Oikos

O18615
Delattre, T., Burel, F., Humeau, A., Stevens, V. M., Vernon, P. and Baguette, M. 2010. Dispersal mood revealed by shifts from routine to direct flights in the meadow brown butterfly *Maniola jurtina*. – Oikos 119: 1900–1908.

Appendix 1

Distribution of move length and turning angles in flight paths of *M. jurtina* butterflies outside their habitat patch adopting either direct flights or foray loops movement strategies (see text for details).

Parameter	Flight path category	Null hypothesis	Test name	Test statistic	p
Move length	direct flights	goodness-of-fit for lognormal distribution	Kolmogorov-Smirnov	D = 0.887	< 0.001
	foray searches	goodness-of-fit for lognormal distribution	Kolmogorov-Smirnov	D = 0.937	< 0.001
Turning angles	direct flights	uniform vs unimodal distribution with mean = 0	modified Rayleigh test	R = 0.810	< 0.001
		symmetrical distribution around 0	Wilcoxon signed-rank test	V = 16601	0.167
		goodness-of-fit for von Mises distribution	Watson's U^2	U^2 = 0.171	< 0.01
	foray searches	uniform vs unimodal distribution with mean = 0	modified Rayleigh test	R = 0.535	< 0.001
		symmetrical distribution around 0	Wilcoxon signed-rank test	V = 189000	0.768
		goodness-of-fit for von Mises distribution	Watson's U^2	U^2 = 0.116	< 0.05

Appendix 2

Timing of the detection of differences between direct flights and foray search. Only results for flight paths reduced to 1–3 first moves are shown (results for longer flight paths are qualitatively similar).

Part of flight path considered	Flight path parameter	Mean in direct flights	Mean in foray searches	Test	Statistic	p
First move	move length (m)	11.446	6.254	one-way Anova	F = 10.105	<0.01
	net displacement (m)[a]	11.446	6.254	one-way Anova	F = 10.105	<0.01
	turning angle[b]	NA	NA	NA	NA	NA
First two moves	move length (m)	14.162	6.495	one-way Anova	F = 47.459	<0.001
	net displacement (m)	14.527	7.047	one-way Anova	F = 23.136	<0.001
	K in turning angle distribution	2.705	0.744	modified χ_i^2	χ_i^2 = 19.38	<0.001
First three moves	move length (m)	14.502	6.586	one-way Anova	F = 81.759	<0.001
	net displacement (m)	22.487	9.379	one-way Anova	F = 56.875	<0.001
	K in turning angle distribution	2.644	0.906	modified χ_i^2	χ_i^2= 25.36	<0.001
Whole path	move length (m)	16.891	8.146	one-way Anova	F = 267.84	<0.0001
	net displacement (m)	138.715	29.554	one-way Anova	F = 145.61	<0.0001
	K in turning angle distribution	3.005	1.271	modified χ_i^2	χ_i^2 = 77.37	<0.0001

[a] at first step the effective distance is equal to the step length
[b] turning angles need two successive steps to be computed

Appendix 3

Tests of equality of means in flight path parameters between males and females *Maniola jurtina*.

Parameter	Test name [a]	Test statistic	p
Effective distance	one-way ANOVA	F = 2.39	0.12
Move length	one-way ANOVA	F = 6.33	0.01
Total distance	one-way ANOVA	F = 0.002	0.96
Orthogonal distance	one-way ANOVA	F = 0.06	0.81
Flying time	one-way ANOVA	F = 0.22	0.64
Time spent in bad habitat	one-way ANOVA	F = 4.31	0.04
Concentration K_i of turning angles	modified χ_i^2 [b]	$\chi_1^2 > 1.4$	> 0.23

[a] the influence of sex-specific proportions in using direct flights and foray search is avoided by adding interaction terms in the models (one-way ANOVA) or dividing dataset on the basis of flight type (modified χ_i^2).
[b] Jammalamadaka and Sengupta 2001

Appendix 4

Comparison of foray search and direct flights parameters between field data and correlated random walk simulations.

		Field data (IC 95%)[a]	CRW simulations (IC 95%)[a]
Move length	foray search	8.14 (8.09–8.47)	10.01 (9.77–10.24)
	direct fligths	16.89 (16.88–16.93)	15.77 (15.33–15.96)
Concentration K_i of turning angles	foray search	1.27 (1.14–1.42)	0.68 (0.50–0.82)
	direct fligths	3.01 (2.96 – 3.26)	2.62 (2.46–2.81)
Proportion of all flights	foray search	81% (72–88%)	92.73% (92.4–98.2%)
	direct fligths	12% (6–20%)	2.09% (1.8–2.6%)
	NA	7%	5.17%

[a] 95% confidence intervals computed by boostrap