

Perry, KI, FS Sivakoff, KF Wallin, JW Wenzel, and DA Herms. Forest disturbance and arthropods: Small-scale canopy and understory disturbances alter movement of mobile arthropods, *Ecosphere*

## Supporting Information

### Appendix S1

**Equation S1.** Equations used to calculate the predicted probabilities of an arthropod taxon being marked with zero, one, two, or three colors of fluorescent powder.

Define  $f(j) = \text{logit}(P(Y \leq j))$ , for  $j = 0, 1, 2, 3$ , where  $j$  is the number of marks. Then we have,

$$\begin{aligned} P(Y = 0) &= 1 - \frac{1}{1 + \exp(f_0)} \\ P(Y = 1) &= \frac{1}{1 + \exp(f_1)} - \frac{1}{1 + \exp(f_2)} \\ P(Y = 2) &= \frac{1}{1 + \exp(f_2)} - \frac{1}{1 + \exp(f_3)} \\ P(Y = 3) &= \frac{1}{1 + \exp(f_3)} \end{aligned}$$

**Table S1.** Predicted probabilities of being unmarked or having one, two, and three colors for each arthropod taxon in July and August 2015. Probabilities were manually generated and then the calculations were confirmed using predict.clm2 function in the ordinal package (Christensen 2019).

Arthropod Taxa			Experiment 1: July				Experiment 2: August			
Class	Order	Family	Unmarked	1 Color	2 Colors	3 Colors	Unmarked	1 Color	2 Colors	3 Colors
Chilopoda	Lithobiomorpha		0.39	0.47	0.10	0.02	0.19	0.49	0.22	0.09
Diplopoda	Chordeumatida	Caseyidae	0.12	0.47	0.31	0.08	0.04	0.27	0.35	0.32
	Julida	Julidae	0.48	0.42	0.07	0.01	0.25	0.50	0.17	0.06
		Parajulidae	0.29	0.51	0.15	0.03	0.13	0.44	0.27	0.13
	Polydesmida	Paradoxosomatidae	0.05	0.31	0.43	0.19	0.02	0.13	0.29	0.54
		Polydesmidae	0.14	0.49	0.28	0.07	0.05	0.30	0.35	0.28
	Spirobolida	Spirobolidae	0.07	0.37	0.40	0.15	0.02	0.17	0.32	0.47
Malacostraca	Isopoda		0.21	0.52	0.21	0.04	0.09	0.38	0.32	0.19
Arachnida	Araneae		0.23	0.52	0.19	0.04	0.09	0.40	0.31	0.18
	Opiliones		0.02	0.20	0.44	0.31	0.01	0.08	0.21	0.69
Collembola			0.47	0.43	0.08	0.01	0.24	0.50	0.18	0.07
Insecta	Coleoptera	Carabidae	0.17	0.51	0.25	0.06	0.07	0.33	0.34	0.24
		Tenebrionidae	0.32	0.50	0.13	0.02	0.14	0.46	0.26	0.12
	Hymenoptera	Formicidae	0.49	0.41	0.07	0.01	0.26	0.50	0.16	0.06
	Orthoptera	Rhaphidophoridae	0.08	0.39	0.38	0.13	0.03	0.19	0.33	0.43

**Table S2.** Results from ordinal regression models examining the arthropod taxon-specific responses to canopy and understory vegetation treatments in July and August 2015. Significant models had a better fit than the null (i.e. intercept) model. Arthropod taxa with fewer than 20 individuals collected were not analyzed.

Arthropod Taxa			Experiment 1: July			Experiment 2: August		
Class	Order	Family	n	Chisq	<i>P</i>	n	Chisq	<i>P</i>
Chilopoda	Geophilomorpha		0	--	--	1	--	--
	Lithobiomorpha		72	1.45	0.69	16	--	--
	Scolopendromorpha		0	--	--	4	--	--
Diplopoda	Callipodida	Abacionidae	0	--	--	1	--	--
	Chordeumatida	Caseyidae	59	2.46	0.48	13	--	--
	Julida	Julidae	42	2.37	0.50	32	1.56	0.21
		Parajulidae	270	8.61	<b>0.01</b>	127	4.83	<b>0.03</b>
	Polydesmida	Paradoxosomatidae	122	1.38	0.71	244	3.77	<b>0.05</b>
		Polydesmidae	62	4.59	0.20	27	2.60	0.46
		Xystodesmidae	7	--	--	6	--	--
	Spirobolida	Spirobolidae	19	--	--	6	--	--
Malacostraca	Isopoda		34	5.72	0.13	7	--	--
Arachnida	Araneae		307	4.00	0.26	124	1.48	0.69
	Opiliones		31	10.35	<b>0.01</b>	36	7.47	<b>0.01</b>
Collembola			173	3.60	0.06	106	15.83	<b>&lt; 0.001</b>
Insecta	Coleoptera	Carabidae	52	1.13	0.77	31	1.94	0.59
		Curculionidae	0	--	--	1	--	--
		Elateridae	5	--	--	0	--	--
		Nitidulidae	1	--	--	1	--	--
		Scarabaeidae	0	--	--	2	--	--
		Silphidae	2	--	--	0	--	--
		Staphylinidae	5	--	--	0	--	--
		Tenebrionidae	27	0.56	0.90	49	2.32	0.51
	Hymenoptera	Formicidae	178	3.01	0.39	113	0.72	0.87
	Orthoptera	Gryllidae	4	--	--	3	--	--
		Rhaphidophoridae	11	--	--	13	--	--

## References

Christensen, R. H. B. 2019. ordinal - Regression Models for Ordinal Data. R package version 2019.12-10. <https://CRAN.R-project.org/package=ordinal>.