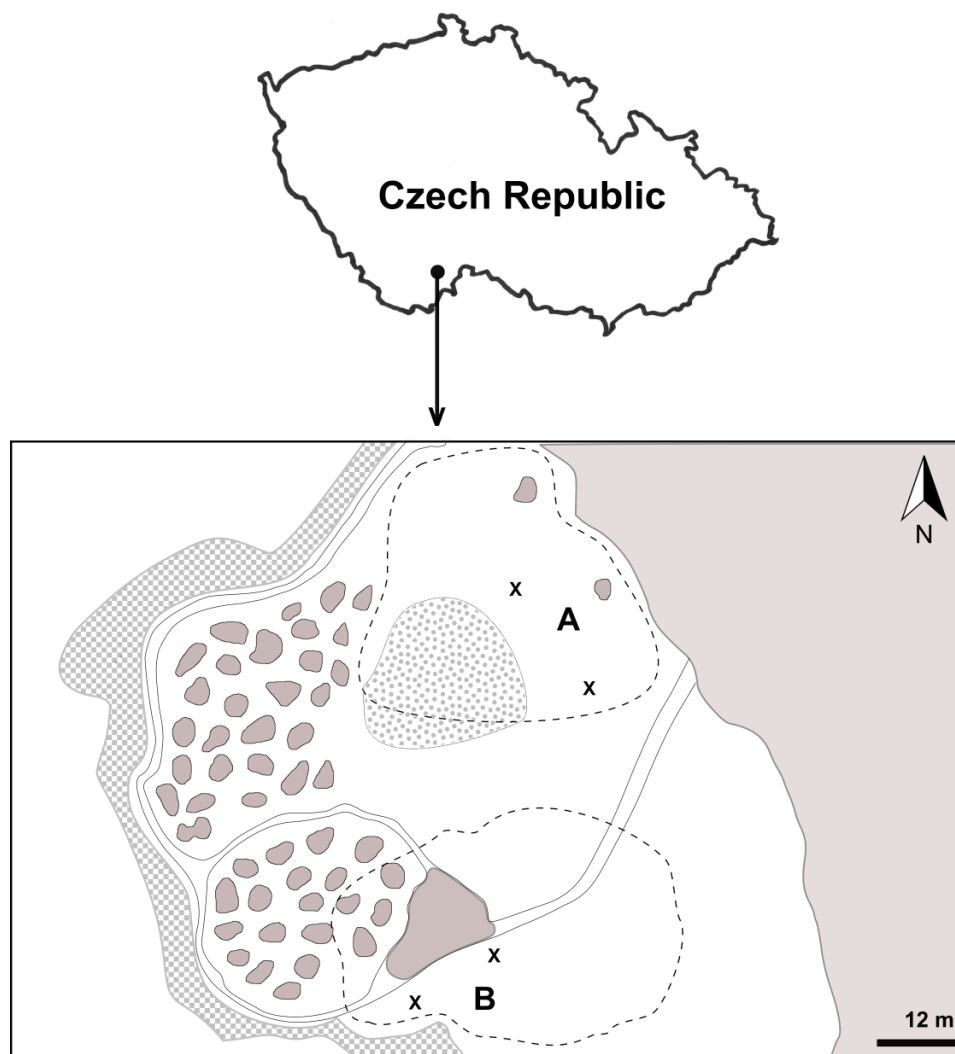


**Additional file 1: Map of the study area and additional information on the sampling protocols (Figures S1 and S2 and Table S1).**

**Figure S1** Schematic map of the study area showing experimental pools (grey circles), lake (grey area), vegetation (dotted area), steep slopes (checkerboard), drains (parallel lines), position of Malaise traps (x), and sweeping route (dashed line) within locations (A and B) in the sandpit



**Figure S2** Malaise trap used in the study. The trap (effective intercept area = 8.7 m<sup>2</sup>) consisted of the main trapezoid vertical panel (black fine mesh, heights 1.85 m and 1 m, upper edge 2.07 m long, lower edge 1.80 m long) bordered by two larger (1.06 x 0.68 m) and two smaller (0.92 x 0.6 m) perpendicular panels (black fine mesh) at each side of the panel and a sloping roof (white fine mesh). Experimental pools and the steep slope shown in Fig. 1 are visible in the background

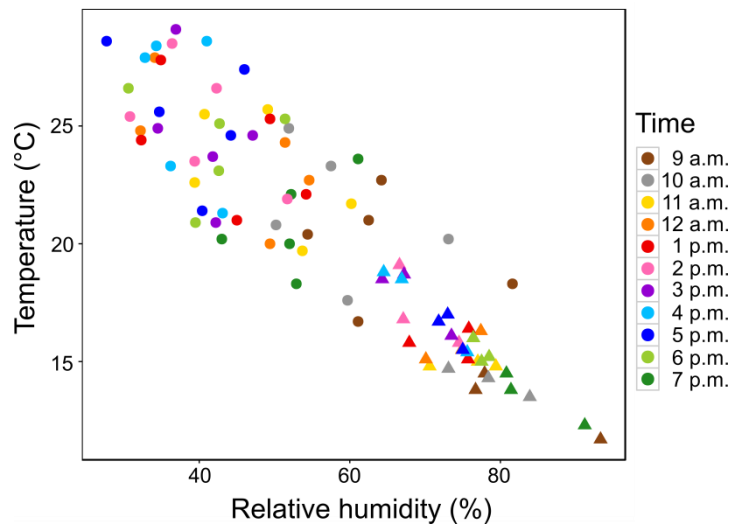


**Table S1** Overview of spatiotemporal resolution and pooling of samples in the analyses of the 2013 and 2014–2015 datasets. See Methods for details

<b>Dataset</b>	<b>Method</b>	<b>Temporal resolution</b>	<b>Spatial resolution</b>
Handnet 2013	univariate analyses	1 hour (11 per day)	separate routes (1 per each hour)
Handnet vs. Malaise traps 2013	rarefaction analyses	pooled daily data	(a) all sites across each method pooled (b) separate sites for both methods
Malaise traps 2014–2015	univariate analyses	pooled afternoon and evening data (1 per day)	separate traps (4 per day)
	multivariate analyses, species response curves, trait-based response analysis	pooled afternoon and evening data (1 per day)	all traps pooled (1 per day)

**Additional file 2: Weather conditions (Figures S3 and S4 and Tables S2–S4)**

**Figure S3** Air temperature and relative humidity recorded in 2013 at the study site in the sandpit during each 15-minute handnet sampling interval in August (circles) and September (triangles). Data points = average values for the 15-minute intervals, colour coded by hours



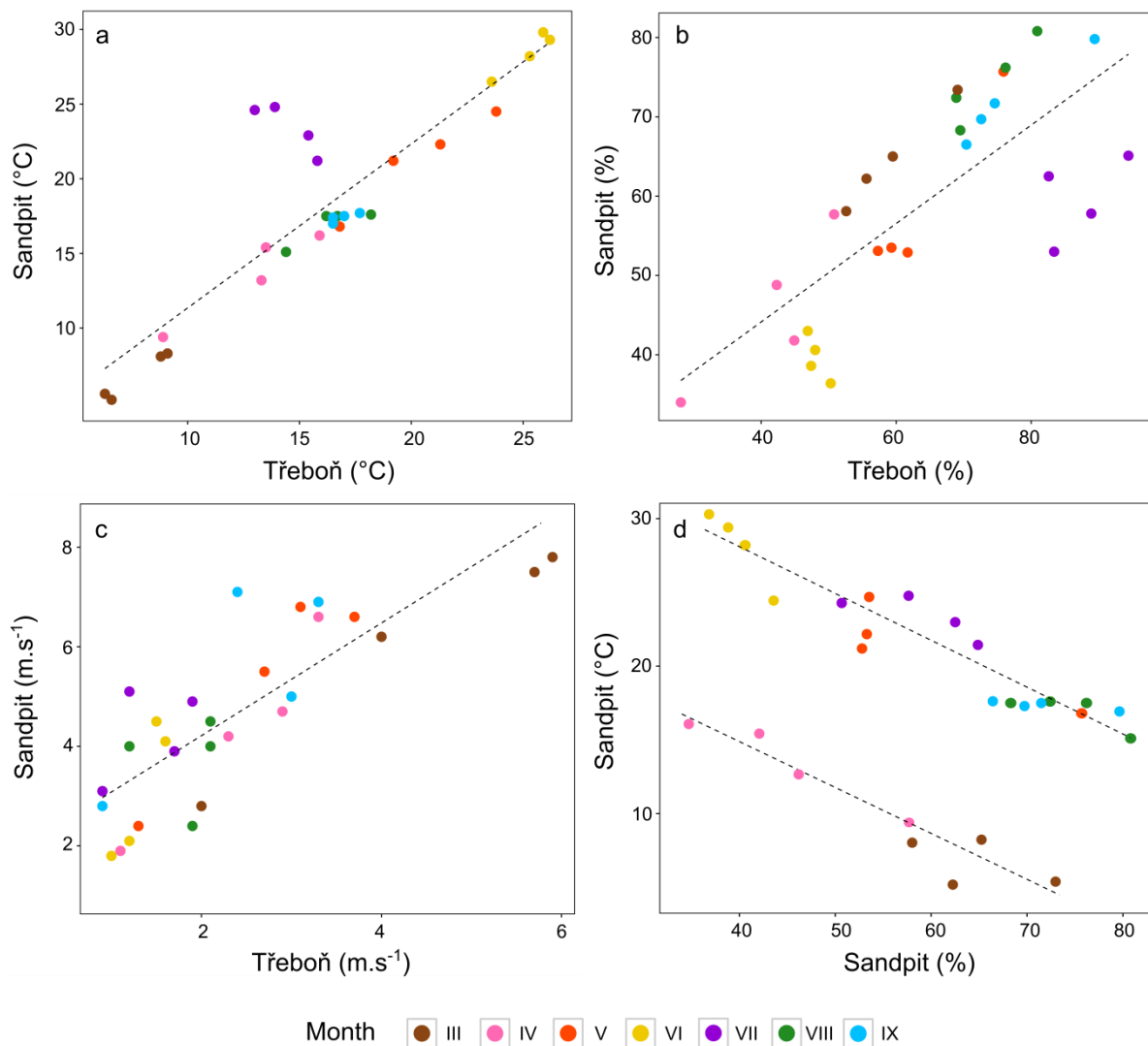
**Table S2** Weather conditions during the sampling dates in 2013 and 2014–2015. Summary based on point data measured on the site once during each 15-minute sampling interval for the 2013 dataset and on average values for the sampling interval (14:30 to 22:30) for the 2014–2015 dataset. Data for wind speed, cloud cover, and air pressure for 2014–2015 were provided by the Czech Hydrometeorological Institute weather station in Třeboň. Cloud cover data from 2013 and 2014–2015 are on different scales; categories for 2013 data: 1 = clear sky, 2 = mostly sunny, 3 = mostly cloudy, and 4 = cloudy (see Methods for details)

Variable	2013			2014–2015		
	Mean ± SD	Min	Max	Mean ± SD	Min	Max
Temperature (°C)	19.9 ± 4.4	9.5	30.5	17.4 ± 8.1	5.2	29.8
Relative humidity (%)	58.8 ± 17.7	25.8	97.3	59.3 ± 18.3	34.0	80.8
Wind speed (m.s <sup>-1</sup> )	2.9 ± 1.1	0.1	3.8	2.4 ± 1.4	0.1	5.9
Cloud cover	2.9 ± 0.98	1	4	5 ± 3.2	0	9
Air pressure (hPa)	-	-	-	970.8 ± 4.5	962.9	979.1

**Table S3** Correlation of average weather conditions (Avg) with their respective minima (Min) and maxima (Max) during the sampling intervals in the 2014–2015 data. See Methods for details. Significant results ( $P < 0.05$ ) in bold;  $r$  = correlation coefficient; CI = 95% confident interval;  $n = 28$

		Min ~ Avg	Max ~ Avg
<b>Temperature</b>	<i>r</i>	0.94	0.98
	<b>CI</b>	(0.87; 0.97)	(0.96; 0.99)
	<b><i>P</i></b>	<b><math>&lt; 10^{-4}</math></b>	<b><math>&lt; 10^{-4}</math></b>
<b>Relative humidity</b>	<i>r</i>	0.95	0.78
	<b>CI</b>	(0.88; 0.97)	(0.57; 0.89)
	<b><i>P</i></b>	<b><math>&lt; 10^{-4}</math></b>	<b><math>&lt; 10^{-4}</math></b>
<b>Wind speed</b>	<i>r</i>	0.93	0.91
	<b>CI</b>	(0.85; 0.97)	(0.81; 0.96)
	<b><i>P</i></b>	<b><math>&lt; 10^{-4}</math></b>	<b><math>&lt; 10^{-4}</math></b>
<b>Cloud cover</b>	<i>r</i>	0.95	0.94
	<b>CI</b>	(0.89; 0.98)	(0.88; 0.97)
	<b><i>P</i></b>	<b><math>&lt; 10^{-4}</math></b>	<b><math>&lt; 10^{-4}</math></b>
<b>Air pressure</b>	<i>r</i>	1.00	0.86
	<b>CI</b>	(0.99; 1.00)	(0.72; 0.93)
	<b><i>P</i></b>	<b><math>&lt; 10^{-4}</math></b>	<b><math>&lt; 10^{-4}</math></b>

**Figure S4** Relationship between values recorded in 2014–2015 at the study site in the sandpit (y) and at the meteorological station in the town of Třeboň (x) for (a) temperature:  $y = 1.09x + 0.37$  ( $r^2 = 0.78$ ), (b) relative humidity:  $y = 0.62x + 19.31$  ( $r^2 = 0.63$ ), (c) wind speed:  $y = 1.13x + 1.95$  ( $r^2 = 0.71$ ), and (d) two temperature-humidity regimes detected in sandpit with linear regression of temperature  $T$  plotted against relative humidity  $H$ :  $T = -0.32H + 40.8$  ( $r^2 = 0.92$ ) in May–September 2014 (upper band) and  $T = -0.31H + 27.3$  ( $r^2 = 0.89$ ) in March and April 2015 (lower band). Data points = average values for the daily sampling intervals (14:30–22:30); dashed lines = regression lines; colour coded by months



**Table S4** Pearson correlation coefficients of weather variables used in the analyses of the 2014–2015 data. Significant results ( $P < 0.05$ ) in bold;  $r$  = correlation coefficient; CI = 95% confidence interval;  $n = 28$ . Correlation between air temperature and relative humidity pools the two weather regimes together; see Methods for details

		Temperature	Relative humidity	Wind speed	Cloud cover
<b>Relative humidity</b>	<i>r</i>	-0.46			
	<b>CI</b>	(-0.71; -0.10)			
	<b>P</b>	<b>0.013</b>			
<b>Wind speed</b>	<i>r</i>	-0.54	0.15		
	<b>CI</b>	(-0.76; -0.20)	(-0.24; 0.49)		
	<b>P</b>	<b>0.003</b>	0.45		
<b>Cloud cover</b>	<i>r</i>	-0.29	0.69	0.21	
	<b>CI</b>	(-0.60; 0.09)	(0.43; 0.85)	(-0.18; 0.54)	
	<b>P</b>	0.13	<b>&lt; 10<sup>-4</sup></b>	0.28	
<b>Air pressure</b>	<i>r</i>	-0.46	-0.28	0.43	-0.12
	<b>CI</b>	(-0.71; -0.11)	(-0.59; 0.11)	(0.07; 0.69)	(-0.47; 0.27)
	<b>P</b>	<b>0.013</b>	0.15	<b>0.022</b>	0.55



**Additional file 3: Adult chironomids collected during the study (Table S5)**

**Table S5** Total abundances and habitat associations of chironomid taxa captured by the two methods in 2013 and in 2014–2015

Taxon	Habitat	Species code	Handnet 2013	Malaise traps 2013	Malaise traps 2014–15
<b>Chironominae</b>					
<i>Chironomus</i> sp.	(aqua)		0	0	4
<i>Chironomus obtusidens</i> Goetghebuer, 1921	aqua		0	1	6
<i>Chironomus plumosus</i> (Linnaeus, 1758)	aqua		0	0	5
<i>Chironomus riparius</i> agg. Meigen, 1804	aqua		0	0	4
<i>Chironomus</i> cf. <i>venustus</i> Pinder, 1978	aqua		0	0	4
<i>Cladopelma edwardsi</i> (Kruseman, 1933)	aqua		0	1	2
<i>Cladopelma virescens</i> (Kruseman, 1933)	aqua		0	1	1
<i>Cladotanytarsus</i> sp.	(aqua)		0	0	5
<i>Cladotanytarsus atridorsum</i> Kieffer, 1924	aqua		0	0	1
<i>Cladotanytarsus bicornutus</i> Kieffer, 1922	aqua		0	0	1
<i>Cladotanytarsus mancus</i> (Walker, 1856)	aqua	<i>CladManc</i>	21	96	38
<i>Cladotanytarsus</i> cf. <i>molestus</i> Hirvenoja, 1962	aqua		0	0	1
<i>Cladotanytarsus vanderwulpi</i> (Edwards, 1929)	aqua		0	0	2
<i>Cryptotendipes</i> cf. <i>usmaensis</i> (Pagast, 1931)	aqua		1	2	7
<i>Demicryptochironomus vulneratus</i> (Zetterstedt, 1838)	aqua		0	0	2
<i>Dicrotendipes pulsus</i> (Walker, 1856)	aqua		0	1	1
<i>Endochironomus tendens</i> (Fabricius, 1775)	aqua		0	1	1
<i>Glyptotendipes</i> sp.	(aqua)		0	0	1
<i>Glyptotendipes pallens</i> (Meigen, 1804)	aqua		0	1	1
<i>Glyptotendipes</i> cf. <i>paripes</i> (Edwards, 1929)	aqua		0	0	2
<i>Glyptotendipes signatus</i> (Kieffer, 1909)	aqua		0	0	1
<i>Harnischia curtilamellata</i> (Malloch, 1915)	aqua	<i>HarnCurt</i>	2	17	70
<i>Microchironomus tener</i> (Kieffer, 1918)	aqua	<i>MicrTenr</i>	5	15	78
<i>Micropsectra atrofasciata</i> (Kieffer, 1911)	aqua		0	0	2
<i>Micropsectra lindrothi</i> Goetghebuer, 1931	aqua		0	0	2
<i>Microtendipes pedellus</i> (De Geer, 1776)	aqua		0	0	6
<i>Paracladopelma laminatum</i> (Kieffer, 1921)	aqua		0	0	4
<i>Parachironomus</i> sp.	(aqua)		0	1	1
<i>Polypedilum</i> sp. 1	(aqua)		0	1	0
<i>Polypedilum</i> sp. 2	(aqua)		0	0	1
<i>Polypedilum bicrenatum</i> Kieffer, 1921	aqua		0	1	1
<i>Polypedilum nubeculosum</i> (Meigen, 1804)	aqua		0	0	1
<i>Polypedilum nubifer</i> (Skuse, 1889)	aqua		792	45	0
<i>Polypedilum sordens</i> (van der Wulp, 1875)	aqua		0	0	1

<i>Polypedilum tritum</i> (Walker, 1856)	aqua		0	0	4
<i>Polypedilum uncinatum</i> (Goetghebuer, 1921)	aqua		0	0	1
<i>Rheotanytarsus muscicola</i> (Thienemann, 1929)	aqua		0	1	2
<i>Saetheria reissi</i> Jackson, 1977	aqua		0	0	1
<i>Stempellinella edwardsi</i> Spies & Saether, 2004	aqua	<i>StemEdwr</i>	2	2	29
<i>Stictoichironomus</i> sp.	(aqua)		0	3	10
Tanytarsini gen. sp.	(aqua)		0	0	2
<i>Tanytarsus</i> sp.	(aqua)		0	0	2
<i>Tanytarsus bathophilus</i> Kieffer, 1911	aqua		0	1	12
<i>Tanytarsus brundini/curticornis</i>	aqua	<i>TanyBrun</i>	0	0	9
<i>Tanytarsus buchonius</i> Reiss & Fittkau, 1971	aqua	<i>TanyBuch</i>	0	0	31
<i>Tanytarsus chinyensis</i> Goetghebuer, 1934	aqua		0	0	10
<i>Tanytarsus eminulus</i> (Walker, 1856)	aqua		0	0	2
<i>Tanytarsus lestagei</i> agg. (Lindeberg, 1967)	aqua		0	0	2
<i>Tanytarsus lugens/gregarius</i>	aqua		0	0	1
<i>Tanytarsus mendax</i> Kieffer, 1925	aqua		0	0	2
<i>Tanytarsus pallidicornis</i> (Walker, 1856)	aqua		0	0	4
<i>Tanytarsus signatus</i> (van der Wulp, 1859)	aqua		0	0	1
<i>Tanytarsus striatulus</i> Lindeberg, 1976	aqua		0	1	0
<i>Tanytarsus sylvaticus</i> (van der Wulp, 1859)	aqua		0	0	8
<i>Tanytarsus volgensis</i> Miseiko, 1967	aqua	<i>TanyVolg</i>	11	95	160
<i>Virgatanytarsus</i> sp.	(aqua)		0	1	2
<b>Tanypodinae</b>					
<i>Ablabesmyia</i> sp.	(aqua)		0	0	2
<i>Ablabesmyia longistyla</i> Fittkau, 1962	aqua		2	3	11
<i>Ablabesmyia monilis</i> (Linnaeus, 1758)	aqua	<i>AblaMonl</i>	1	1	21
<i>Conchapelopia melanops</i> (Meigen, 1818)	aqua		0	0	1
<i>Conchapelopia viator</i> (Kieffer, 1911)	aqua		0	0	4
<i>Macropelopia adaucta</i> Kieffer, 1916	aqua		0	0	4
<i>Procladius</i> sp.	(aqua)		0	0	1
<i>Procladius choreus</i> (Meigen, 1804)	aqua	<i>ProcChor</i>	2	81	148
<i>Procladius</i> cf. <i>flavifrons</i> Edwards, 1929	aqua		0	0	2
<i>Procladius sagittalis</i> (Kieffer, 1909)	aqua		0	1	4
<b>Orthocladiinae</b>					
<i>Acricotopus lucens</i> (Zetterstedt, 1850)	aqua		0	6	0
<i>Allocladius bothnicus</i> (Tuiskunen, 1984)	terr		0	0	3
<i>Allosmittia</i> sp.	(terr)		4	1	4
<i>Bryophaenocladus ictericus</i> (Meigen, 1830)	terr		-	-	4
<i>Bryophaenocladus</i> cf. <i>illimbatus</i> (Edwards, 1929)	terr	<i>BryoIlll</i>	1	3	217
<i>Bryophaenocladus</i> nr. <i>simus</i> (Edwards, 1929)	terr		-	-	4
<i>Bryophaenocladus nitidicollis</i> (Goetghebuer, 1913)	terr		-	-	2
<i>Camptocladus stercorarius</i> (De Geer, 1776)	terr	<i>CampSter</i>	0	1	17
<i>Cricotopus</i> sp.	(aqua)		0	0	1

<i>Cricotopus cf. albiforceps</i> (Kieffer, 1916)	aqua		0	0	1
<i>Cricotopus brevialpis</i> Kieffer, 1909	aqua		3	8	2
<i>Cricotopus festivellus</i> (Kieffer, 1906)	aqua		0	0	5
<i>Cricotopus intersectus</i> (Staeger, 1839)	aqua		0	5	7
<i>Cricotopus sylvestris</i> (Fabricius, 1794)	aqua	<i>CricSylv</i>	0	2	26
<i>Cricotopus vierrensis</i> Goetghebuer, 1935	aqua		2	2	0
<i>Eukiefferiella</i> sp.	(aqua)		0	0	1
<i>Heterotrissocladius marcidus</i> (Walker, 1856)	aqua		0	0	1
<i>Hydrosmittia oxoniana</i> (Edwards, 1922)	terr	<i>HydrOxon</i>	3	0	79
<i>Limnophyes</i> sp.	(aqua)		2	6	17
<i>Limnophyes asquamatus</i> Andersen, 1937	ND		0	1	0
<i>Limnophyes pumilio</i> (Holmgren, 1869)	aqua	<i>LimnPuml</i>	2	6	23
<i>Metriocnemus</i> 4 spp.	ND		0	1	20
<i>Orthocladius</i> sp.	(aqua)		0	0	2
<i>Parakiefferiella bathophila</i> (Kieffer, 1912)	aqua	<i>ParkBath</i>	44	31	118
<i>Paraphaenocladus impensus</i> (Walker, 1856)	semi		1	2	0
<i>Psectrocladius bisetus</i> Goetghebuer, 1942	aqua		0	0	2
<i>Psectrocladius</i> gr. <i>limbatellus</i> Wuelker, 1956 †	aqua	<i>PsecLimb</i>	0	14	64
<i>Psectrocladius platypus</i> (Edwards, 1929)	aqua		0	0	1
<i>Pseudorthocladius</i> sp.	(terr)		-	-	3
<i>Pseudosmittia</i> sensu lato	(terr)		3	0	1
<i>Pseudosmittia holsata</i> Thienemann & Strenzke, 1940	terr		-	-	4
<i>Pseudosmittia mathildae</i> Albu, 1968	ND		-	-	2
<i>Rheocricotopus</i> sp.	(aqua)		0	0	2
<i>Rheosmittia spinicornis</i> (Brundin, 1956)	aqua		0	0	1
<i>Smittia</i> spp. ‡	(terr)	<i>SmitSpp</i>	-	-	954
<i>Tvetenia</i> sp.	(aqua)		0	0	18
unidentified terrestrial Orthoclaadiinae §	terr		675	432	-
Total number of aquatic males			890	449	1042
Total number of semi- and terrestrial males			687	439	1292
Ratio aquatic males : total males (%)			56.4	50.4	44.2
Total number of females ¶			-	-	5286

† *P. limbatellus* (Holmgren, 1869), *P. oxyura* Langton, 1985, and *P. oligosetus* Wuelker, 1956 are present at the site.

‡ Mostly *S. edwardsi* Goetghebuer, 1932, but *S. aterrima* (Meigen, 1818) and *S. leucopogon* (Meigen, 1804) were also present.

§ Mostly *Smittia* with *Bryophaenocladus* and one species of *Hydrosmittia*.

¶ Females were not considered in the analyses.

Abbreviations: *aqua* = aquatic larvae, *semi* = semi-terrestrial larvae living mostly outside or near water but requiring high humidity, *terr* = terrestrial larvae, *ND* = no data on larval habitat type;

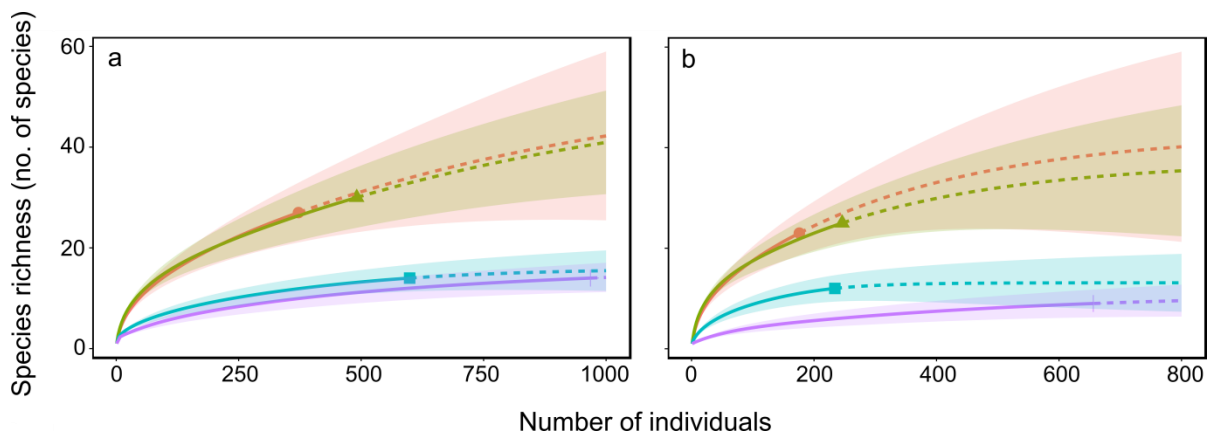
habitat data in parentheses = dominant habitat preference of other members of the genus. Habitat preferences based on [1–4]. Some terrestrial Orthocladiinae taxa were not distinguished in the identification and no females were counted in the 2013 dataset; these data are entered as ‘-’. *Chironomus* sp., *Cladotanytarsus* sp., *Glyptotendipes* sp., *Tanytarsus* sp., *Ablabesmyia* sp., *Procladius* sp., *Cricotopus* sp., and *Limnophyes* sp. refer to unidentifiable specimens that most likely belonged to one of the other recorded species from the respective genus.

## References

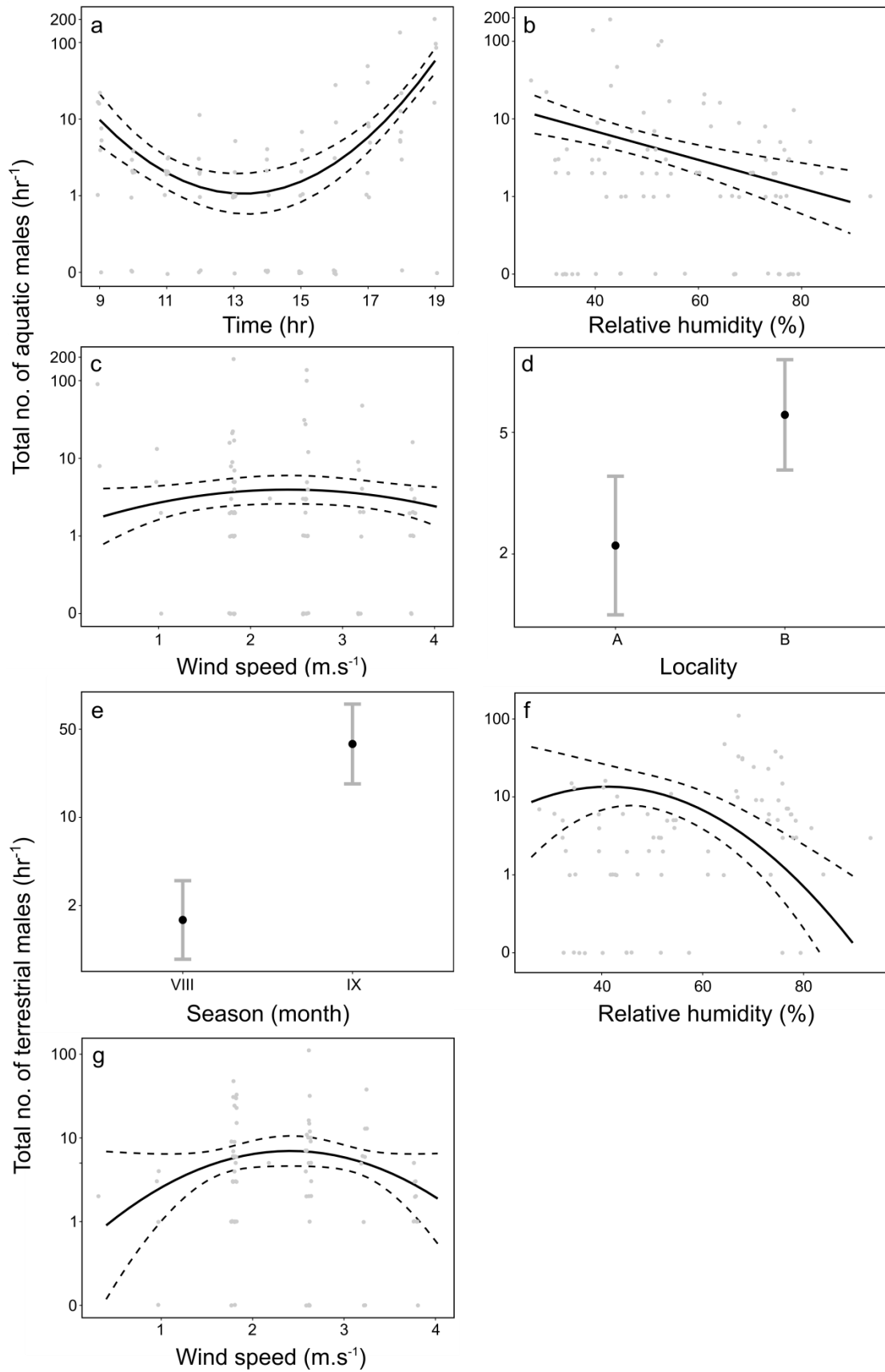
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**Additional file 4: Supplementary results (Figures S5–S7)**

**Figure S5** Rarefaction curves (data: solid lines, extrapolation: dashed lines) of the handnet (blue and violet lines), Malaise trap (red and green lines) for (a) whole chironomid assemblage and (b) only for aquatic species with data disaggregated between the sites near the lake shore (locality A, red and blue lines) and close to the southern edge of the experimental pools (locality B, green and violet lines). Shaded areas indicate 95 % confidence intervals



**Figure S6** Drivers of diel patterns of total flight activity of (a–d) aquatic and (e–g) terrestrial species according to the second best model (D2). Symbols and axes as in Fig. 2



**Figure S7** Drivers of seasonal patterns of total flight activity of aquatic species (a–e) according to the second best model (S1). Symbols and axes as in Fig. 2

