

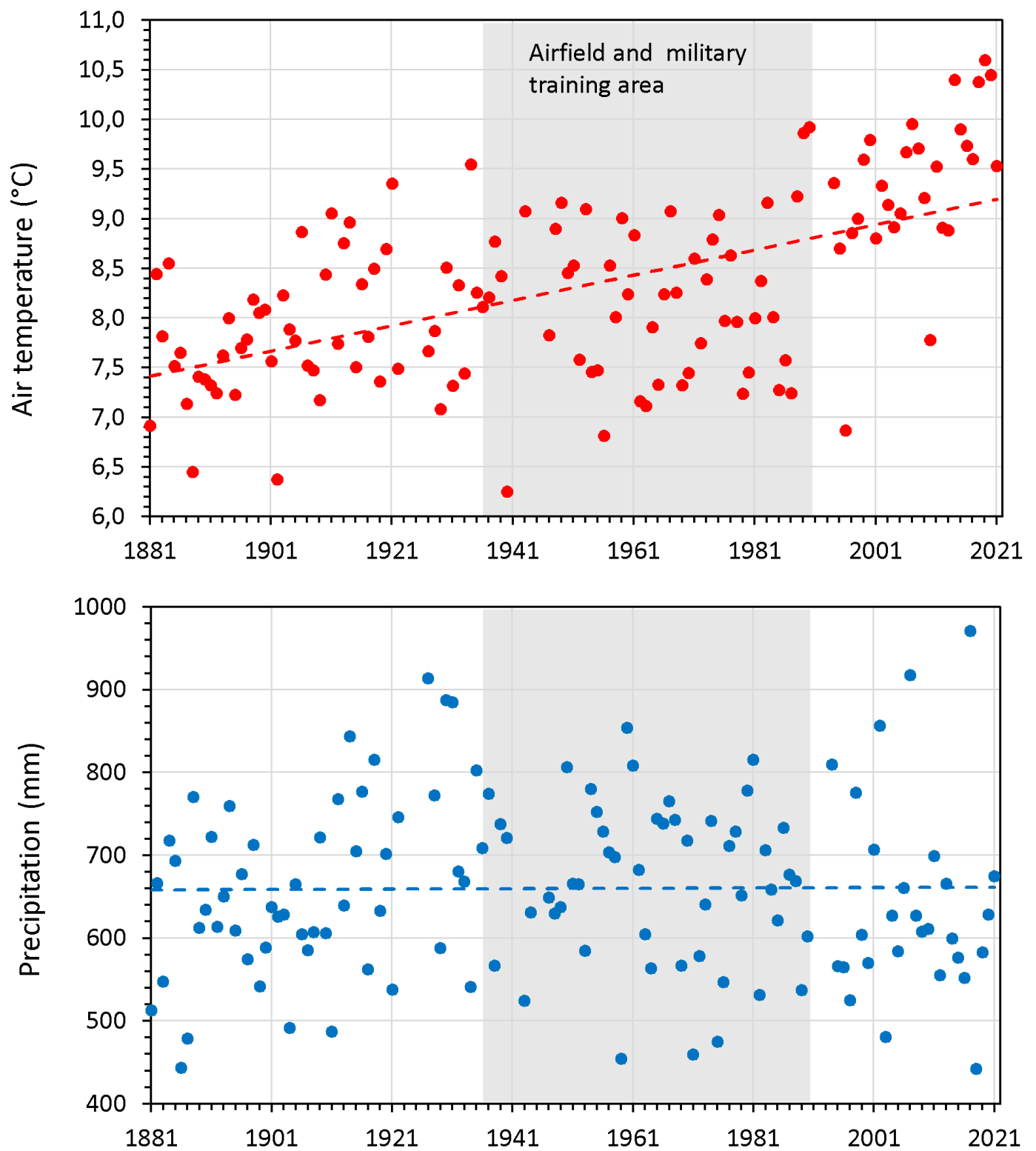


Fig. S1. Average annual air temperature and total annual precipitation over the last 140 years recorded at the Marnitz meteorological station 12 km from Marienfließ. This data comes from DWD (2022). The grey area indicates the time when the land was used.

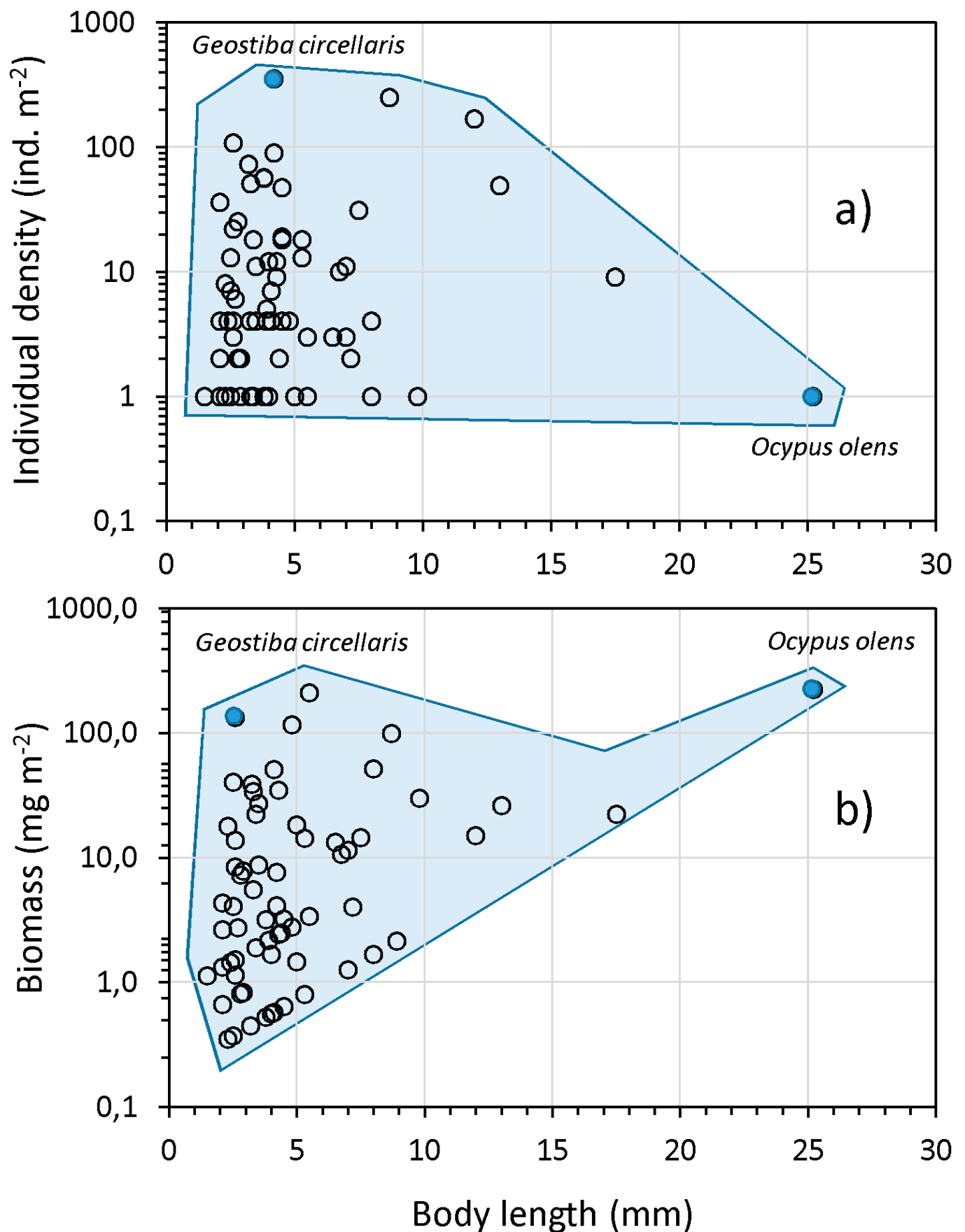


Fig. S2. Relationship between body length and abundance a) and biomass b) of 72 species of rove beetles (Staphylinidae) collected from 10 × 1 m² sites on Marienfließ heath in 2021.

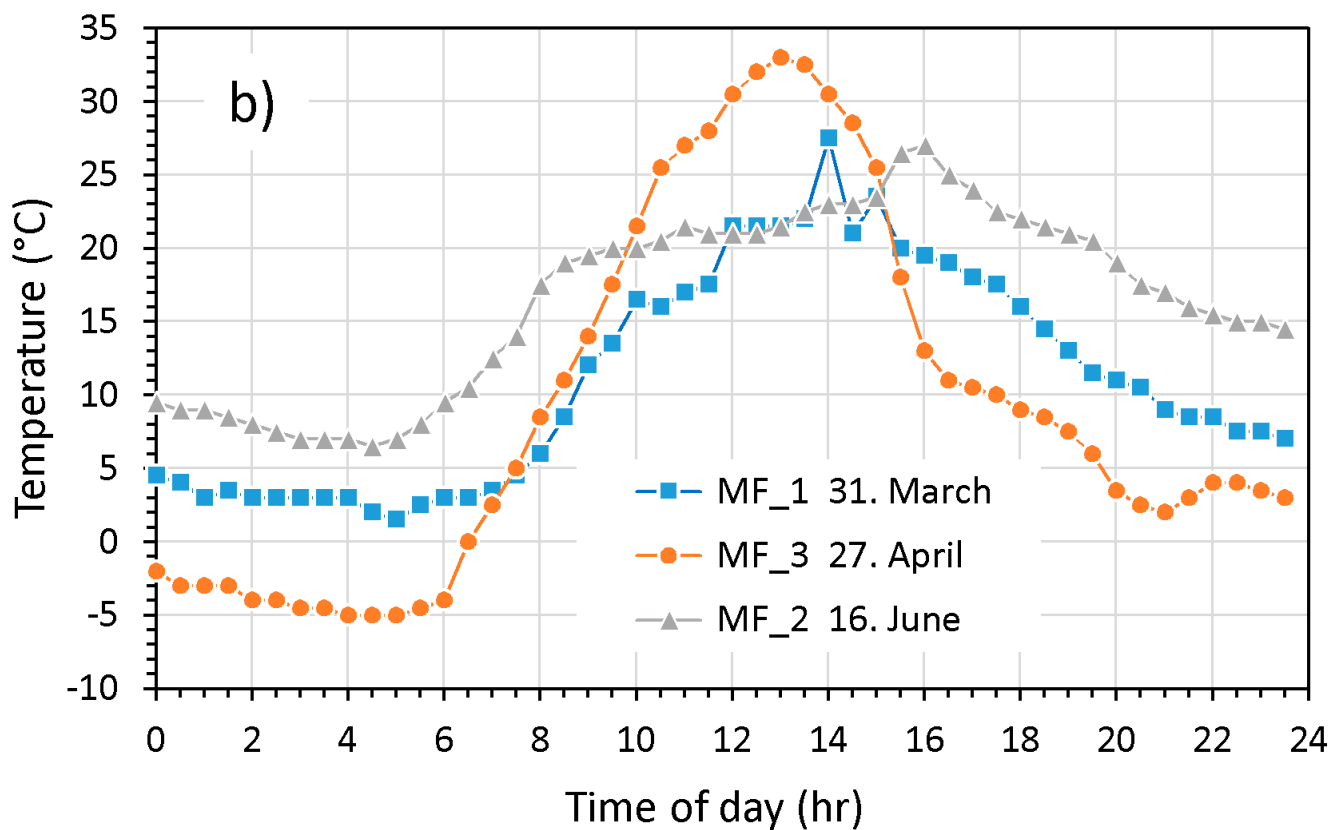
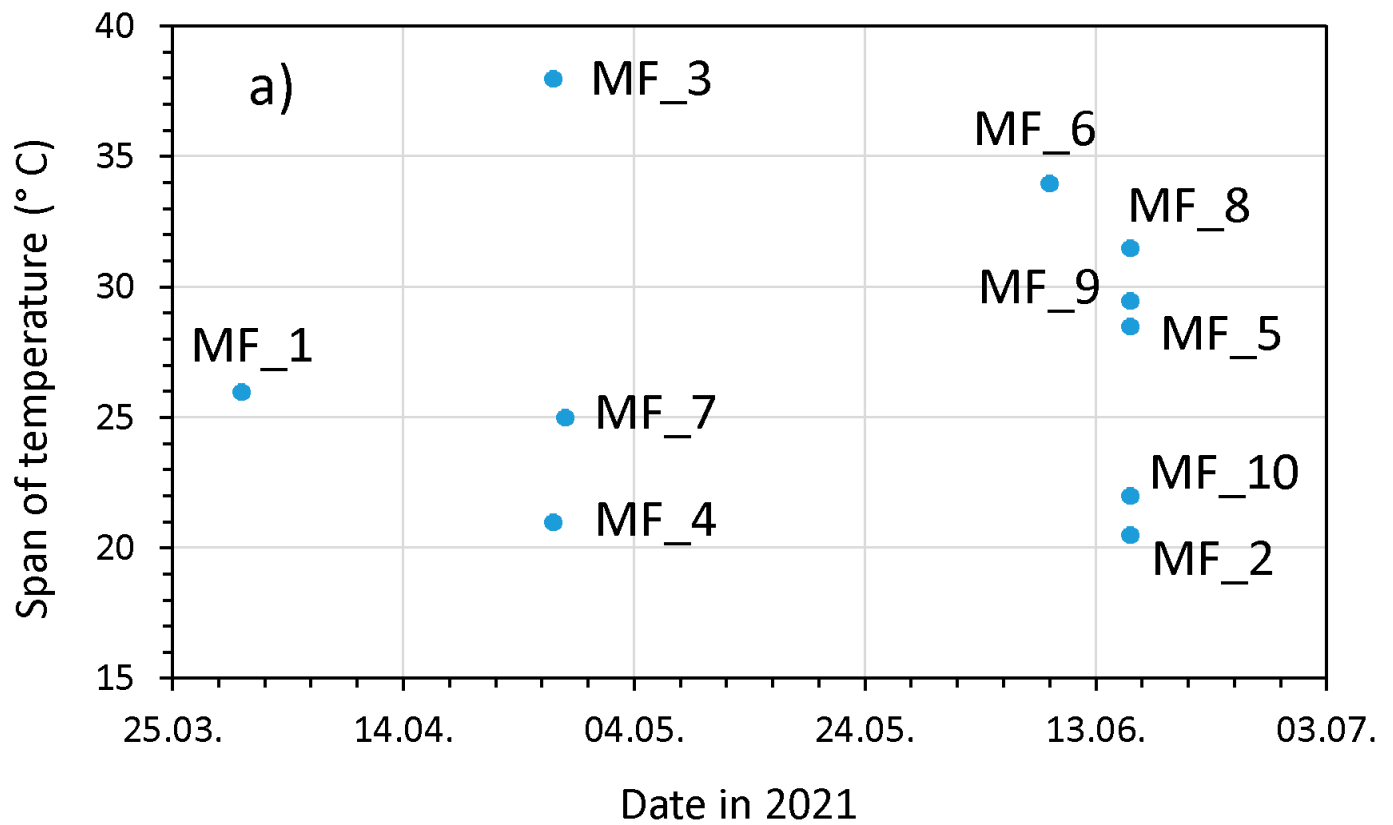


Fig. S3. a) maximum range in air temperatures recorded at ground level at 10 sites on Marienfließ heath (Fig. 1, Table 1) at different dates in 2021. b) vertical course of the maximum range in air temperature at ground level in 2021 in the adjacent sites MF_1 (pine forest), MF_2 (moss under pine branches) and MF_3 (open area among pine trees).

Table S1. Meteorological conditions and special features at the time of monthly sampling at the 10 sites (cf. Table 1) along a transect in the nature reserve Marienfließ in 2021.

Date	Environmental conditions at the time of sampling
6 March	air temperature 2 °C; soil frozen
22 April	6 - 12 °C, wind velocity ca. 20 to 30 km h ⁻¹
13 May	10 to 11 °C; heavy rain, followed on 05/16 by 10 - 15 °C, sun and drizzle
24 June	16 - 18 °C, very cloudy, no rain and still conditions; vegetation and soil very dry
14 July	24 - 33 °C, windless, soil and vegetation very dry
4 August	19 - 29 °C, cloudy and calm with a little rain
8 September	9 - 25°C, calm, fog/dew, wind increasing during the day
9 October	2 - 15 °C, hoarfrost, cloudless, almost windless; The area was grazed by sheep on 1 and 2 October.
10 November	2 - 6 °C, light ground frost, hoarfrost and fog

Table S2. Abundances of the 72 species of rove beetles (Staphylinidae) collected at the 10 sites (no. 1 - 10) in the nature reserve Marienfließ between 6 March and 10 November 2021. Also listed are the sum of all individuals (ind.), the body size (length) of each species and its ecological preference or niche: hy – hygrophilous, humidity; hu – humicolous, humus; my – mycetophilous, fungi; xe – xerophilous, aridity; th – thermophilous, heat; si – silvicolous, forest; sa – saprophilous, digestible matter; co – coprophilous, animal waste; as cited by Koch (1989).

Species	Abundance (individuals m ⁻²)										Sum ind.	Length (mm)	preference
	1	2	3	4	5	6	7	8	9	10			
<i>Anthobium unicolor</i> (Marsham, 1802)		54		11		3		5		12	85	3.2	hy, hu
<i>Olophrum piceum</i> (Gyllenhal, 1810)										4	4	5.5	hy
<i>Metopsia similis</i> Zerche, 1998		2						1			3	2.6	hu
<i>Metopsia clypeata</i> (Müller, 1821)		3		1							4	2.6	hu
<i>Ischnosoma splendidum</i> (Gravenhorst, 1806)	1	1		1							3	4.0	hy, hu
<i>Lordithon trinotatus</i> (Erichson, 1837)				1							1	4.5	my
<i>Mycetoporus baudueri</i> Mulsant & Rey, 1875	1	9		12		13	2	4	1	5	47	3.4	xe, hu
<i>Mycetoporus clavicornis</i> (Stephens, 1832)	6	8		1		3					18	3.5	hu
<i>Mycetoporus forticornis</i> Fauvel, 1875		1		3							4	3.9	th
<i>Mycetoporus lepidus</i> (Gravenhorst, 1806)	1	3						1			5	4.5	hu
<i>Mycetoporus mulsanti</i> (Ganglbauer, 1895)	9	8		1							18	2.8	si, hu
<i>Mycetoporus piceolus</i> Rey, 1883		1								1	2	2.8	xe
<i>Mycetoporus rufescens</i> (Stephens, 1832)	4	16	1					1		3	25	5.0	hy, si, hu
<i>Lamprinodes saginatus</i> (Gravenhorst, 1806)		1									1	4.5	xe, hu
<i>Sepedophilus immaculatus</i> (Stephens, 1832)	9	10									19	2.9	hu
<i>Sepedophilus pedicularius</i> (Grav., 1802)	2										2	2.9	xe, hu
<i>Tachinus marginellus</i> (Fabricius, 1781)				1							1	4.1	sa
<i>Tachyporus atriceps</i> Stephens, 1832	1	3		1		1		1			7	2.7	hy
<i>Tachyporus chrysomelinus</i> (Linnaeus, 1758)	1		2	1		2					6	3.8	hu
<i>Tachyporus hypnorum</i> (Fabricius, 1775)	5	25	2	11	1	5		3		4	56	3.5	hu
<i>Tachyporus pusillus</i> Gravenhorst, 1806		5		2	1	1	1		1		11	2.5	hu
<i>Tachyporus solutus</i> Erichson, 1839		1									1	3.8	xe, hu
<i>Aleochara bilineata</i> Gyllenhal, 1810				1							1	4.0	co
<i>Aleochara bipustulata</i> (Linnaeus, 1760)	2	5	1	4							12	3.3	co
<i>Acrotona aterrima</i> (Gravenhorst, 1802)	1										1	2.5	hy
<i>Amischa analis</i> (Gravenhorst, 1802)	5	1		1	1	2			3		13	2.1	hu
<i>Amischa bifoveolatus</i> (Mannheim, 1830)				1			1				2	2.1	hu
<i>Amischa nigrofusca</i> (Stephens, 1832)		2								2	4	2.1	hu
<i>Atheta amplicollis</i> (Mulsant & Rey., 1873)	23	4			1	1		5		2	36	2.6	hy
<i>Atheta fungi</i> (Gravenhorst, 1806)	8	3	2	8		1					22	2.6	hu
<i>Atheta orbata</i> (Erichson, 1837)	6	20	1	6		61	1	5	6	2	108	2.5	xe, hu
<i>Atheta pallidicornis</i> (Thomson, 1856)	1										1	2.6	si
<i>Liogluta alpestris</i> (Heer, 1839)		1	2					1	3		7	4.2	hy, hu
<i>Geostiba circellaris</i> (Gravenhorst, 1806)	316	28		1				3		2	350	2.6	hy, hu

<i>Lomechusa pubicollis</i> Bris. de Barn., 1860	4											4	4.8	si
<i>Drusilla canaliculata</i> (Fabricius, 1787)		2		1				1				4	4.4	xe
<i>Pella limbata</i> (Paykull, 1789)										2		2	5.0	xe
<i>Cousya longitarsis</i> (Thomson, 1867)				1								1	3.2	xe, hu
<i>Oxypoda abdominalis</i> (Mannerheim, 1830)		2		23	2	42	2	2				73	3.3	xe, hu
<i>Oxypoda annularis</i> (Mannerheim, 1830)	44	7										51	2.3	si, hu
<i>Oxypoda brachyptera</i> (Stephens, 1832)				2		5	1					8	2.1	xe, hu
<i>Oxypoda exoleta</i> Erichson, 1839						1						1	2.3	xe
<i>Oxypoda longipes</i> Mulsant & Rey, 1861		1										1	4.5	hu
<i>Oxypoda soror</i> Thomson, 1855					1				3			4	2.4	hy, hu
<i>Oxypoda vicina</i> (Kraatz, 1858)		1		1			1			1		4	3.4	xe, hu
<i>Anotylus nitidulus</i> (Gravenhorst, 1802)						1						1	2.5	hy
<i>Stenus ater</i> Mannerheim, 1830		1										1	5.3	hy
<i>Stenus clavicornis</i> (Scopoli, 1763)	1	10		6		1						18	5.3	xe
<i>Stenus geniculatus</i> Gravenhorst, 1806		2		5				4		2		13	4.2	xe, hu
<i>Stenus impressus</i> Germar, 1824	17	35		34						3		89	4.1	xe
<i>Euaesthetus superlatus</i> Peyerimhoff, 1937				1	1	2						4	1.5	xe, hu
<i>Astenus pulchellus</i> (Heer, 1839)				1								1	3.8	xe, hu
<i>Medon piceus</i> (Kraatz, 1858)	17	32	1	1		1		1		4		57	4.3	xe
<i>Othius angustus angustus</i> Stephens, 1833		3	3	3				2		1		12	6.5	xe, hu
<i>Othius punctulatus</i> (Goeze, 1777)		3										3	12	si
<i>Othius subuliformis</i> Stephens, 1833	84	53	1	2		1		19		8	168	4.8	hu	
<i>Heterothops quadripunctulus</i> (Grav., 1806)			1	1		2						4	3.9	hy
<i>Bisnius nitidulus</i> (Gravenhorst, 1802)			1			2	1					4	4.3	xe
<i>Philonthus carbonarius</i> (Gravenhorst, 1802)	1	1	3	1		1	1		1			9	7.0	xe
<i>Philonthus cognatus</i> Stephens, 1832		5		6								11	9.8	hy
<i>Philonthus cruentatus</i> (Gmelin, 1790)		1										1	8.0	hy
<i>Quedius levicollis</i> (Brullé, 1832)		1			1	2						4	13	th
<i>Quedius nigriceps</i> Kraatz, 1857	12	20		3				6		8	49	8.7	xe	
<i>Quedius persimilis</i> Mulsant & Rey 1876	9	84	9	53	2	7	5	43	1	36	249	5.5	xe, hu	
<i>Quedius semiaeneus</i> (Stephens, 1833)				1								1	7.0	xe, hu
<i>Quedius suturalis</i> Kiesenwetter, 1845		3										3	7.2	hy, si, hu
<i>Ocypus olens</i> (Müller, 1764)			1		1							2	25.2	hy, hu
<i>Ocypus picipennis picipennis</i> (F., 1792)								1				1	17.5	xe, hu
<i>Xantholinus gallicus</i> Coiffait, 1956		1	1	1	4					2		9	6.8	xe
<i>Xantholinus linearis</i> (Olivier, 1795)		2	2	2	2	1			1			10	7.5	xe
<i>Xantholinus longiventris</i> Heer, 1839		3	4	5	3		11	2	3			31	8.0	hy
<i>Xantholinus tricolor</i> (Fabricius, 1787)							1					1	8.9	si
Sum of individuals	610	477	44	220	13	171	19	112	19	104	1789			

Table S3. Number of species and individuals of rove beetles (Staphylinidae) collected at 10 sites in the nature reserve Marienfließ (MF) between 6 March and 10 November 2021. The data are ordered according to the species' ecological preferences or niches: hy – hygrophilous, humidity; xe – xerophilous, aridity and/or th – thermophilous, heat; div – diverse, i.e. mycetophilous, fungi; silvicolous, forest; saprophilous, digestible matter; coprophilous, animal waste, according to Koch (1989).

Site code	number of species			abundance			remarks
	hy	xe/th	div	hy	xe/th	div	
MF_1	18	12	6	477	70	63	forest, reference
MF_2	22	19	3	229	228	20	sites with dense vegetation (see Table 1, Fig. 4)
MF_4	16	22	5	47	165	8	
MF_8	11	10	0	43	69	0	
MF_10	8	12	0	37	67	0	
MF_3	9	8	1	22	21	1	sites with open vegetation (see Table 1, Fig. 4)
MF_5	5	5	0	5	8	0	
MF_6	13	11	1	34	136	1	
MF_7	3	9	0	4	15	0	
MF_9	4	4	0	10	9	0	
Sum	32	30	10	908	788	93	
Percentage	44.4	41.7	13.9	50.8	44.0	5.2	