

Caterpillars of the crown fauna in stands of substitute tree species

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Abstract

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We studied the crown fauna of caterpillars in the air-polluted area of the Krušné hory Mts, in tree stands consisting of substitute tree species *Betula pendula* Roth, *Sorbus aucuparia* L., *Alnus alnobetula* (Ehrh.), *Picea pungens* Englm., *Pinus sylvestris* L., *Larix decidua* Mill., *Acer campestre* L., *Pinus sylvestris* L., *Fagus sylvatica* L., *Quercus robur* L. and *Q. rubra* L. We used the method of shaking off the crown fauna of caterpillars. In the course of two years, larvae of 137 Lepidoptera species were registered, namely 123 species on broadleaved trees and 27 on conifers. Birch (63 species), alder (54) and mountain ash (38) showed the richest crown fauna. The proportion of caterpillars in the crown of beech (24), larch (18) and oak (25) was, however, poorer in species. *Paraswammerdamia albicapitella* (Scharf.) was found only on mountain ash, *Aleimma loeflingianum* (L.) on red oak and *Ypsolopha ustella* (Cl.) on sessile oak. The occurrence of caterpillars on *Picea pungens* is surprising because it represents a very unattractive species for phytophages and information is missing on its fauna from the area of the CR. Soerensen's index of faunistic similarity was highest between birch and alder (51.3%) and the same level of similarity was noted between birch and mountain ash (31.7%) and beech (32.2%) and oak (26%).

Keywords

Lepidoptera, caterpillars, birch, alder, mountain ash, larch, pine, Norway spruce, blue spruce, the Krušné hory Mts, air-polluted area

Introduction

Waste zones, 30 thousand ha in area, in the eastern part of the Krušné hory Mts and in the Děčín Upland subjected to strong air pollution resulted from clear cuts performed at the first 80s of the last century. The cuts were forced by the dieback of spruce stands after a frost shock (1978/1979). Recently, the clear-cut areas have been reforested (KULA, 2006). In the eastern Krušné hory Mts, there have been established extensive stands of alternative tree species with dominant *Picea pungens* Englm. (16%), *Larix decidua* Mill. (8.4%) and *Betula* sp. particularly *B. pendula* Roth (18.3 %) (KULA, 2006). The changed species spectrum is characteristic also for the area of Sněžník (the Děčín Upland) where, eg to the radius of 1,000 m around a light trap (KULA and

MACHOVÁ, 2006), occurred the following species: *Betula* sp. (43.6%), *L. decidua* (18.4%), *Picea abies* (L.) Karst. (0.3%), *Sorbus aucuparia* L. (6.5%), *P. pungens* (7.5%), *Fagus sylvatica* L. (7.5%), *Pinus mugo* Turra (1.1%), *Quercus robur* L. (0.8%), *Pinus sylvestris* L. (6%), *Alnus alnobetula* (Ehrh.) (2.3%) (forest management plan for the Forest District Sněžník in effect from 1/1/1995 to 31/12/2004, LHC (Forest Management Unit) Sněžník) (KULA, 2006).

Free-living and mining caterpillars are one of the most important components causing defoliation of birch in the eastern part of the Krušné hory Mts and the Děčín Upland (KULA et al. 1999; KULA, 2005, 2006). Since 1980, in some species, eg *Operophtera brumata* (L.), *O. fagata* (Scharf.), *Eriocrania* sp., there were recorded gradations associated with heavy

feeding or even complete defoliation (BADALÍK, 1988; KULA 1988, 2000; LEMME, 2001). In the crown fauna of birch in the air-polluted area of Sněžník, KULA (in print) mentions 145 species of moth caterpillars. The fauna of moths determined around light traps was characterized by KULA (1997a, 1997b, 1999), KULA et al. (2005a, 2005b, 2006, 2007), KULA and KRÁLÍČEK (1995) in the area of Sněžník. Data on the crown fauna concerning moth caterpillars of the other tree species mentioned above are not available for the area under study. Only LEMME (2001) used the gradation period (1991–1995) of moths (*O. fagata*, *O. brumata*) on mountain ash to study them in detail. Generally known data on the crown fauna of moths give PATOČKA and ČAPEK (1971).

Material and methods

The collection of material was carried out using the method of shaking off caterpillars onto a 2 × 2 m sheet at 14-day intervals throughout the growing season (1/4–15/10/2005 and 20/4–15/10/2006). A check sample consisted of caterpillars shaken off from 5 trees in the stand in each of the check terms. In the following 6 weeks, the same trees were avoided to shake off repeatedly. The material was preserved in 75% ethanol. Main tree species aged 5–10 years in the area of Sněžník (*B. pendula* 6 stands in 2005 + 6 stands in 2006, *F. sylvatica* 3 + 3, *A. alnobetula* 4 + 6, *Q. robur* 1 + 1, *Q. rubra* 1 + 1, *S. aucuparia* 6 + 5, *P. pungens* 2 + 2, *P. sylvestris* 2 + 2, *L. decidua* 3 + 3, *P. abies* 2 + 2, *Acer campestre* L. 1 + 1) were included into the study. We highly appreciate Assoc Prof Dr J. Patočka, Institute of Forest Ecology, Slovak Academy of Sciences, Zvolen for determination of the caterpillars.

Results and discussion

In the course of two years, 1,402 caterpillars of 137 species of moths were obtained. Particular species were found occurring at normal density. In broadleaved, the crown fauna of birch (63 species), alder (54) and mountain ash (38) was richest from the aspect of fauna. The proportion of caterpillars in the crown of beech (24), larch (18) and oak (25) was species-poorer. A very poor community of caterpillars was related to the remaining species (pine, maple, Norway spruce, blue spruce). In crowns of broadleaved and coniferous trees, 123 and 27 species were found, respectively, with 13 species being common to the both groups (Table 1).

Cabera pusaria (L.) (21.5%) was the most significant species, which attacked both birch and alder reaching the highest value (34.8%) in the last-mentioned

tree species. Caterpillars in crowns of birch trees feed from the beginning of June to the end of October, in the early spring aspect only sporadically. Decisive is late summer aspect when caterpillars create the dominant component of crown fauna, and their occurrence till the end of the growing season is not rare. In case of existence of two generations, the 1st generation (May–June) and the 2nd generation (July–September) occur in crowns (EBERT et al., 2003). Population dynamics in the crown fauna of birch indicated repeated two-year culmination. Considerable number of trapped adults, eg in 1992, 1995–1997, 2002–2003 (Fig. 1) coincides with culmination levels of the caterpillar population in birch crowns in 1987–1988, 1991–1992, 1995–1998, 2002 (Fig. 2). The month occurs in broadleaved forests, parks and gardens on poplar, willow, birch and alder, but also on hornbeam and bird cherry (LADENBURGER, 1989). In Scandinavia, it is mentioned particularly on birch (NORDSTRÖM et al., 1941). Although damage to forests by the species is not known, it is possible to consider this indifferent species as a pest in air-polluted areas with high proportion of stands of substitute tree species. In the fauna of moths of the area of Sněžník, it ranks among the most frequent species (KULA et al., 2005b) with respect to the number of individuals caught in light traps as well as position in the crown fauna of birch. *O. fagata* attacked at the same time and with the same intensity birch (13.2%) and beech (10.5%), and it also occurred on mountain ash and alder. The autumn species (October–November, max mid-October) occurs before *O. brumata* (BERGMANN, 1955). Females lay eggs either individually or in groups consisting from 200 to 300 eggs (VORBRODT, 1914).

Caterpillars hatched at the turn of April/May (Sněžník). In the birch stands under investigation, culmination started in the second half of May (18 to 28 May). The highest population density (1992, 1994, 2001, 2003) was accompanied with local heavy feeding (KULA et al., 2005b). Similarly as *O. brumata*, the species has outbreaks, which take 3–5 years (Fig. 2). It manifests itself by heavier damage to beech, but not by heavy defoliation as in case of pale tussock moth (BERGMANN, 1955). Gradations of *O. brumata* and *O. fagata* occurred on *S. aucuparia* in German Seiffen (the Krušné hory Mts, 1981–1983, 1992–1993) and in following years (1994–1997), an increase in the population represented from 18 to 55% (LEMME, 2001). In birch stands (1986–2004), *O. fagata* was an eudominant species demonstrating the cyclic type of gradations, while *O. brumata* occurred sporadically (1.02%). Thus, *O. fagata* attacking beech can rank among economically important forest pests in the regeneration of stands in the Krušné hory Mts.

In all broadleaved species under investigation, we confirmed occurrence of *Agriopsis aurantiaria* (Hbn.), which slightly preferred mountain ash (18.8%) (Table 1). Apterous females lay eggs (October–November)

Table 1. Species spectrum of caterpillars of the crown fauna of trees in an area affected by air pollution (Sněžník, 2005–2006)

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP	Conifers		Sum	
								N	%					N	%	N	%
<i>Acleris abietana</i>										2		1		3	4.11	3	0.21
<i>Acleris logiana</i>	1							1	0.08					1		1	0.07
<i>Acleris</i> sp.	8	1					1	10	0.75					10		10	0.71
<i>Acrobasis obtusella</i>			1					1	0.08					1		1	0.07
<i>Acrionicta leporina</i>	4	1						5	0.38					5		5	0.36
<i>Acrionicta psi</i>	1		1					3	0.23					3		3	0.21
<i>Acrionicta rumicis</i>			1					1	0.08					1		1	0.07
<i>Adela</i> sp.	1							1	0.08					1		1	0.07
<i>Aethalura punctulata</i>	13	16						29	2.18					29		29	2.07
<i>Agriopsis aurantiaria</i>	24	11	19	3	2	2	1	62	4.67	1			1	1	1.37	63	4.49
<i>Agriopsis leucophaearia</i>								1	0.08					1		1	0.07
<i>Agriopsis marginaria</i>	1							1	0.08					1		1	0.07
<i>Achlya flavicornis</i>	2							2	0.15					2		2	0.14
<i>Alcis maculata</i>			2					2	0.15					2		2	0.14
<i>Alcis repandata</i>	17	1	3					21	1.58					21		21	1.50
<i>Aleimma loeflingianum</i>						6		6	0.45					6		6	0.43
<i>Allopyges oxyacanthae</i>			3					3	0.23					3		3	0.21
<i>Alsophila aescularia</i>	1		4					5	0.38					5		5	0.36
<i>Altenia scriptella</i>							1	1	0.08					1		1	0.07
<i>Amphipyra pyramidea</i>	1							1	0.08					1		1	0.07
<i>Anacampsis blattariella</i>	1							1	0.08					1		1	0.07
<i>Apocheima pilosarium</i>	2	2		1		3		8	0.60					8		8	0.57
<i>Apotomis</i> sp.	3							3	0.23					3		3	0.21
<i>Archiearis parthenias</i>	2	1						3	0.23					3		3	0.21
<i>Archips crataeganus</i>			2					2	0.15					2		2	0.14
<i>Asthena albulata</i>							1	1	0.08					1		1	0.07
<i>Bacotia claustrrella</i>	2							2	0.15					2		2	0.14

Table 1. Continued

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP	Conifers		Sum	
								N	%					N	%	N	%
<i>Beta prasinana</i>				1				1	0.08							1	0.07
<i>Biston betularius</i>	21	3		2	1		1	28	2.11							28	2.00
<i>Brachionycha mibeculosa</i>		1						1	0.08							1	0.07
<i>Bucculatrix cidarella</i>		3						3	0.23							3	0.21
<i>Bupalus piniarius</i>										1	7			8	10.96	8	0.57
<i>Cabera pusaria</i>	170	116						286	21.52							286	20.40
<i>Calliteara pudibunda</i>	5	1		1				7	0.53							7	0.50
<i>Campaea margaritata</i>	14	2	2		2			20	1.50							20	1.43
<i>Coleophora serratella</i>	7							7	0.53							7	0.50
<i>Colocasia coryli</i>	1			1				2	0.15							2	0.14
<i>Colotois pennaria</i>	2	4			1			7	0.53	1				1	1.37	8	0.57
<i>Conistra vaccinii</i>							1	1	0.08							1	0.07
<i>Cosmia pyralina</i>		1						1	0.08							1	0.07
<i>Cosmia trapezina</i>						2		2	0.15							2	0.14
<i>Crambus</i> sp.	3							3	0.23							3	0.21
<i>Crocallis elinguaris</i>		2	1					3	0.23							3	0.21
<i>Cyclophora albipunctata</i>	40	17						57	4.29							57	4.07
<i>Cyclophora annularis</i>							1	1	0.08							1	0.07
<i>Cyclophora linearis</i>								1	0.08							1	0.07
<i>Cyclophora punctaria</i>	35	5						40	3.01							40	2.85
<i>Dahlica triquetrella</i>	1							1	0.08							1	0.07
<i>Deileptenia ribeata</i>	1							1	0.08	3				3	4.11	4	0.29
<i>Dendrolimus pini</i>	1							1	0.08			1		1	1.37	2	0.14
<i>Drepana falcataria</i>	6	3						9	0.68							9	0.64
<i>Drymonia ruficornis</i>						2		2	0.15							2	0.14
<i>Ectropis crepuscularis</i>		6	1					7	0.53	1				1	1.37	8	0.57
<i>Electrophaes corylata</i>	9	1						10	0.75							10	0.71

Table 1. Continued

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP		Conifers		Sum	
								N	%				N	%	N	%	N	%
<i>Ennomos alniarius</i>	2							2	0.15								2	0.14
<i>Ennomos autumnarius</i>			1					1	0.08								1	0.07
<i>Epinotia nanana</i>											1		1	1.37			1	0.07
<i>Epinotia sordidana</i>	2							2	0.15								2	0.14
<i>Epinotia</i> sp.	17	19						36	2.71								36	2.57
<i>Epirrita autumnata</i>	12	2	1					15	1.13	2			2	2.74			17	1.21
<i>Epirrita dilutata</i>			4		1			5	0.38								5	0.36
<i>Epirrita christyi</i>				1				1	0.08								1	0.07
<i>Epirrita</i> sp.		1						1	0.08								1	0.07
<i>Erannis aurantiaria</i>	14	3	1					18	1.35								18	1.28
<i>Erannis defoliaria</i>		1	1		1			3	0.23								3	0.21
<i>Eriocrania</i> sp.	30							30	2.26								30	2.14
<i>Eudemis profundana</i>						3		3	0.23								3	0.21
<i>Euchoeca nebulata</i>		19						19	1.43								19	1.36
<i>Eulia ministrana</i>	10	9			1			20	1.50								20	1.43
<i>Eupithecia indigata</i>					1			1	0.08								1	0.07
<i>Eupithecia irriquata</i>					1			1	0.08								1	0.07
<i>Eupithecia lariciata</i>										18			18	24.66			18	1.28
<i>Eupithecia satyrata</i>	1					1		2	0.15								2	0.14
<i>Eupithecia</i> sp.											2		2	2.74			2	0.14
<i>Eupsilia transversa</i>			1					1	0.08								1	0.07
<i>Fagivorina arenaria</i>				1				1	0.08								1	0.07
<i>Falcaria lacertinaria</i>	1							1	0.08								1	0.07
<i>Geometridae</i> g. sp.	5	2	1			2		10	0.75								10	0.71
<i>Hedya nubiferana</i>			1					1	0.08								1	0.07
<i>Hydrelia flammeolaria</i>		3						3	0.23								3	0.21
<i>Hydriomena furcata</i>	1			1				2	0.15								2	0.14

Table 1. Continued

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP		Conifers		Sum	
								N	%				N	%	N	%	N	%
<i>Hydriomena impluviata</i>		4						4	0.30								4	0.29
<i>Hypena</i> sp.				2				2	0.15								2	0.14
<i>Hypomecis punctinalis</i>	9	3	2	1				15	1.13								15	1.07
<i>Chiasmia alternaria</i>		1						1	0.08								1	0.07
<i>Chiasmia liturata</i>										1				1	1.37		1	0.07
<i>Chiasmia notata</i>	20							20	1.50		1				1.37	20	1.43	
<i>Chiasmia signaria</i>																		
<i>Chiasmia</i> sp.		2						2	0.15								2	0.14
<i>Chlorochysta siterata</i>		2						2	0.15								2	0.14
<i>Lasiocampa quercus</i>					1			2	0.15								2	0.14
<i>Lithophane furcifera</i>	1	9						9	0.68								9	0.64
<i>Lithophane ornithopus</i>		1						1	0.08								1	0.07
<i>Lycia hirtaria</i>	13	7	2					22	1.66								22	1.57
<i>Lymantria dispar</i>	1		2		1			4	0.30								4	0.29
<i>Lymantria monacha</i>	1			1				2	0.15	2				2	2.74		4	0.29
<i>Lymantriidae</i> g. sp.			1					1	0.08								1	0.07
<i>Metendothenia atropunctana</i>	2							2	0.15								2	0.14
<i>Mimas tiliae</i>		1						1	0.08								1	0.07
<i>Narycia</i> sp.	4							4	0.30								4	0.29
<i>Nematopogon</i> sp.	4							4	0.30								4	0.29
<i>Noctuidae</i> g. sp.	14	1		2		1	1	19	1.43	1		1			2	2.74	21	1.50
<i>Notodonta dromedarius</i>	12	3						15	1.13								15	1.07
<i>Nycteola revayana</i>						1		1	0.08								1	0.07
<i>Odontopera bidentata</i>										1					1	1.37	1	0.07
<i>Ochropacha duplaris</i>	3							3	0.23								3	0.21
<i>Olethreutes</i> sp.	1							1	0.08								1	0.07
<i>Operophtera brumata</i>	5		2	1		2		10	0.75								10	0.71

Table 1. Continued

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP	Conifers		Sum	
								N	%					N	%	N	%
<i>Operophtera fagata</i>	105	2	1	4				112	8.43							112	7.99
<i>Orgyia antiqua</i>	4	2					1	7	0.53	1		1	1	2	2.74	9	0.64
<i>Ortholepis betulae</i>	1							1	0.08							1	0.07
<i>Orthosia cerasi</i>	1		2	2	1			6	0.45							6	0.43
<i>Orthosia cruda</i>			1					1	0.08							1	0.07
<i>Orthosia gothica</i>		2	5	1				8	0.60	4	1	1		6	8.22	14	1.00
<i>Orthosia incerta</i>	1							1	0.08							1	0.07
<i>Orthosia opima</i>			1					1	0.08							1	0.07
<i>Orthotaenia undulana</i>	48		1					49	3.69						49	3.50	
<i>Pandemis cerasana</i>			1	3				4	0.30						4	0.29	
<i>Pandemis corylana</i>	1		1					2	0.15						2	0.14	
<i>Pandemis heparana</i>	3	2						5	0.38						5	0.36	
<i>Panolis flammea</i>														3	4.11	3	0.21
<i>Paraswammerdamia albicapitella</i>	16					16	1.20							16	1.14		
<i>Paractropis similaria</i>	4	1	1					6	0.45						6	0.43	
<i>Peribatodes rhomboidarius</i>	13		4	1				18	1.35	1			1	1.37	19	1.36	
<i>Peribatodes secundarius</i>										2		1	1	4	5.48	4	0.29
<i>Phalera bucephala</i>	6	5				1		12	0.90						12	0.86	
<i>Pheosia gnoma</i>	1							1	0.08						1	0.07	
<i>Phragmatobia fuliginosa</i>			1					1	0.08						1	0.07	
<i>Phylloporia bistrigella</i>	1							1	0.08						1	0.07	
<i>Plemyria rubiginata</i>		1						1	0.08						1	0.07	
<i>Pseudoips fagana</i>	1			2				3	0.23						3	0.21	
<i>Pseudoips prasinanus</i>	15		1	1		1		17	1.28						17	1.21	
<i>Pterostoma palpinum</i>		1						1	0.08						1	0.07	
<i>Ptilodon capucina</i>	1							1	0.08						1	0.07	
<i>Psycholamoides aeriferanus</i>										1				1	1.37	1	0.07

Table 1. Continued

Species	B	A	SA	FS	QRu	QRo	AC	Broadleaves		LD	PS	PA	PP	Conifers		Sum	
								N	%					N	%	N	%
<i>Pungeleria capreolaria</i>												1	1	1	1.37	1	0.07
<i>Pyralidae</i> g. sp.	3							3	0.23							3	0.21
<i>Scopula incanata</i>		2						2	0.15							2	0.14
<i>Selenia dentaria</i>		1	1					2	0.15							2	0.14
<i>Selenia lumularia</i>		1						1	0.08							1	0.07
<i>Selenia tetralunaria</i>		1						1	0.08	1				1	1.37	2	0.14
<i>Spilonota laricana</i>										2				2	2.74	2	0.14
<i>Spilonota ocellana</i>		4		1				5	0.38	1				1	1.37	6	0.43
<i>Spilosoma lubricipeda</i>			1					1	0.08							1	0.07
<i>Syndemis musculana</i>		1		1		1		3	0.23							3	0.21
<i>Teleiodes alburnellus</i>	1							1	0.08							1	0.07
<i>Teleiodes proximellus</i>	4	7						11	0.83							11	0.78
<i>Teiheella fluctuosa</i>	1							1	0.08							1	0.07
<i>Thera obeliscata</i>											1			1	1.37	1	0.07
<i>Thera variata</i>												1	1	2	2.74	2	0.14
<i>Tortricidae</i> g. sp.	3	2						5	0.38							5	0.36
<i>Tortrix viridana</i>						1		1	0.08							1	0.07
<i>Xanthia aurago</i>				1				1	0.08							1	0.07
<i>Yponomeutidae</i> g. sp.		1						1	0.08							1	0.07
<i>Ypsolopha asperella</i>			4					4	0.30							4	0.29
<i>Ypsolopha</i> sp.	1							1	0.08							1	0.07
<i>Ypsolopha ustella</i>						6		6	0.45							6	0.43
Sum	798	333	101	38	25	25	9	1,329	100	46	15	6	6	73	100	1,402	100
Number of species	63	54	38	24	16	11	7	126		18	6	6	5	27		137	

B – *Betula* sp.; A – *Alnus* sp.; SA – *Sorbus aucuparia*; FS – *Fagus sylvatica*; QRu – *Quercus rubra*; QRo – *Quercus robur*; AC – *Acer campestre*; LD – *Larix decidua*; PS – *Pinus sylvestris*; PA – *Picea alba*; PP – *Picea pungens*; N – number of larvae

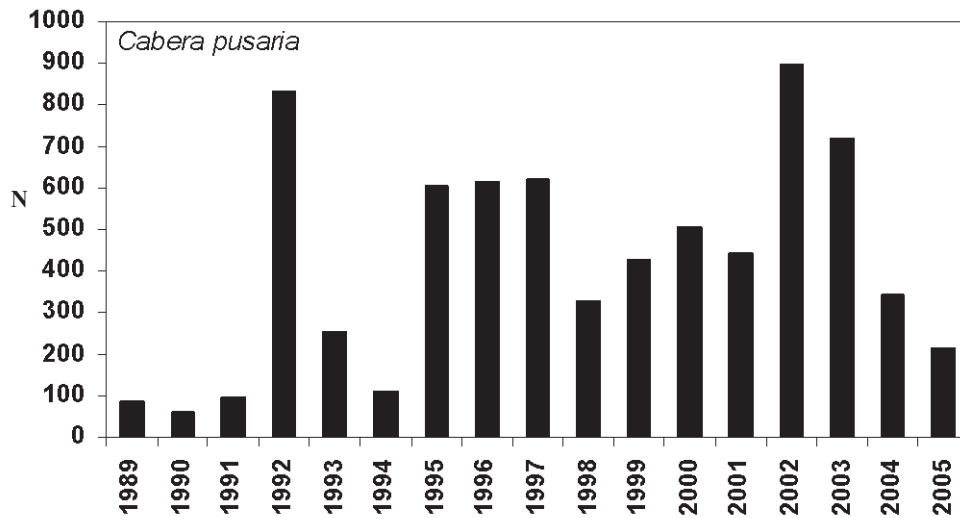


Fig. 1. Trapping *Cabera pusaria* (L.) in a light trap (Sněžník, 1989–2004)

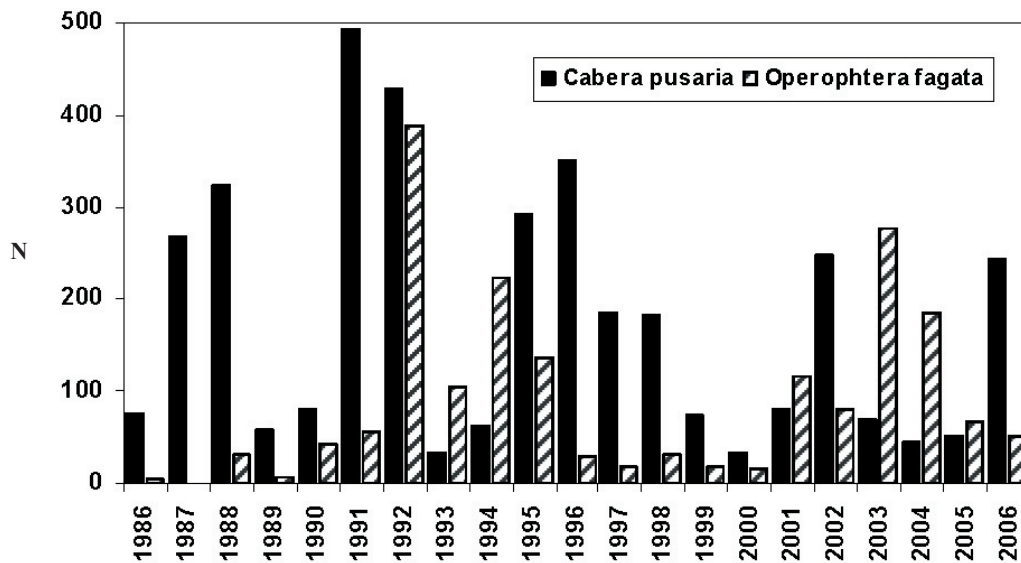


Fig. 2. Population dynamics of caterpillars of *Cabera pusaria* (L.), *Operophtera fagata* (Scharf.) in the crown fauna of birch (Sněžník, 1986–2006)

on the wide spectrum of broadleaved woody plants (21 species) (beech, oak, birch, alder etc., in mountains also larch). In mountain forests, gradations of the species can occur (EBERT et al., 2003). Caterpillars, which are relatively less numerous in the crown fauna of birch do not show special changes in population dynamics.

Biston betularius (L.) (Table 1), ranked among species from the broad spectrum of nutrient tree species. This polyphage characterized by industrial melanism is abundantly represented in air-polluted areas with stands of alternative species (KULA and KRÁLÍČEK, 1995). In spite of the high fecundity of females

(600–2,200) the occurrence of larvae in crowns of young birch trees was not observed adequate. It can be caused not only by preference for mature trees, which was demonstrated by more imagoes caught in a trap hanged in the tree crown (22 m) at 1.5 m above the ground (KÖPPEL, 1997), but also by possible preference for the species. Outbreaks occurring in birch and aspen stands associated with complete defoliation are known, eg from western Siberia (GNINENKO, 1974, 2002) and China on *Betula platyphylla* (Suk.) (SUN-FAN et al., 2000). In the air-polluted area of Sněžník, *Biston betularius* has been keeping its normal density since long.

The Soerensen's index of similarity was highest between birch and alder (51.3%) and the same value of similarity was found between birch and mountain ash (31.7%) and beech (32.2%) and oak (26%). A similar position showed the fauna of caterpillars on alder and mountain ash (30.4%), alder and beech (28.9%). Another decline in similarity becomes evident between the fauna of caterpillars on mountain ash and beech (25.8%).

The species *Paraswammerdamia albicapitella* (Scharf.) (5.84%) occurred only on mountain ash, *Aleimma loeflingianum* (L.) (24%) on red oak and *Ypsolopha ustella* (Cl.) (24%) on sessile oak (Table 1). On conifers, we noted only 27 species of caterpillars (73). Larch with 18 species markedly dominated while max 6 species occurred on other conifers and most of them represented individually trapped caterpillars. As for the species commonly occurring on both conifers and broadleaves (13), 9 species were confirmed on larch (Table 1).

Caterpillars of *Eupithecia lariciata* (Freyer) showed decisive position on larch. On the basis of the total trapping of imagoes by a light trap we suppose the higher proportion of caterpillars to be probably in crowns of older larch trees.

In pine, we confirmed only the occurrence of two "disaster" pests, namely *Bupalus piniarius* L. and *Panolis flammea* (Den. & Schiff.), which were rather rare in the studied area as indicated by the low number of insects caught in light traps in 1990–2004, while *B. piniarius* stagnated and *P. flammea* slightly increased their proportions. The occurrence of caterpillars on blue spruce – a highly unattractive species for phytophagous insects is surprising. Information from the CR concerning the problems is missing. *Peribatodes secundarius* (Den. & Schiff.) occurred rarely in 1999–2004 (2–4) with exception of 2003 (75). *Thera variata* (Den. & Schiff.) occurred in a light trap after 2000 and culminated in 2003. Generally, however, it ranks among less numerous members. *Pungeleria capreolaria* (Den. & Schiff.), which is mentioned from Saxony, was not caught in a light trap on Sněžník. Thus, the occurrence of caterpillars on blue spruce is a new find in this area. Using the method of shaking off and pho-

toelectors, KULFAN et al. (2007) noted 16 caterpillar species on blue spruce, above all *Batrachedra pinicolella* (Zell.), *Epinotia nanana* (Tr.), *Pseudohermenias abietana* (Fabr.), *P. secundarius*, *Hylaea fasciaria* (L.), which ranked among rather rarely occurring species in the studied area Sněžník (KULA et al., 2005b, 2005c).

Conclusions

In the crown fauna of caterpillars in stands of alternative tree species, we trapped 137 Lepidoptera species (123 on broadleaves and 27 on conifers). Most significant were *C. pusaria*, *O. fagata*, *A. aurantiaria*. As for the conifers, *E. lariciata* was significant on larch. Pests causing disasters to conifers (*B. piniarius*, *P. flammea*) are at present of only secondary importance there. The highest degree of similarity was determined between the fauna of caterpillars on birch and alder. Relatively wide species spectrum of caterpillars occurred on larch. *P. capreolaria*, found on blue spruce, is a new species in the area of the Děčín Upland.

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Housenky korunové fauny porostů náhradních dřevin

Souhrn

V imisním území Krušných hor byla sledována metodou sklepávání korunová fauna housenek v porostech náhradních dřevin *Betula pendula* Roth, *Sorbus aucuparia* L., *Alnus alnobetula* (Ehrh.), *Picea pungens* Englm., *Pinus sylvestris* L., *Larix decidua* Mill., *Acer campestre* L., *Pinus sylvestris* L., *Fagus sylvatica* L., *Quercus robur* L., *Q. rubra* L.

V průběhu dvou let bylo zachyceno 137 druhů housenek motýlů, 123 druhů na listnáčích, 27 na jehličnanech. Nejbohatší korunovou faunou se vyznačuje bříza (63 druhů), olše (54 druhů) a jeřáb (38 druhů). Druhově chudší se jeví zastoupení housenek v koruně buku (24), modřínu (18) a dubů (25). Výskyt druhu *Paraswammerdamia albicapitella* (Scharf.) byl pouze na jeřábu a druh *Aleimma loeflingianum* (L.) na dubu červeném, *Ypsolopha ustella* (Cl.) na dubu zimním. Překvapivý je výskyt housenek na smrku pichlavém, který představuje dřevinu vysoce neatraktivní pro fytofágní zástupce a z území ČR informace o jeho fauně chybí.

Soerensenův index faunistické podobnosti byl nejvyšší mezi břízou a olší (51,3 %) a shodnou výši podobnosti jsme zaznamenali mezi břízou a jeřábem (31,7 %) i bukem (32,2 %) a duby (26 %).

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