

Bark beetles (Coleoptera: Curculionidae: Scolytinae) in supranational migration of the Czech Republic

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Electronic Supplementary Material (ESM)

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Table S1. List of taxa, abundance, dominance, and frequency of occurrence of bark beetles (Scolytinae) in Johnson-Taylor suction trap catches in the Czech Republic during 2020–2025 (nomenclature according to Zahradník 2017)

Taxon	Status	Abundance (pcs)							Dominance (%)							Frequency (%)						
		2020	2021	2022	2023	2024	2025	Σ	2020	2021	2022	2023	2024	2025	Σ	2020	2021*	2022*	2023	2024	2025	Σ
Eudominant																						
<i>Pityogenes chalcographus</i> (Linnaeus, 1761)	P	123	307	352	160	214	159	1 315	51.46	58.14	61.01	66.95	70.16	65.98	61.77	33.90	28.33*	31.93*	26.97	38.73	33.14	32.13*
<i>Crypturgus cinereus</i> (Herbst, 1793)	I	51	154	65	16	14	3	303	21.34	29.17	11.27	6.69	4.59	1.24	14.23	15.25	18.89*	18.07*	6.18	6.94	1.71	11.15*
Dominant																						
<i>Xyleborinus saxesenii</i> (Ratzeburg, 1837)	S	12	9	41	18	28	26	134	5.02	1.70	7.11	7.53	9.18	10.79	6.29	5.65	3.89	8.43*	8.43	8.09	7.43	6.96*
Subdominant																						
<i>Ernoporus tiliae</i> (Panzer, 1793)	I	2	12	13	4	7	16	54	0.84	2.27	2.25	1.67	2.30	6.64	2.54	1.13	3.33	3.01*	2.25	2.89	8.00	3.43*
Recedent																						
<i>Dryocoetes autographus</i> (Ratzeburg, 1837)	I	3	3	16	7	4	3	36	1.26	0.57	2.77	2.93	1.31	1.24	1.69	1.69	1.67	2.41*	2.25	2.31	0.57	1.81*
<i>Pityophthorus pityographus</i> (Ratzeburg, 1837)	S	2	5	12	4	4	9	36	0.84	0.95	2.08	1.67	1.31	3.73	1.69	1.13	2.78	4.22*	2.25	2.31	4.00	2.76*
<i>Xyleborus monographus</i> (Fabricius, 1792)	S	6	4	12	4	3	3	32	2.51	0.76	2.08	1.67	0.98	1.24	1.50	2.82	1.67	2.41	1.69	1.73	1.14	1.91
<i>Crypturgus pusillus</i> (Gyllenhal, 1813)	I	–	9	12	1	5	4	31	–	1.70	2.08	0.42	1.64	1.66	1.46	–	4.44*	5.42*	0.56	2.89	2.29	2.57*
<i>Polygraphus poligraphus</i> (Linnaeus, 1758)	S	12	3	5	1	2	1	24	5.02	0.57	0.87	0.42	0.66	0.41	1.13	5.65	1.67	1.81*	0.56	1.16	0.57	1.91*
Subrecedent																						
<i>Ips typographus</i> (Linnaeus, 1758)	P	11	2	6	2	–	–	21	4.60	0.38	1.04	0.84	–	–	0.99	4.52	1.11*	1.20*	1.12	–	–	1.33*
<i>Scolytus rugulosus</i> (P.W.J. Müller, 1818)	S	1	4	1	4	7	2	19	0.42	0.76	0.17	1.67	2.30	0.83	0.89	1.13	2.22	0.60	2.25	1.73	1.14	1.53
<i>Hylesinus varius</i> (Fabricius, 1775)	S	2	2	5	4	3	–	16	0.84	0.38	0.87	1.67	0.98	–	0.75	1.13	1.11	1.81*	2.25	1.16	–	1.24*
<i>Taphrorychus bicolor</i> (Herbst, 1793)	I	–	2	6	3	3	2	16	–	0.38	1.04	1.26	0.98	0.83	0.75	–	1.11	2.41*	1.69	1.73	1.14	1.33*
<i>Hylastes attenuatus</i> Erichson, 1836	S	4	2	3	1	1	1	12	1.67	0.38	0.52	0.42	0.33	0.41	0.56	2.26	1.11	1.20	0.56	0.58	0.57	1.05
<i>Ips duplicatus</i> (C.R. Sahlberg, 1836)	P	–	2	8	–	–	1	11	–	0.38	1.39	–	–	0.41	0.52	–	1.11	0.60*	–	–	0.57	0.38*
<i>Cryphalus asperatus</i> (Gyllenhal, 1813)	I	1	2	2	–	–	2	7	0.42	0.38	0.35	–	–	0.83	0.33	0.56	1.11	1.20	–	0.57	0.57	
<i>Pityophthorus lichtensteinii</i> (Ratzeburg, 1837)	I	1	1	1	–	2	1	6	0.42	0.19	0.17	–	0.66	0.41	0.28	0.56	0.56	0.60	–	1.16	0.57	0.57
<i>Eidophelus caucasicus</i> (Lindemann, 1877)	I	–	1	1	–	3	–	5	–	0.19	0.17	–	0.98	–	0.23	–	0.56	0.60*	–	–	–	0.48*

Table S1. To be continued

Taxon	Status	Abundance (pcs)							Dominance (%)							Frequency (%)						
		2020	2021	2022	2023	2024	2025	Σ	2020	2021	2022	2023	2024	2025	Σ	2020	2021*	2022*	2023	2024	2025	Σ
<i>Crypturgus subcribrosus</i> Eggers, 1933	I	–	–	1	2	–	1	4	–	–	0.17	0.84	–	0.41	0.19	–	–	0.60*	1.12	–	0.57	0.38*
<i>Dryocoetes villosus</i> (Fabricius, 1792)	I	2	–	1	–	–	1	4	0.84	–	0.17	–	–	0.41	0.19	1.13	–	0.60*	–	–	0.57	0.38*
<i>Pityophthorus exsculptus</i> (Ratzeburg, 1837)	I	–	1	2	–	–	1	4	–	0.19	0.35	–	–	0.41	0.19	–	0.56	1.20	–	–	0.57	0.38
<i>Trypodendron lineatum</i> (Olivier, 1800)	S	–	–	2	1	1	–	4	–	–	0.35	0.42	0.33	–	0.19	–	–	1.20	0.56	0.58	–	0.38
<i>Hylastes brunneus</i> (Erichson, 1836)	S	–	1	2	–	–	–	3	–	0.19	0.35	–	–	–	0.14	–	0.56	0.60	–	–	–	0.19
<i>Hylastes cunicularius</i> Erichson, 1836	S	–	–	–	2	1	–	3	–	–	–	0.84	0.33	–	0.14	–	–	1.12	0.58	–	–	0.29
<i>Orthotomicus laricis</i> (Fabricius, 1792)	S	–	–	1	1	–	1	3	–	–	0.17	0.42	–	0.41	0.14	–	–	0.60*	0.56	–	0.57	0.29*
<i>Gnathotrichus materiarius</i> (Fitch, 1858)	N	–	1	1	–	–	–	2	–	0.19	0.17	–	–	–	0.09	–	0.56	0.60	–	–	–	0.19
<i>Hylastes pinicola</i> (Bedel, 1888)	S	–	–	2	–	–	–	2	–	–	0.35	–	–	–	0.09	–	–	0.60	–	–	–	0.10
<i>Pityogenes bistridentatus</i> (Eichhoff, 1878)	S	–	1	–	–	–	1	2	–	0.19	–	–	–	0.41	0.09	–	0.56	–	–	–	0.57	0.19
<i>Pityophthorus glabratus</i> Eichhoff, 1878	I	2	–	–	–	–	–	2	0.84	–	–	–	–	–	0.09	0.56	–	–	–	–	–	0.10
<i>Scolytus intricatus</i> (Ratzeburg, 1837)	S	1	–	–	–	–	1	2	0.42	–	–	–	–	0.41	0.09	0.56	–	–	–	0.57	0.19	
<i>Scolytus multistriatus</i> (Marshall, 1802)	S	1	–	–	–	1	–	2	0.42	–	–	–	0.33	–	0.09	0.56	–	–	0.58	–	–	0.19
<i>Anisandrus dispar</i> (Fabricius, 1792)	S	–	–	–	–	1	–	1	–	–	–	–	0.33	0.05	–	–	–	–	0.58	–	–	0.10
<i>Cryphalus piceae</i> (Ratzeburg, 1837)	S	–	–	–	–	–	1	1	–	–	–	–	–	0.41	0.05	–	–	–	–	0.57	0.10	
<i>Hylastes angustatus</i> (Herbst, 1793)	S	–	–	1	–	–	–	1	–	–	0.17	–	–	–	0.05	–	–	0.60	–	–	–	0.10
<i>Hylastes linearis</i> Erichson, 1836	S	–	–	–	–	–	1	1	–	–	–	–	–	0.41	0.05	–	–	–	–	0.57	0.10	
<i>Hylesinus crenatus</i> (Fabricius, 1787)	S	–	–	–	1	–	–	1	–	–	–	0.42	–	–	0.05	–	–	–	0.56	–	–	0.10
<i>Hylesinus wachtli</i> Reitter, 1887	S	–	–	–	–	1	–	1	–	–	–	–	0.33	0.05	–	–	–	–	0.58	–	–	0.10
<i>Ips acuminatus</i> (Gyllenhal, 1827)	P	1	–	–	–	–	–	1	0.42	–	–	–	–	–	0.05	0.56	–	–	–	–	–	0.10
<i>Orthotomicus suturalis</i> (Gyllenhal, 1827)	I	–	–	1	–	–	–	1	–	–	0.17	–	–	–	0.05	–	–	0.60	–	–	–	0.10

Table S1. To be continued

Taxon	Status	Abundance (pcs)							Dominance (%)							Frequency (%)						
		2020	2021	2022	2023	2024	2025	Σ	2020	2021	2022	2023	2024	2025	Σ	2020	2021*	2022*	2023	2024	2025	Σ
<i>Pityogenes bidentatus</i> (Herbst, 1783)	I	1	–	–	–	–	–	1	0.42	–	–	–	–	–	0.05	0.56	–	–	–	–	–	0.10
<i>Pityokteines spinidens</i> (Reitter, 1895)	S	–	–	–	1	–	–	1	–	–	–	0.42	–	–	0.05	–	–	–	0.56	–	–	0.10
<i>Pteleobius vittatus</i> (Fabricius, 1787)	S	–	–	–	1	–	–	1	–	–	–	0.42	–	–	0.05	–	–	–	0.56	–	–	0.10
<i>Scolytus carpini</i> (Ratzeburg, 1837)	S	–	–	1	–	–	–	1	–	–	0.17	–	–	–	0.05	–	–	0.60	–	–	–	0.10
<i>Tomicus piniperda</i> (Linnaeus, 1758)	P	–	–	1	–	–	–	1	–	–	0.17	–	–	–	0.05	–	–	0.60	–	–	–	0.10
<i>Xyleborinus attenuatus</i> (Blandford, 1894)	N	–	–	–	1	–	–	1	–	–	–	0.42	–	–	0.05	–	–	–	0.56	–	–	0.10

*A portion of the samples collected in 2021 and 2022 was primarily utilised for internal testing of laboratory detection and determination as part of the preparation for the CAI (Czech Accreditation Institute) accreditation process; for procedural reasons, location and collection date data are not available for these specimens; however, following the completion of testing, the samples were evaluated using standard methods and included in the final overview; status indicates the classification of species into functional categories: P – primary (economic) pests; S – secondary and technical pests; I – indifferent and associated species; N – non-native (invasive) species

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Table S2. Indicators characterising bark beetle (Scolytinae) communities at selected locations in the Czech Republic in 2020–2025, captured using Johnson-Taylor suction traps

Year	2020					2021					2022						
Location	Č	D	Ch	L	V	Č	D	Ch	L	V	*	Č	D	Ch	L	V	*
<i>C</i>	29	66	57	72	15	64	140	18	248	19	39	50	123	9	133	21	241
<i>C_{total}</i>	239					528					577						
<i>C_{cumul}</i>						2 129											
<i>N</i>	36	36	35	36	34	36	36	36	36	36	–	33	32	35	34	32	–
<i>N_{total}</i>	177					180					166						
<i>N_{cumul}</i>						1 049											
<i>S</i>	7	11	8	11	6	6	18	5	11	7	4	8	17	4	11	8	16
<i>S_{total}</i>	20					22					30						
<i>S_{max}</i>						45											
<i>H'</i>	1.64	1.95	1.70	2.23	2.23	1.46	2.38	1.61	1.32	2.31	1.27	1.95	2.51	1.89	2.01	2.39	1.81
<i>H'_{total}</i>	2.44					1.84					2.37						
<i>H'_{cumul}</i>						2.29											
<i>J'</i>	0.59	0.56	0.57	0.64	0.86	0.56	0.57	0.69	0.38	0.82	0.63	0.65	0.61	0.95	0.58	0.80	0.45
<i>J'_{total}</i>	0.56					0.41					0.48						
<i>J'_{cumul}</i>						0.42											
<i>d</i>	1.78	2.39	1.73	2.34	1.85	1.20	3.44	1.38	1.81	2.04	0.82	1.79	3.32	1.37	2.04	2.30	2.73
<i>d_{total}</i>	3.47					3.35					4.56						
<i>d_{cumul}</i>						5.74											

Year	2023					2024					2025				
Location	Č	D	Ch	L	V	Č	D	Ch	L	V	Č	D	Ch	L	V
<i>C</i>	69	81	8	63	18	58	133	26	56	32	33	82	12	87	27
<i>C_{total}</i>	239					305					241				
<i>C_{cumul}</i>						2 129									
<i>N</i>	36	36	36	34	36	33	35	35	35	35	35	35	35	35	35
<i>N_{total}</i>	178					173					175				
<i>N_{cumul}</i>						1 049									
<i>S</i>	9	11	4	14	9	8	14	7	12	6	8	13	6	10	5
<i>S_{total}</i>	22					20					23				
<i>S_{max}</i>						45									
<i>H'</i>	1.34	1.73	1.75	2.31	2.32	1.63	1.43	1.89	1.97	1.68	1.84	1.79	1.95	1.81	1.63
<i>H'_{total}</i>	2.12					1.91					2.08				
<i>H'_{cumul}</i>						2.29									
<i>J'</i>	0.42	0.50	0.88	0.61	0.73	0.54	0.38	0.67	0.55	0.65	0.6	0.5	0.8	0.5	0.7
<i>J'_{total}</i>	0.48					0.44					0.46				
<i>J'_{cumul}</i>						0.42									
<i>d</i>	1.89	2.28	1.44	3.14	2.77	1.72	2.66	1.84	2.73	1.44	2.00	2.72	2.01	2.02	1.21
<i>d_{total}</i>	3.83					3.32					4.01				
<i>d_{cumul}</i>						5.74									

Table S2. To be continued

*A portion of the samples collected in 2021 and 2022 was primarily utilised for internal testing of laboratory detection and determination as part of the preparation for the CAI (Czech Accreditation Institute) accreditation process; for procedural reasons, location and collection date data are not available for these specimens; however, following the completion of testing, the samples were evaluated using standard methods and included in the final overview

Č – Čáslav; D – Dobřichovice; Ch – Chrlice; L – Lípa; V – Věrovany; C – abundance; C_{total} – total abundance; C_{cumul} – cumulative abundance; N – number of samples; N_{total} – total number of samples; N_{cumul} – cumulative number of samples; S – number of taxa; S_{total} – total number of taxa; S_{max} – maximum number of taxa; H' – Shannon–Weaver index; H'_{total} – total Shannon–Weaver index; H'_{cumul} – cumulative Shannon–Weaver index; J' – Pielou's index; J'_{total} – total Pielou's index; J'_{cumul} – cumulative Pielou's index; d – Margalef's index; d_{total} – total Margalef's index; d_{cumul} – cumulative Margalef's index