2. Sampling methods and period

Window flight trapping was used as the sampling method. Six traps, which were set pairwise (one pair being a sampling unit), were used in each sample plot, one pair in the

Table 1. Site characters and number of window trap pairs in the sample plots. P1–P3 = Pallas, H–H3 = Härkäselkä, I1–I3 = Inari and S1–S3 = Sotajoki. Forest site types: EMT = *Empetrum nigrum–Vaccinium myrtillus* type, MCCIT = *Vaccinium myrtillus-Calluna vulgaris–Cladina* type.

Sample plot	Height from the sea level (m)	Forest site type	Total volume of timber (m^3)	Tree species composition (% of volume)			Number of trap pairs
				Pine	Birch	Spruce	
P1	330	MCCIT	57.1	100	–	–	3
P2	310	MCCIT	95.9	100	–	–	1
P3	295	EMT	117.1	100	–	–	3
H1	300	EMT	58.0	93	7	–	3
H2	330	EMT	54.9	86	9	5	1
H3	330	EMT	47.9	37	26	37	3
I1	220	MCCIT	51.6	92	8	–	3
I2	200	EMT	65.0	98	2	–	1
I3	240	EMT	145.2	100	–	–	3
S1	310	EMT	42.4	94	6	–	1
S2	300	EMT	60.2	95	5	–	1
S3	220	EMT	66.9	94	6	–	1

middle of the plot and the other two in the opposite corners of the plot. Only one trap pair in the middle of the sample plot was used in Sotajoki and in the sample plots with medium volume of timber (see Table 1). The trap was composed of a transparent acrylic window of 50 × 50 cm, under which a 67 cm long and 11 cm deep plastic flower pot was attached. The pots were filled with water up to the over-flow holes. Coarse salt (NaCl) was used as the preserving agent, and some detergent was added to reduce the surface tension.

The trapping period was from the 5th of June until the 15th of September, 1992. The traps were emptied every third week.

2.3. Calculations and statistical treatments

Species richness was calculated as the mean number of species per trap pairs in each sample plot, to make different trapping efforts comparable. Fisher's α (Fisher, Corbet & Williams 1943) was used as the measure of alpha diversity, since this index is relatively little affected by sample size (Wolda 1983, Magurran 1988). Diversity was calculated as the mean diversity of the trap pairs in each sample plot. In addition, total species richness and diversity in each study area were calculated by pooling the catches of the three sample plots. Rarefaction (Simberloff 1978) was used to compare species richness between the study areas.

Renkonen's percentage index (Renkonen 1939) and Sørenses's index (Sørensen 1948) were used to describe similarities in species composition between the sample plots and the study areas. Renkonen's index values depend mostly on the relative abundances of abundant species, whereas Sørensen's binary index only takes into account the presence/absence of the species and, thus, is independent of relative abundances (Wolda 1981).

Differences in species richness and diversity between the study areas were tested by Kruskal-Wallis non-parametric test. A window trap pair was used as a sampling unit, and the diversities of all the trap pairs within each area were compared to the respective values in other areas.

3. Results

3.1. Species found

A total of 4905 individuals of 195 species were caught (Table 2, Appendix 1). The ten most abundant species comprised over 70% of the individuals in the pooled sample. These species form ecologically a mixed lot. Most of the abundant species were generalist predators belonging to the families Staphylinidae (*Anthophagus omalinus* 1005 individuals, *Dimetrota aeneipennis* 318 ex., *Atheta procera* 158 ex., *Deliphrum tectum* 127 ex.) and Cantharidae (*Malthodes guttifer* 684 ex., *Absidia schoenherri* 339 ex.). These species live as larvae on forest floor in litter or in decaying organic material. The larvae of other abundant species live on decaying birch (*Anaspis arctica* 230 ex.), on roots in forest soil (*Eanus costalis* 229 ex.) or in water pools (*Cyphon variabilis* 203 ex.). The larvae of *Epuraea aestiva* (241 ex.) live probably in nests of bumble bees. Most of the common species were found in all study areas. 92 species (47% of all the species found) were represented only by one or two specimens.

Species new to the province were recorded as compared Lindroth (1960) and the later published literature that concerns these areas (Lekander et al. 1977, Biström & Helve 1977, Silfverberg & Biström 1981, Silfverberg 1987). Of the 89 species caught in Pallas, 43 (48%) were new to the province *Le*, and of the 174 species caught in Härkäselkä, Inari and Sotajoki, 44 (25%) were new to the province *Li*.

Table 2. Numbers of individuals and species caught, species richness and alpha diversity in the sample plots and study areas. Species richness and alpha diversity in the sample plots are calculated as the means of the trap pairs in each plot.

Sample plot/ Study area	Number of individuals	Species richness	Alpha diversity
P1	403	32	14.4
P2	184	30	10.2
P3	381	26	9.8
P pooled	968	89	24.2
H1	748	34	10.5
H2	292	46	15.4
H3	1193	54	17.2
H pooled	2233	118	26.8
I1	460	29	11.6
I2	329	47	15.1
I3	440	38	16.6
I pooled	1229	109	28.9
S1	88	32	18.1
S2	216	53	22.4
S3	171	27	9.1
S pooled	475	78	26.5
All the areas	4905	195	41.1

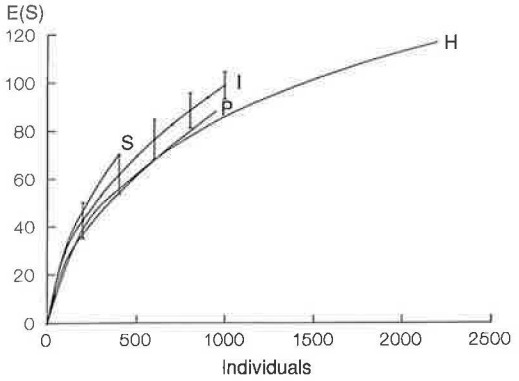

Fig. 2. Rarefaction curves of the pooled catches of the different study areas. 95% confidence limits indicated for Inari (I).

Eleven rare species (known at most from 25 localities in Finland, see Rassi 1993) were found: *Hydnobius septentrionalis*, *Eudectus giraudi*, *Mycetoporus inaris*, *Tachinus atripes*, *Denticollis borealis*, *Ernobius longicornis*, *Stagetus borealis*,, *Nephus bisignatus*, *Corticaria orbicollis*, *Orthocis linearis* and *Pityogenes saalasi*.

Four species living on spruce (*Xylechinus pilosus*, *Polygraphus punctifrons*, *Pityogenes saalasi* and *Dryocoetes autographus*) were found exclusively in Härkäselkä, where spruce occurred (see Table 1). Several species living on decayed birch were found exclusively or most abundantly in Härkäselkä (e.g. *Denticollis linearis*, *D. borealis*, *Triplax russica*, *Cis comptus* and *Rabocerus foveolatus*). Some species living on birch were, however, found also in pure pine stands.

3.2. Species richness, diversity and variation between the areas

The number of species caught varied in the study areas from 89 in Pallas to 118 in Härkäselkä (the total amount of species caught in Sotajoki can not be directly compared with the other areas because of the smaller sampling effort). Species richnesses and alpha diversities did not differ significantly among the study areas (richness: $H = 6.6$, $df = 3$, $p > 0.05$. n.s., diversity: $H = 3.4$, $df = 3$, $p > 0.05$, n.s.). Consistently, rarefaction analysis did not reveal any significant differences in species richness (Fig. 2).

The percentage similarities in species composition between the study areas varied from 40% (Inari-Pallas) to 64% (Härkäselkä-Sotajoki) (Table 3). The similarities counted by the Sørensen binary index varied from 51% (Sotajoki-Pallas) to 57% (Härkäselkä-Inari) (Table 3).

Table 3. Similarities between the pooled catches of the study areas. Renkonen's percentage index values on the upper right face of the table and Sørensen's index values on the lower left face.

Area	P	H	I	S
P	1	0.49	0.41	0.45
H	0.53	1	0.51	0.64
I	0.55	0.57	1	0.50
S	0.51	0.55	0.54	1

4. Discussion

The high proportion of species new to the province, especially in *Le*, shows that the beetle fauna in the subarctic forests in Finland is still poorly known. The fact that almost half of the species in the pooled catch were represented only by one or two specimens indicates that many more species could be caught with a greater trapping effort.

According to Lindroth (1960), the number of beetle species recorded from *Le* is 438 and from *Li* 692. Since then, records on over 80 species new to these two provinces have been published. Unpublished records in *Li* exceed 200 species (J. Muona, personal communication). If we use the proportion of new species (i.e., species with no earlier published records) found in this study (48% in *Le* and 25% in *Li*) as an estimate of the number of unrecorded species in total, we can calculate that the rough estimate of the number of Coleoptera species in these provinces may be close to 700 in *Le* and 900 in *Li*. Some large data sets from more southern but phytogeographically comparable forest areas have been published in Sweden (Wiren 1945, 1947, Lundberg 1974, 1977). Lundberg reported a total of 1069 species found in the Messaure area, Lule Lappmark.

The small differences in the rarefaction curves and alpha diversities show that the species richness and abundance patterns within the same forest site type in subarctic pine forests are very similar. According to the species list and similarity indices, the species composition was rather similar in all the

study areas. Tree species composition explains the occurrence of some saproxylic species (spruce and birch bound species). All the rare species found in our study have northern distribution in Fennoscandia (Lindroth 1960, Lundberg 1986), and their rarity (low number of known occurrences) may reflect the fact that northern areas are still poorly studied.

References

Ahti, T., Hämet-Ahti, L. & Jalas, J. 1968: Vegetation zones and their sections in northwestern Europe. — Ann. Bot. Fennici 5:169–211.

Biström, O. & Helve, E. 1977: Koleopterologiska bidrag från Tana älvdal (Norra Finland). — Notulae Entomol. 57:83–84.

Erämaakomitean mietintö, 1989: - Komiteanmietintö [Committee Report] 1988:39. Helsinki. 238 pp. (in Finnish).

Fisher, R. A., Corbet, A. S. & Williams, C. B. 1943: The relation between the number of species and the number of individuals in a random sample of an animal population. — J. Anim. Ecol. 12:42–58.

Kalela, A. 1961: Waldvegetationszonen Finnlands und ihre klimatischen Paralleltypen. — Arch. Soc. Zool. Bot. Fennicae Vanamo 16 Suppl. pp. 65–83.

Lekander, B., Bejer-Petersen, B., Kangas, E. & Bakke, A. 1977: The distribution of bark beetles in the Nordic countries. — Acta Ent. Fenn. 32:1–37.

Lindroth, C. H. (ed.) 1960: Catalogus Coleopterorum Fennoscandiae at Daniae. — Entomologiska Sällskapet i Lund, 476 pp.

Lundberg, S. 1974: Skalbaggar funna i Messaureområdet, Lule Lappmark. 1 (Coleoptera). — Entomol. Tidsskr. 95:85–94.

— 1977: Skalbaggar funna i Messaureområdet, Lule Lappmark. 2 (Coleoptera). — Entomol. Tidsskr. 98:91–94.

— ed.) 1986: Catalogus Coleopterorum Sueciae. — Entomologiska Föreningen i Stockholm och Naturhistoriska Riksmuseet. Stockholm. 155 p.

Magurran, A. 1988: Ecological diversity and its measurement. — Princeton University Press, Princeton, New Jersey, 179 pp.

Rassi, P. (ed.) 1993: Frequency point enumeration of Finnish Coleoptera. — Maailman Luonnon Säätiö WWF Suomen Rahasto. Raportteja 6. WWH, Helsinki. 136 pp.

Renkonen, O. 1938: Statistich-ökologische untersuchungen über die terrestrische Käferwelt der Finnischen Bruchmoore. — Ann. Zool. Soc. Zool. Bot. Fenn. Vanamo 6:1–231.

Saalas, U. 1917: Die Fichtenkäfer Finnlands I. — Ann. Acad. Sci. Fenn. A8, 547 pp.

— 1923: Die Fichtenkäfer Finnlands II. — Ann. Acad. Sci. Fenn. A22, 746 pp.

Silfverberg, H. & Biström, O. 1981: Kartering av Finlands långhorningar (Coleoptera, Cerambycidae). — Notulae Entomol. 61:15–28.

Silfverberg, H. 1987: Mapping the Finnish Crysomelidae (Coleoptera). I. — Notulae Entomol. 67:5–16.

Simberloff, D. 1978: Use of rarefaction and related methods in Ecology. — In: Dickson, K. L., Cairns, J. Jr. and R. J. Livingston (eds.): Biological data in water Pollution Assessment: Quantitative and Statistical Analyses. ASTM STP 652, pp. 150-165.

Suomen säädöskokoelma 1991: N:o 62. Erämaalaki, pp. 129–131. Helsinki.

Sørensen, T. A. 1948: A method of establishing groups of equal amplitude in plant sociology based on similarity of species content, and its application to analyses of the vegetation on Danish commons. — K. Danske Vidensk. Selsk. Biol. Skr. 5:1–34.

Wegelius, A. 1960: Bidrag till kännedomen om skalbaggsfaunan inom Pallas-Ounastunturi nationalpark. — Notulae Entomol. 40:86–107.

Wiren, E, 1945: Bidrag till kännedomen om Coleopterafaunan i norra delen av det nordsvenska barrskogsområdet från insamlingar vid Pålkem. I. — Entomol. Tidskr. 66:24–43.

— 1947: Bidrag till kännedomen om Coleopterafaunan i norra delen av det nordsvenska barrskogsområdet från insamlingar vid Pålkem. II. — Entomol. Tidskr. 68:189–192.

Wolda, H. 1981: Similarity indices, sample size and diversity. — Oecologia 50:296–302.

— 1983: Diversity, diversity indices and tropical cockroaches. — Oecologia 58:290–298.

Appendix. Species caught by window flight trapping in the four study areas. Number of specimens caught in each area (P = Pallas, H = Härkäselkä, I = Inari and S = Sotajoki) are given. Species new to the provinces as compared to Lindroth (1960) and later published records are indicated (E = *Le*, I = *Li*).

Family/Species	P	H	I	S	Prov.
Carabidae					
Calathus melanocephalus (Linnaeus)	*1*	–	–	–	
Dromius agilis (Fabricius)	4	5	1	1	E
Hydrophilidae					
Helophorus flavipes (Fabricius)	–	1	–	–	I
Ptiliidae					
Acrotrichis silvatica Rosskothen	–	–	1	–	
Leiodidae					
Hydnobius septentrionalis Thomson	1	–	–	–	E
Leiodes punctulata (Gyllenhal)	–	2	1	–	I
L. inordinata (J.Sahlberg)	–	–	–	1	I
Anisotoma axillaris Gyllenhal	–	6	1	1	
A. castanea (Herbst)	–	3	3	2	
A. glabra (Kugelann)	2	5	2	1	E
Agathidium confusum Brisout de Barneville	–	2	–	–	I
A. arcticum Thomson	1	13	10	2	
Cholevidae					
Catops alpinus Gyllenhal	–	21	3	–	
C. coracinus Kellner	–	-	1		
C. tristis (Panzer)	–	1	–		
C. nigrita Erichson	–	1	–	–	I
Staphylinidae					
Philonthus puella Nordmann	–	1	–	–	I
Quedius mesomelinus (Marsham)	–	1	1	–	I
Q. plagiatus (Mannerheim)	–	2	1	1	
Atrecus pilicornis (Paykull)	–	6	1		
Stenus geniculatus Gravenhorst	–	–	1		
Eusphalerum sorbicola (Y. Kangas)	1	–	–	–	E
E. lapponicum (Mannerheim)	1	–	2		
Acrulia inflata (Gyllenhal)	1	4	5	1	
Hapalaraea linearis (Zetterstedt)	1	1	1	–	E, I
Omalium rivulare (Paykull)	–	3	4		
O. strigicolle Wankowicz		–	–	–	1
Phloeonomus lapponicus (Zetterstedt)	1	2	2	1	
Deliphrum tectum (Paykull)	3	48	76		
Olophrum boreale (Paykull)	–	1	–		
Acidota crenata (Fabricius)	4	4	1		
Anthophagus alpinus (Paykull)	11	1	1		
A. omalinus Zetterstedt	186	555	133	131	
Coryphium angusticolle Stephens	67	1	2	–	E
Eudectus giraudi Redtenbacher	–	1	–	1	
Scaphisoma agaricinum (Linnaeus)	–	–	1	–	
S. subalpinum Reitter	–	–	–	1	
Oxytelus laqueatus (Marsham)	–	2	–	1	I
Mycetoporus monticola Fowler	–	–	1	–	
M. lepidus (Gravenhorst)	1	–	3	3	E
M. inaris Luze	–	1	–	–	
Bryoporus punctipennis Thomson	1	–	–	–	E
B. rugipennis (Pandelle)	2	4	–	1	
Lordithon thoracicus (Fabricius)	–	–	1	–	

(Contnd.)

Appendix contnd.

Family/Species	P	H	I	S	Prov.
L. speciosus (Erichson)	1	5	–	1	I
Tachyporus obscurellus Zetterstedt	–	1	–	–	
Tachinus rufipes (Linnaeus)	–	1	–	–	I
T. pallipes (Gravenhorst)	–	6	1	–	
T. proximus Kraatz	–	–	16	–	
T. atripes J. Sahlberg	–	2	–	–	
T. elongatus Gyllenhal	1	11	6	3	
Aleochara moerens Gyllenhal	1	5	72	3	E
Oxypoda spectabilis Märkel	–	8	2	1	I
O. skalitzkyi Bernhauer	–	–	1	–	I
O. umbrata (Gyllenhal)	–	–	–	1	I
Acrostiba borealis Thomson	1	–	1	–	
Ischnoglossa elegantula (Mannerheim)	1	1	–	–	E, I
Haploglossa marginalis (Gravenhorst)	1	–	–	–	E
Phloeopora concolor (Kraatz)	1	–	–	–	E
Atheta arctica (Thomson)	1	1	–	–	
A. gyllenhalii (Thomson)	–	–	–	1	I
A. subtilis (Scriba)	–	1	3	–	
A. lateralis (Mannerheim)	–	–	1	–	
A. sparreschneideri Munster	2	–	1	–	E
A. cinnamoptera (Thomson)	–	–	3	1	
A. aeneipennis (Thomson)	13	78	216	10	
A. parapicipennis Brundin	1	2	–	1	E, I
A. lapponica J.Sahlberg	–	21	56	1	I
A. altaica Bernhauer	–	3	–	–	
A. laevicauda J.Sahlberg	1	–	1	–	I
A. graminicola (Gravenhorst)	1	–	–	–	
A. procera (Kraatz)	12	72	44	30	E
A. allocera Eppelsheim	1	1	–	1	
A. diversa (Sharp)	–	2	–	–	
A. pilicornis (Thomson)	1	1	–	1	E
A. nigricornis (Thomson)	3	–	1	1	E
A. picipes (Thomson)	8	–	–	–	E
Anopleta corvina (Thomson)	–	5	–	–	
Lyprocorrhe anceps (Erichson)	–	–	–	1	I
Amischa nigrofusca (Stephens)	–	–	–	1	I
Zyras humeralis (Gravenhorst)	1	–	–	–	E
Bolitochara pulchra (Gravenhorst)	–	–	1	–	I
Pselaphidae					
Euplectus punctatus Mulsant	–	–	1	–	I
Sphaeritidae					
Sphaerites glabratus (Fabricius)	–	–	1	–	
Scirtidae					
Cyphon variabilis (Thunberg)	14	186	3	–	
Scarabaeidae					
Aphodius tenellus Say	1	2	1	1	E
A. lapponum Gyllenhal	1	7	5	5	
A. piceus Gyllenhal	1	–	–		
Potosia cuprea (Fabricius)	2	2	–	–	E, I
Trichius fasciatus (Linnaeus)	1	2	–	–	E

(Contnd.)

Appendix contnd.

Family/Species	P	H	I	S	Prov.
Lycidae					
Dictyoptera aurora (Herbst)	1	–	1	1	E
Lygisopterus sanguineus (Linnaeus)	–	–	1	1	I
Cantharidae					
Rhagonycha limbata Thomson	–	1	–	–	
R. elongata (Fallén)	55	1	3	1	
R. atra (Linnaeus)	–	59	–	1	I
Absidia schoenherri (Dejean)	26	195	67	51	
Malthodes guttifer Kiesenwetter	353	175	129	27	
M. mysticus Kiesenwetter	–	–	–	3	
M. pumilus (Brébisson)	–	–	1	–	I
M. brevicollis (Paykull)	1	2	17	3	
Elateridae					
Athous subfuscus (Müller)	–	3	–	–	
Harminius undulatus (Degeer)	–	1	–	–	
Denticollis linearis (Linnaeus)	–	4	–	–	
D. borealis (Paykull)	–	3	–	–	
Liotrichus affinis (Paykull)	–	26	3	–	
Orithales serraticornis (Paykull)	1	–	–	–	E
Selatosomus impressus (Fabricius)	3	4	1	1	
Eanus costalis (Paykull)	32	116	45	36	E
Ampedus tristis (Linnaeus)	–	1	–	–	
A. nigrinus (Herbst)	–	9	14	4	
Sericus brunneus (Linnaeus)	10	3	1	7	
Anobiidae					
Ernobius longicornis (Sturm)	1	–	–	–	E
Stagetus borealis Israelson	1	–	–	–	E
Lymexylidae					
Hylecoetus dermestoides (Linnaeus)	3	13	1	6	
Melyridae					
Aplocnemus tarsalis (Sahlberg)	7	5	14	5	E,I
Dasytes obscurus Gyllenhal	1	–	–	–	
Nitidulidae					
Epuraea angustula Sturm	1	3	2	–	E
E. oblonga (Herbst)	–	1	–	–	
E. boreella (Zetterstedt)	4	11	30	1	
E. marseuli Reitter	–	–	1		
E. terminalis (Mannerheim)	–	–	1	1	I
E. silacea (Herbst)	1	7	3	10	E
E. aestiva (Linnaeus)		14	213	9	5
E. rufomarginata (Stephens)	–	–	2	–	I
Thalycra fervida (Olivier)	1	–	–	–	E
Gliscrochilus quadripunctatus (Linnaeus)	–	1	2	–	
Rhizophagidae					
Rhizophagus dispar (Paykull)	–	2	2	–	
Cucujidae					
Pediacus fuscus Erichson	1	–	–	–	
Cryptophagidae					
Cryptophagus lapponicus Gyllenhal	14	18	14	2	E
C. instabilis Bruce	–	3	–	–	
C. dorsalis Sahlberg	4	–	–	–	E
Atomaria peltataeformis Sjöberg	1	–	–	–	
Atomaria affinis (F. Sahlberg)	–	1			

(Contnd.)

Appendix contnd.

Family/Species	P	H	I	S	Prov.
Atomaria pulchra Erichson	1	1	4	1	
Erotylidae					
Triplax aenea (Schaller)	–	–	–	1	
T. russica (Linnaeus)	–	4	3	1	
T. scutellaris Charpentier	1	–	3	–	
Cerylonidae					
Cerylon histeroides (Fabricius)	–	2	3	–	
C. ferrugineum Stephens	2	3	5	–	E
Coccinellidae					
Nephus bisignatus (Boheman)	–	4	–	1	I
Calvia quatuordecimguttata (Linnaeus)	–	2	1	–	
Latridiidae					
Latridius consimilis Mannerheim	2	20	1	1	I
Enicmus fungicola Thomson	–	12	4	3	
E. rugosus (Herbst)	–	–	1	1	
Corticaria lapponica (Zetterstedt)	–	2	1	–	
C. orbicollis Mannerheim	1	–	1	–	
C. abietorum Motschulsky	–	–	–	1	
C. rubripes Mannerheim	–	–	–	1	
C. ferruginea Marsham	2	–	1	–	E
Corticarina obfuscata Strand	–	1	–	–	
Cisidae					
Cis comptus Gyllenhal	–	2	–	–	
C. boleti (Scopoli)	–	–	1	2	
Orthocis alni (Gyllenhal)	–	2	–	–	
O. linearis (J.Sahlberg)	2	–	–	–	E
Oedemeridae					
Oedemera virescens (Linnaeus)	–	1	–	–	I
Salpingidae					
Rabocerus foveolatus (Ljungh)	–	6	–	1	I
Salpingus ruficollis (Linnaeus)	2	8	10	4	E,I
Stenotrachelidae					
Stenotrachelus aeneus (Paykull)	6	1	1	–	
Tenebrionidae					
Bolitophagus reticulatus (Linnaeus)	–	–	1	–	
Anaspidae					
Anaspis arctica Zetterstedt	23	90	77	40	
A. rufilabris (Gyllenhal)	1	–	11	1	E
Tetratomidae					
Tetratoma ancora Fabricius	1	–	–	–	E
Melandryidae					
Orchesia micans (Panzer)	–	1	–	–	
Abdera triguttata (Gyllenhal)	–	–	1	–	
Xylita laevigata (Hellenius)	–	2	2	1	
Cerambycidae					
Rhagium mordax (Degeer)	–	–	1	–	
R. inquisitor (Linnaeus)	–	–	2	–	
Oxymirus cursor (Linnaeus)	–	–	2	–	
Anoplodera reyi (Heyden)	1	–	–	5	
A. virens (Linnaeus)	–	1	–	–	I
Judolia sexmaculata (Linnaeus)	1	2	7	15	
Monochamus sutor (Linnaeus)	1	1	1	–	
Pogonocherus fasciculatus (Degeer)	–	–	–	1	

(Contnd.)

Appendix contnd.

Family/Species	P	H	I	S	Prov.
Chrysomelidae					
Cryptocephalus pini (Linnaeus)	–	–	1	–	I
Phratora polaris (Sparre Schneider)	–	1	–	1	
Nemonychidae					
Cimberis attelaboides (Fabricius)	8	–	–	1	E,I
Attelabidae					
Deporaus betulae (Linnaeus)	4	5	–	2	I
Curculionidae					
Polydrusus ruficornis (Bonsdorff)	–	32	–	–	
Anthonomus phyllocola (Herbst)	1	1	–	–	E
Rhynchaenus rusci (Herbst)	–	–	1	–	I
Magdalis phlegmatica (Herbst)	1	–	1	–	E,I
M. duplicata Germar	1	–	5	–	E,I
Hylobius abietis (Linnaeus)	–	–	1		
Pissodes validirostris (Sahlberg)	–	–	1	–	I
Scolytidae					
Hylurgops glabratus (Zetterstedt)	2	5	–	1	
Hylastes brunneus Erichson	–	1	2	2	
H. cunicularius Erichson	1	6	2	–	
Xylechinus pilosus (Ratzeburg)	–	1	–	–	
Tomicus piniperda (Linnaeus)	–	–	2	–	
Polygraphus punctifrons Thomson	–	2		–	
Pityogenes saalasi Eggers	–	1	–	–	
P. bidentatus (Herbst)	–	–	1	4	
Dryocoetes autographus (Ratzeburg)	–	4	–	–	
Trypodendron lineatum (Olivier)	1	–	-	–	
Pityophthorus lichtensteinii (Ratzeburg)	5	1	6	2	