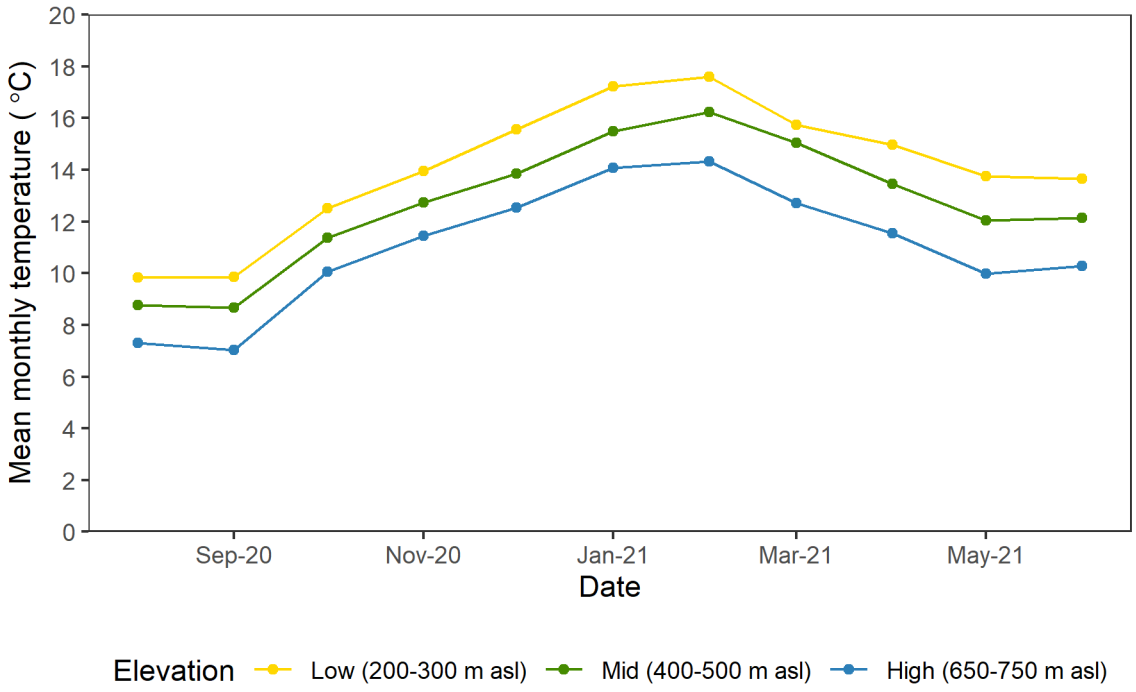
Supplementary Material



Appendix S1. Mean monthly temperature across three elevational bands on Mount Pirongia, New Zealand. Temperature was collected using automated temperature loggers (Tinytag) measuring air temperature 1.3 m above ground every 30 minutes. Twelve temperature loggers were used per elevational band to account for microclimates. Note that the standard errors around the monthly means are so small that they do not display on the figure.

Appendix S2. Comparison of models for time-specific factors affecting nest survival of miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*). K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models.

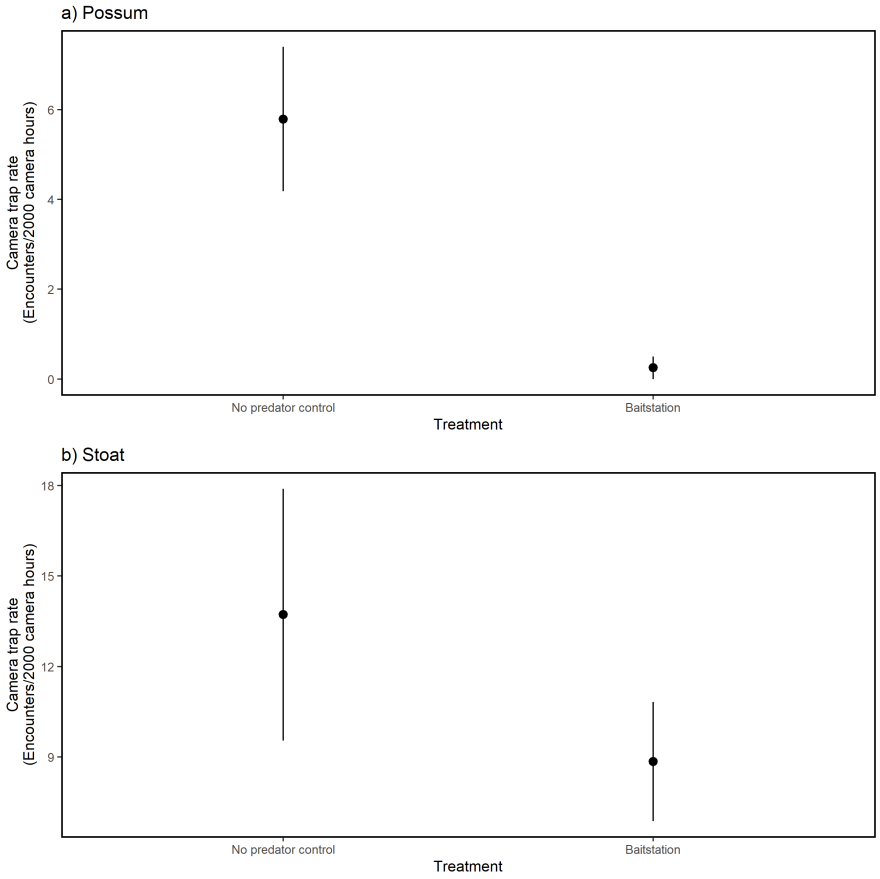
Model	K	AICc	Δ AICc	AICc weight
Species	3	203.43	0.00	0.50
Species + TimeSeason	4	205.05	1.63	0.22
Species + NestAge	4	205.42	1.99	0.19
Species + NestAge + TimeSeason	5	206.98	3.55	0.09

Appendix S3. Comparison of models affecting rat tracking indices after predator control through poisoning at three elevational bands on Mount Pirongia, New Zealand. K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models.

Model	K	AICc	Δ AICc	AICc weight
Timing × Elevation	11	277.21	0.00	0.82
Timing	5	281.34	4.13	0.10
Timing + Elevation	7	281.86	4.65	0.08
Null	3	295.00	17.79	0.00

Appendix S4. Parameter estimates for the best generalised linear mixed model (Appendix S3) of the rat tracking indices after predator control on Mount Pirongia across three elevational bands.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	−4.05	−5.88	−2.24
Timing (Summer)	−0.73	−3.30	2.33
Timing (Autumn)	0.45	−1.63	2.54
Elevation (Low)	0.58	−1.51	3.18
Elevation (Mid)	2.08	−0.18	4.24
Timing (Summer) × Elevation (Low)	0.28	−3.05	3.56
Timing (Autumn) × Elevation (Low)	1.53	−0.85	4.13
Timing (Summer) × Elevation (Mid)	−2.33	−5.93	1.10
Timing (Autumn) × Elevation (Mid)	−1.46	−3.66	1.05



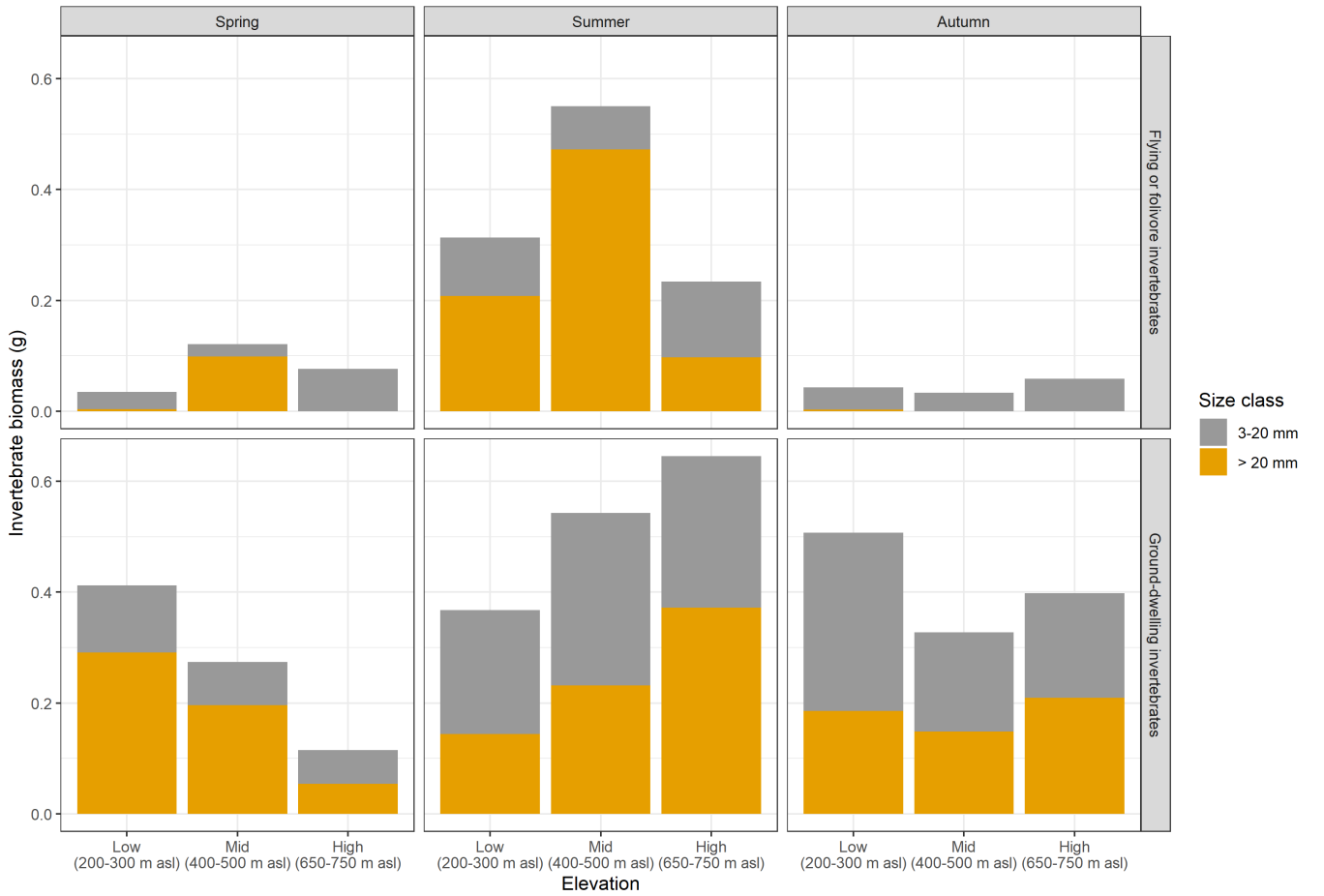
Appendix S5. Mean camera trap rate (Encounters/2000 camera hours ± SE) in December 2019–January 2020 on Mount Pirongia based on six camera transects in the no predator control and four camera transects in the bait station area. All transects were within 360–750 m a.s.l.

Appendix S6. Overview of the contribution to overall biomass by the ten most common orders sampled with flying intercept-traps opened for one month in spring (September–October), summer (December–January) and autumn (April–May) across three elevational bands on Mount Pirongia, New Zealand.

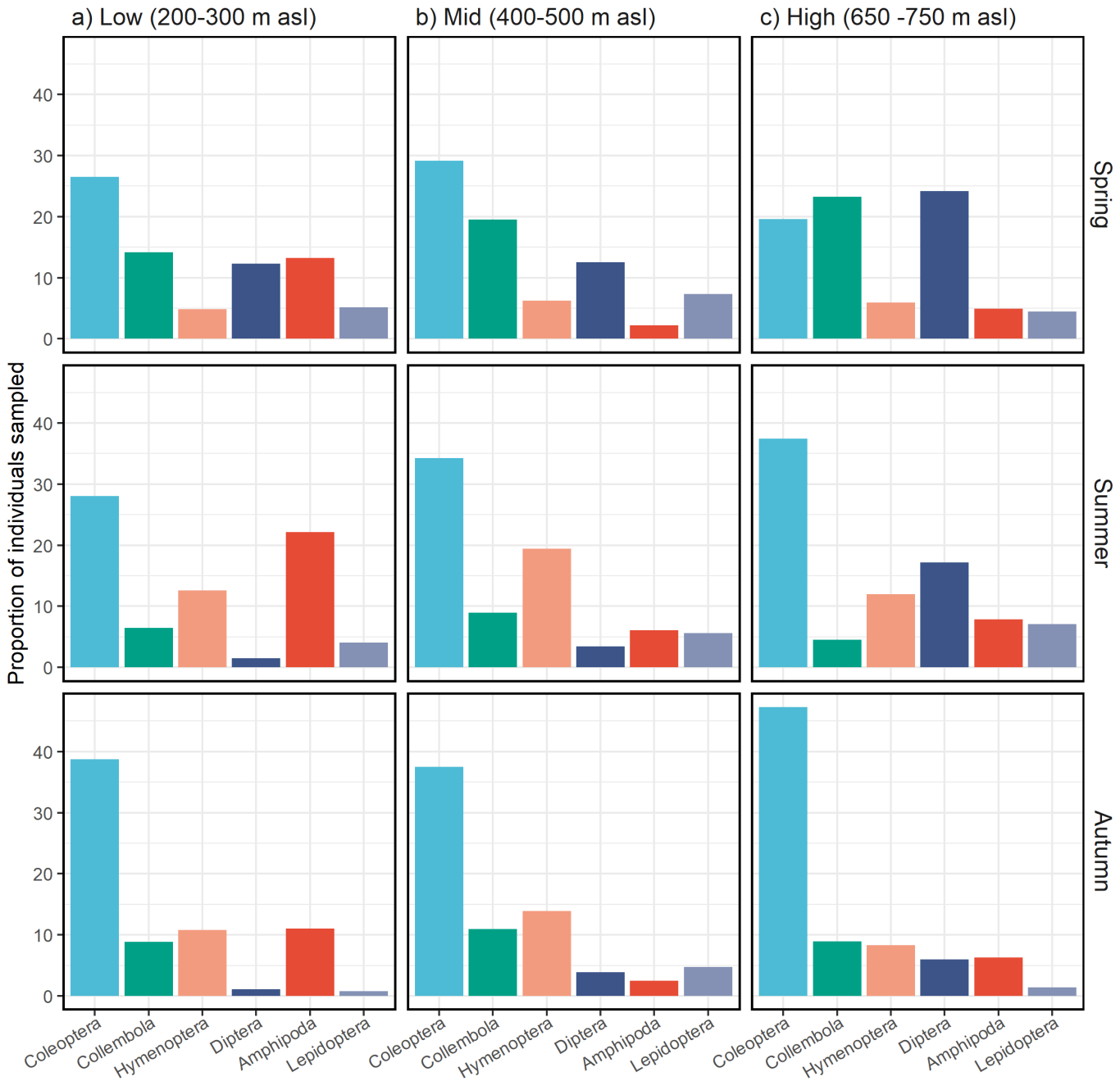
Order	Total	Percentage	Cumulative Percentage
Coleoptera	1514	46	46
Diptera	659	20	66
Lepidoptera	382	11	77
Araneae	186	6	83
Hymenoptera	161	5	88
Hemiptera	111	3	91
Collembola	56	2	93
Isopoda	56	2	95
Blattodea	25	1	96
Diplopoda	39	1	97

Appendix S7. Overview of the contribution to overall biomass by the ten most common orders sampled with pitfall traps opened for one month in spring (September–October), summer (December–January) and autumn (April–May) across three elevational bands on Mount Pirongia, New Zealand.

Order	Total	Percentage	Cumulative Percentage
Coleoptera	2496	29	29
Hymenoptera	1216	14	43
Amphipoda	1103	13	57
Collembola	1141	13	70
Araneae	645	8	78
Diplopoda	366	4	82
Diptera	286	3	85
Isopoda	269	3	88
Opiliones	243	3	91
Chilopoda	164	2	93



Appendix S8. Overview of relative contribution of flying/folivore and ground-dwelling invertebrate body size class to mean biomass sampled with flying-intercept and pitfall traps, respectively, opened for one month in spring (September–October), summer (December–January) and autumn (April–May) across elevational bands on Mount Pirongia, New Zealand.



Appendix S9. Overview of relative abundance of invertebrates sampled in pitfall or flying-intercept traps opened for one month in spring (September–October), summer (December–January) and autumn (April–May) across (a) low, (b) mid, and (c) high elevational bands on Mount Pirongia, New Zealand. Data only shown for orders that constituted > 10% of biomass sampled in either trap type (Appendix S6 and S7).

Appendix S10. Comparison of models affecting biomass of flying or folivore invertebrates (log-transformed) during the forest bird nesting season across three elevational bands on Mount Pirongia, New Zealand. K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models.

Model	K	AICc	Δ AICc	AICc weight
Season	5	1123.78	0.00	0.86
Season + Elevation	7	1127.61	3.83	0.13
Season × Elevation	11	1132.67	8.89	0.01
Null	3	1220.19	96.40	0.00

Appendix S11. Parameter estimates for the best linear mixed model (Appendix S10) of flying or folivore invertebrate biomass during spring, summer, and autumn across three elevational bands on Mount Pirongia.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	1.48	0.98	1.98
Season (Summer)	3.01	2.39	3.61
Season (Autumn)	−0.10	−0.74	0.51

Appendix S12. Comparison of models affecting biomass of invertebrates (log-transformed) caught in pitfall traps during the forest bird nesting season across three elevational bands on Mount Pirongia, New Zealand. K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models.

Model	K	AICc	Δ AICc	AICc weight
Season × Elevation	11	1075.89	0.00	0.53
Season	5	1077.25	1.36	0.27
Season + Elevation	7	1077.90	2.01	0.20
Null	3	1140.77	64.88	0.00

Appendix S13. Parameter estimates for the best linear mixed model (Appendix S12) of ground-dwelling invertebrate biomass during spring, summer, and autumn across three elevational bands on Mount Pirongia.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	2.11	1.26	3.02
Elevation (Low)	1.95	0.75	3.17
Elevation (Mid)	1.23	0.06	2.46
Season (Summer)	3.22	2.35	4.03
Season (Autumn)	2.20	1.35	3.06
Elevation (Low) × Season (Summer)	−1.90	−3.15	−0.78
Elevation (Mid) × Season (Summer)	−1.07	−2.25	0.09
Elevation (Low) × Season (Autumn)	−1.03	−2.14	0.16
Elevation (Mid) × Season (Autumn)	−1.09	−2.19	0.21

Appendix S14. Parameter estimates for the second best linear mixed model (Appendix S12) of ground-dwelling invertebrate biomass during spring, summer, and autumn across three elevational bands on Mount Pirongia.

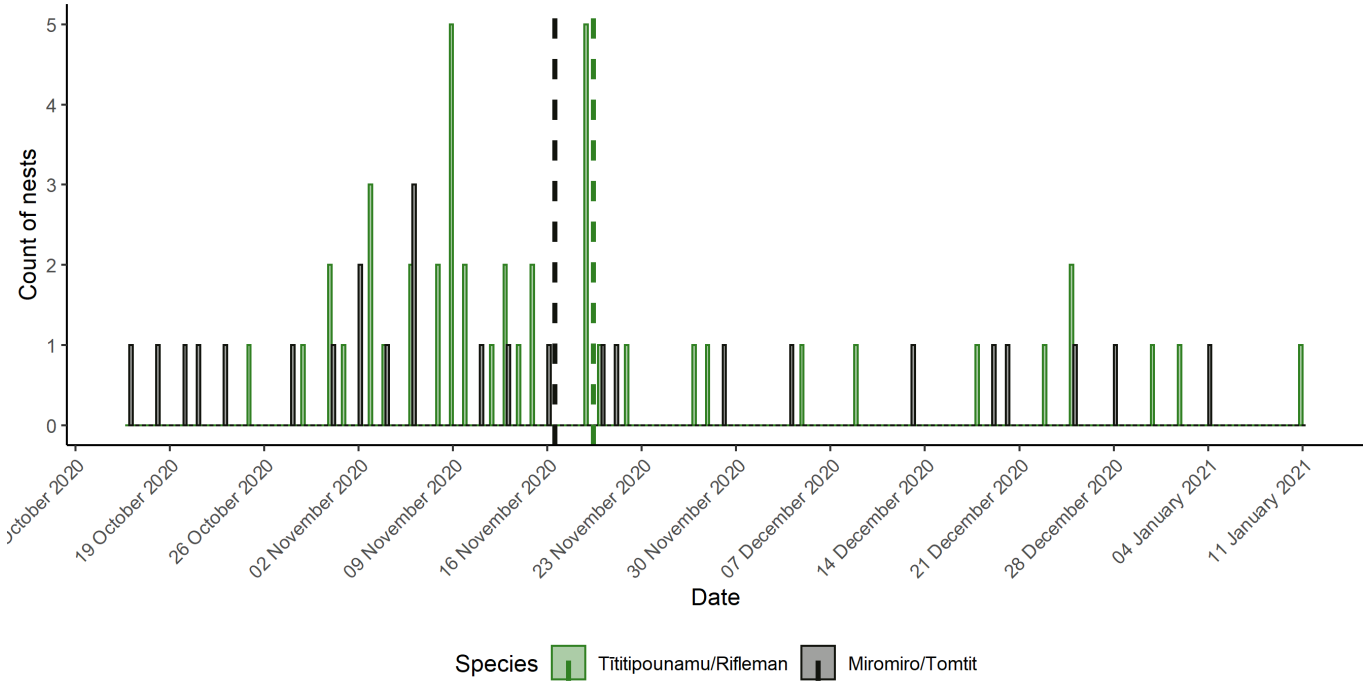
Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	3.19	2.63	3.66
Season (Summer)	2.22	1.74	2.74
Season (Autumn)	1.48	0.99	1.93

Appendix S15. Parameter estimates for the third best linear mixed model (Appendix S12) of ground-dwelling invertebrate biomass during spring, summer, and autumn across three elevational bands on Mount Pirongia.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	2.70	2.02	3.47
Elevation (Low)	0.96	−0.01	1.92
Elevation (Mid)	0.49	−0.47	1.47
Season (Summer)	2.22	1.73	2.77
Season (Autumn)	1.48	0.97	1.99

Appendix S16. Overview of number of nests monitored across species and elevational bands.

Elevation	Number of nests		
	Tītitipounamu /Rifleman	Miromiro/Tomtit	Total
Low (200–300 m a.s.l.)	17	16	33
Mid (400–500 m a.s.l.)	17	10	27
High (650–750 m a.s.l.)	21	7	28
Total	55	33	88



Appendix S17. Observed hatching dates of tītitipounamu/rifleman (green) and miromiro/tomtit (black) nests throughout the breeding season 2020/21. The mean hatching date across the season is shown by the dashed line.

Appendix S18. Comparison of logistic-exposure mixed models of daily nest survival of miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*) across an elevational gradient. K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models. RatIndex was scaled and centred; biomass was log-transformed.

Model	K	AICc	Δ AICc	AICc weight
RatIndex + Species	4	203.99	0.00	0.53
RatIndex + Species + Biomass	5	205.87	1.87	0.21
RatIndex + Species + Elevation	6	206.31	2.32	0.17
RatIndex + Species + Elevation + Biomass	7	208.37	4.38	0.06
RatIndex + Species × Elevation	8	210.23	6.24	0.02
RatIndex + Species × Elevation + Biomass	9	212.32	8.33	0.01

Appendix S19. Parameter estimates for the second best linear mixed model (Appendix S18) of nest survival of miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*) across an elevational gradient on Mount Pirongia. RatIndex was scaled and centred; biomass was log-transformed.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	4.18	2.36	5.82
RatIndex	−0.23	−0.58	0.13
Species (Miromiro)	−0.80	−1.69	0.01
Biomass	−0.36	−2.21	1.11

Appendix S20. Parameter estimates for the third best linear mixed model (Appendix S18) of nest survival of miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*) across an elevational gradient on Mount Pirongia. RatIndex was scaled and centred; biomass was log-transformed.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	4.85	3.95	5.94
RatIndex	−0.25	−0.73	0.32
Species (Miromiro)	−0.67	−1.51	0.22
Elevation (Low)	−0.72	−1.77	0.41
Elevation (Mid)	−0.29	−1.84	1.23

Appendix S21. Overview of the number of nests where the number of fledglings could be determined across species and elevational bands.

Elevation (m a.s.l.)	Number of nests		
	Tītitipounamu/Rifleman	Miromiro/Tomtit	Total
Low (200–300 m a.s.l.)	9	10	19
Mid (400–500 m a.s.l.)	13	6	19
High (650–750 m a.s.l.)	12	5	17
Total	34	21	55

Appendix S22. Comparison of generalised linear mixed models with Conway-Maxwell-Poisson error of habitat-specific factors affecting the number of fledglings of miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu/rifleman (*Acanthisitta chloris*) of successful nests. K = number of parameters included in model, AICc = Aikake's information criterion corrected for small sample size, Δ AICc = difference in AICc value from that of the best model, Akaike weights, indicating relative support for models.

Model	K	AICc	Δ AICc	AICc weight
Species	3	138.71	0.00	0.55
Species + Biomass	4	139.84	1.13	0.31
Species + Elevation	5	142.50	3.79	0.08
Species + Elevation + Biomass	6	143.57	4.86	0.05
Species × Elevation	7	147.14	8.43	0.01
Species × Elevation + Biomass	8	148.48	9.77	0.00

Appendix S23. Parameter estimates for the second best linear mixed model (Appendix S22) of number of fledglings produced by miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*) across an elevational gradient on Mount Pirongia. Biomass was log-transformed.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	1.26	1.04	1.49
Species (Miromiro)	0.04	−0.10	0.18
Biomass	0.13	−0.10	0.12

Appendix S24. Parameter estimates for the third best linear mixed model (Appendix S22) of number of fledglings produced by miromiro/tomtit (*Petroica macrocephala*) and tītitipounamu /rifleman (*Acanthisitta chloris*) across an elevational gradient on Mount Pirongia. Biomass was log-transformed.

Parameter	Estimate	Lower 95% CI	Upper 95% CI
Intercept	1.11	0.98	1.24
Species (Miromiro)	0.03	−0.11	0.17
Elevation (Low)	0.02	−0.15	0.19
Elevation (Mid)	0.08	−0.09	0.25