Appendix S5. Table of forest bird primary habitat associations, figures of proportional presence of species along climate gradients, and map of 2100 analogous climate areas.

Analogue climate map shows areas (in green) where 2100 climate is projected to remain within the 99.9% quantile range of current bioclimatic values (for bio 1, 7, 12, 15). This is based on a simple rectilinear climate envelope approach (refs below). The map shows the majority of non-analogue areas are in coastal areas that by 2100 are projected to be hotter than anywhere currently in the archipelago. Native forest birds are largely absent from these low elevation areas today.

Busby, J.R. 1991. BIOCLIM - a bioclimate analysis and prediction system. Plant Protection Quarterly 6(1): 8–9.

Nix, H.A. 1986. A biogeographic analysis of Australian Elapid snakes. p. 4–15. In Longmore, R. (ed.), Atlas of Australian Elapid snakes. Bureau of Flora and Fauna, Canberra.

Price, J.P., J.D. Jacobi, S.M. Gon, D. Matsuwaki, L. Mehrhoff, W. Wagner, M. Lucas, and B. Rowe. 2012. Mapping plant species ranges in the Hawaiian Islands-Developing a methodology and associated GIS layers. United States Geological Survey.
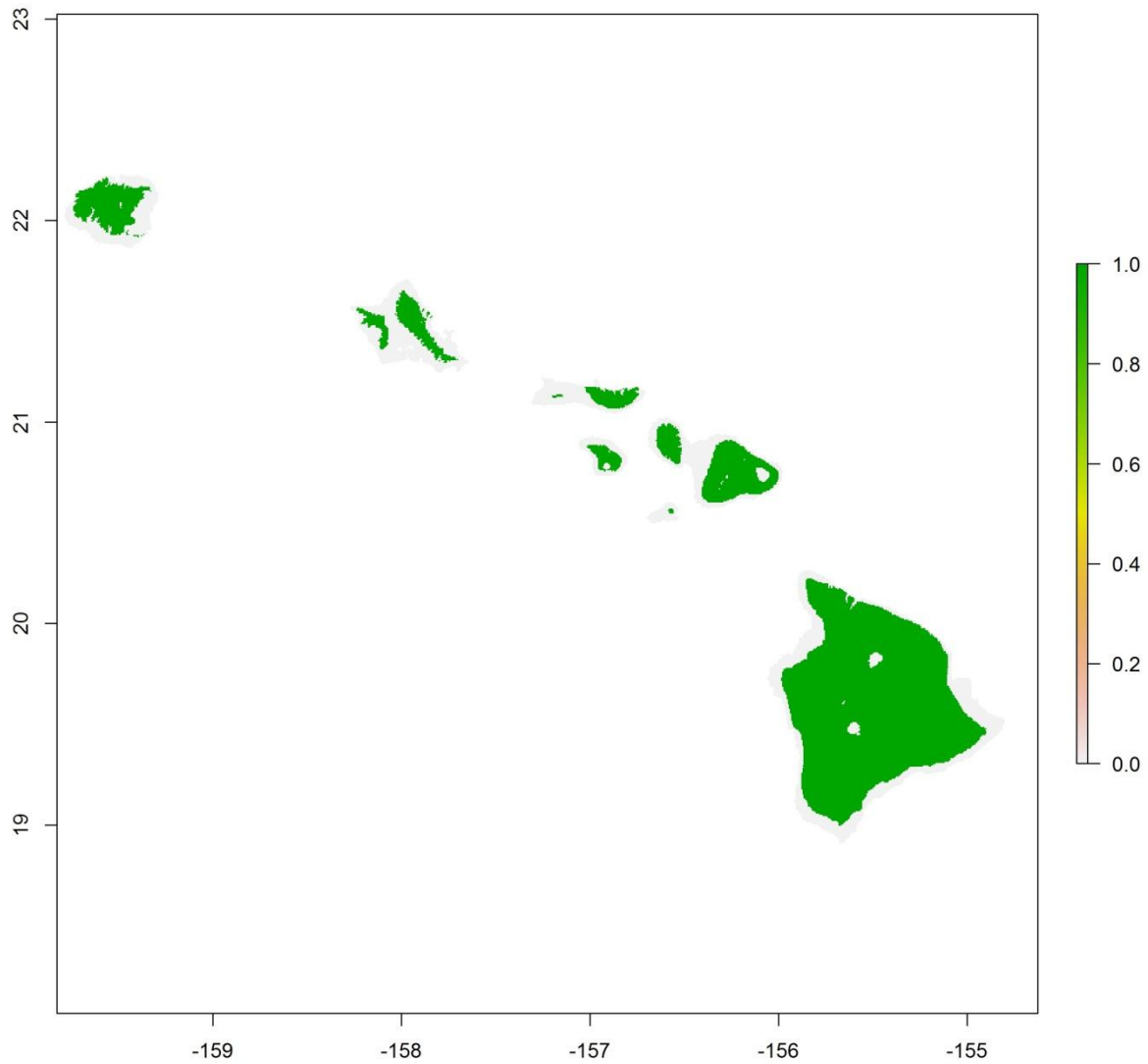
Table listing the primary habitat considered for each species, as described in manuscript. Percent distribution of known species locations across broad land cover classes. Values in bold denote cover classes that make up to 90% of known species sightings. Since we exclude 'other' cover, highlighted values represent cover types considered the primary habitat for the species.

Land cover	Wet forest	Mesic forest	Dry shrubland	Other	Dry forest	Perennial grassland	Wet/mesic forest	Evergreen shrubland	Dry grassland	Mesic shrubland	Decidious shrubland	Mesic grassland
Akekee	93	4	0	1	0	0	2	0	0	0	0	0
Anianiau	91	3	0	2	0	0	4	0	0	0	0	0
Akikiki	100	0	0	0	0	0	0	0	0	0	0	0
Puaiohi	100	0	0	0	0	0	0	0	0	0	0	0
Hawaii_Akepa	61	33	4	1	0	0	0	0	0	0	0	1
Hawaii_Creeper	65	31	2	1	0	0	0	0	0	0	0	1
Kauai_Amakihi	79	9	0	3	0	0	9	0	0	0	0	0
Kauai_Elepaio	82	8	0	3	0	0	8	0	0	0	0	0
Omao	67	23	4	4	0	1	1	0	0	0	0	0
Maui_Parrotbill	63	23	0	14	0	0	0	0	0	0	0	0
Oahu_Amakihi	48	6	0	13	1	0	28	4	0	0	1	0
Akohekohe	57	22	0	20	0	0	0	0	0	0	0	0
Maui_Alauahio	71	13	0	14	1	1	1	0	0	0	0	0
Akiapolauu	52	32	7	1	3	4	0	0	0	0	0	0
Apapane	53	23	8	5	3	3	2	0	0	1	0	0
Iiwi	60	26	6	3	2	2	1	0	0	0	0	0
Hawaii_Elepaio	51	29	5	3	7	3	1	0	0	0	0	0
Hawaii_Amakihi	35	28	14	6	9	5	1	0	0	0	0	0
Oahu_Elepaio	16	17	0	3	1	1	55	7	0	0	1	0
Palila	0	0	45	8	34	12	0	0	0	0	0	0
All combined	54	25	8	4	4	3	2	0	0	0	0	0

All proportional presence figures below follow the exact format as figure 1 in the manuscript.

File S5. Proportional presence of species along climate gradients

To determine if location data encompassed the full range of each species modeled, using presence/absence data from all locations for each species, we compared overall species prevalence (proportion of total points a species was sought in which species was actually observed) with prevalence at the low and high ends of our climate predictors (using <2.5% and >97.5% quantile values). In this simplified analyses we classified species as being comprehensively sampled if they had prevalence at the limits of surveyed climate < 50% of the overall species prevalence, with prevalence weighted by climate predictor importance. This was done as we naturally expected the prevalence at the limits of surveyed climate predictors to be substantially smaller than overall prevalence.

As a comparative example, the figure below shows proportional presence of species representing adequate (a-Akikiki) and poor (b- Kaua'i `Amakihi) sampling along temperature gradients. In the case of Kauai `Amakihi, the high proportion of presence locations with respect to total bird survey locations at higher temperatures indicate the species can likely inhabit locations hotter than those represented across all available bird surveys. Similar figures for all other species and predictors are included below.
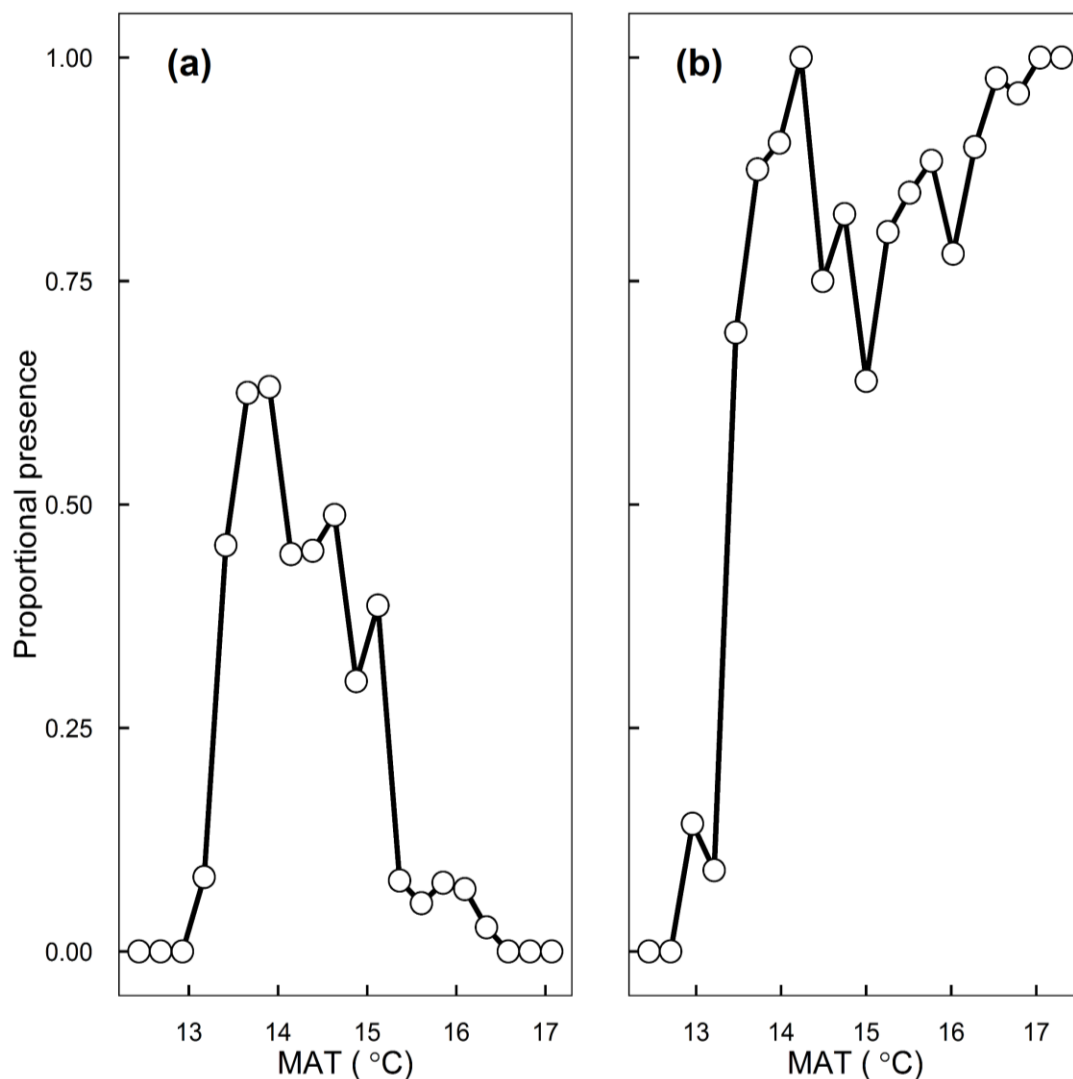
S5

Proportional presence of species along climate gradients
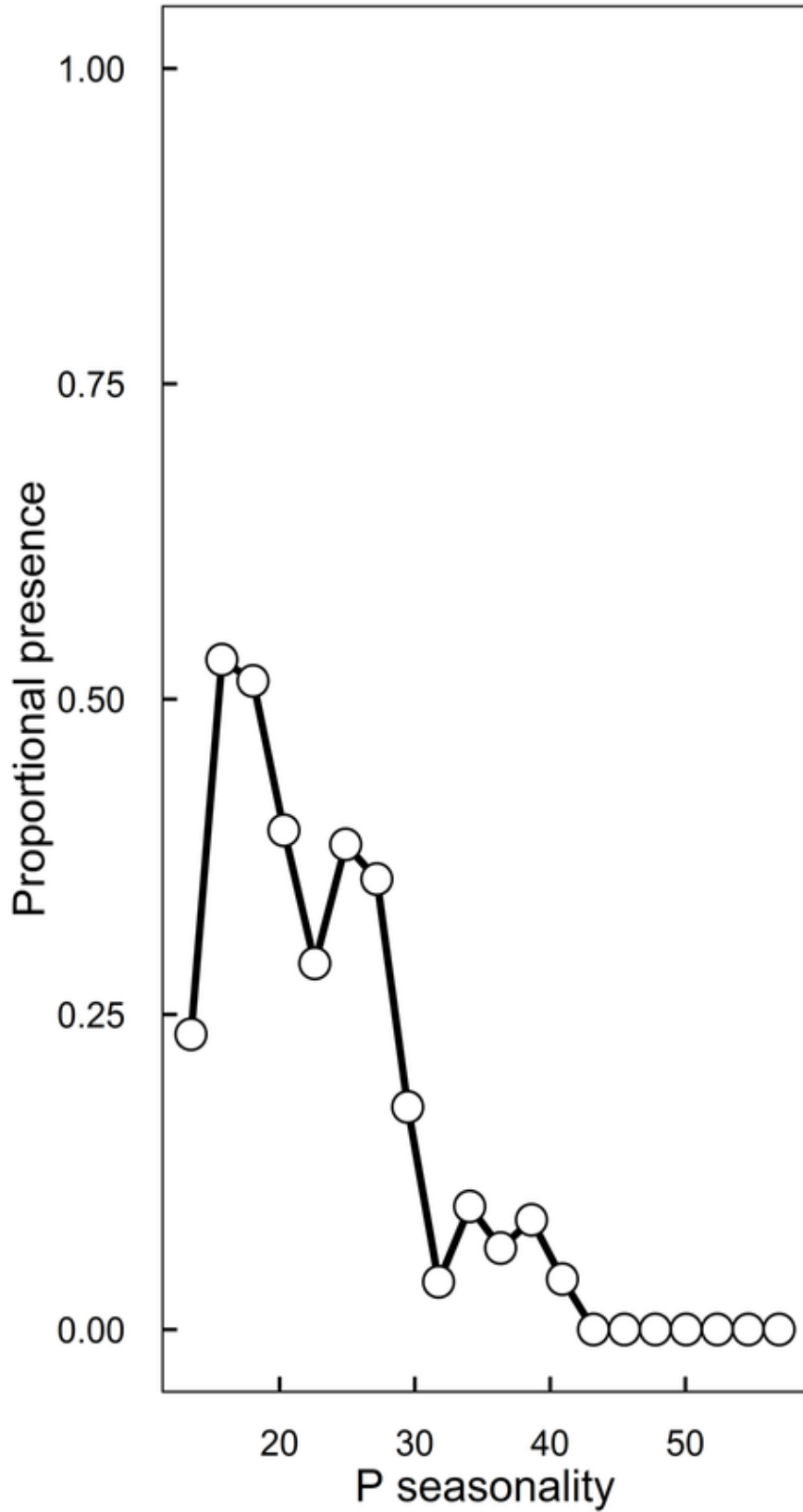
Proportional presence Akekee bio1
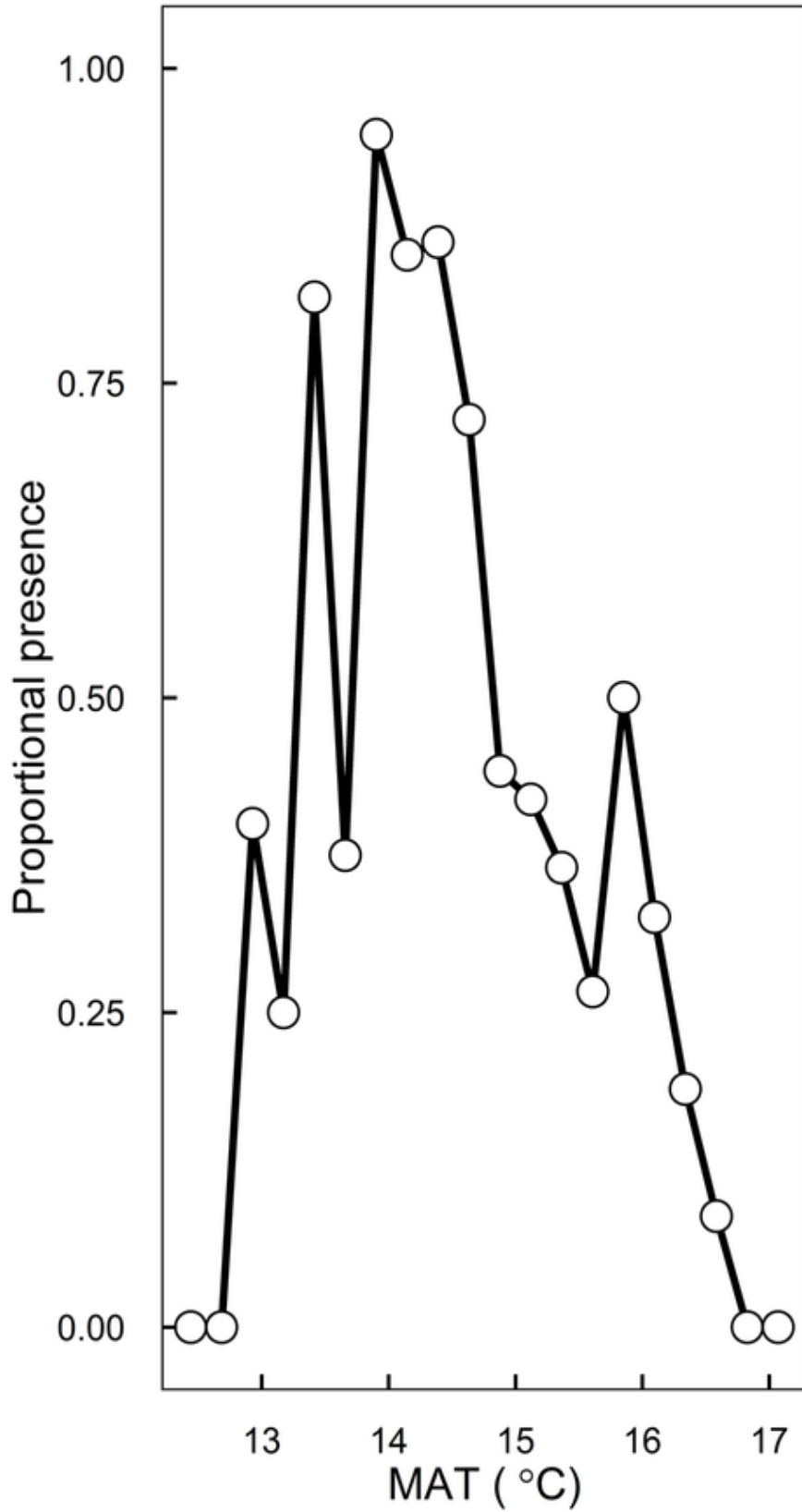
S5
Proportional presence of species along climate gradients
Proportional presence Akekee bio12
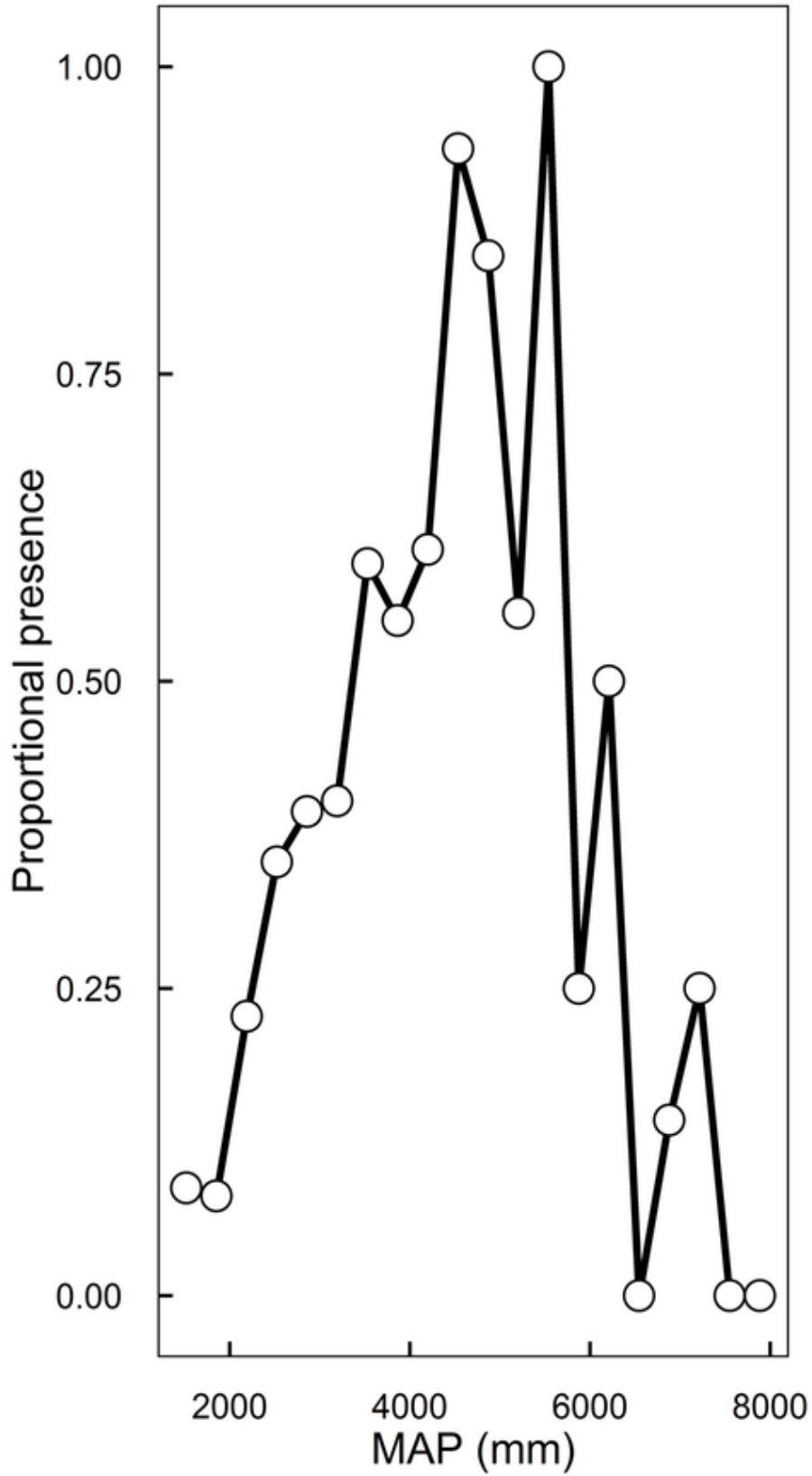
S5
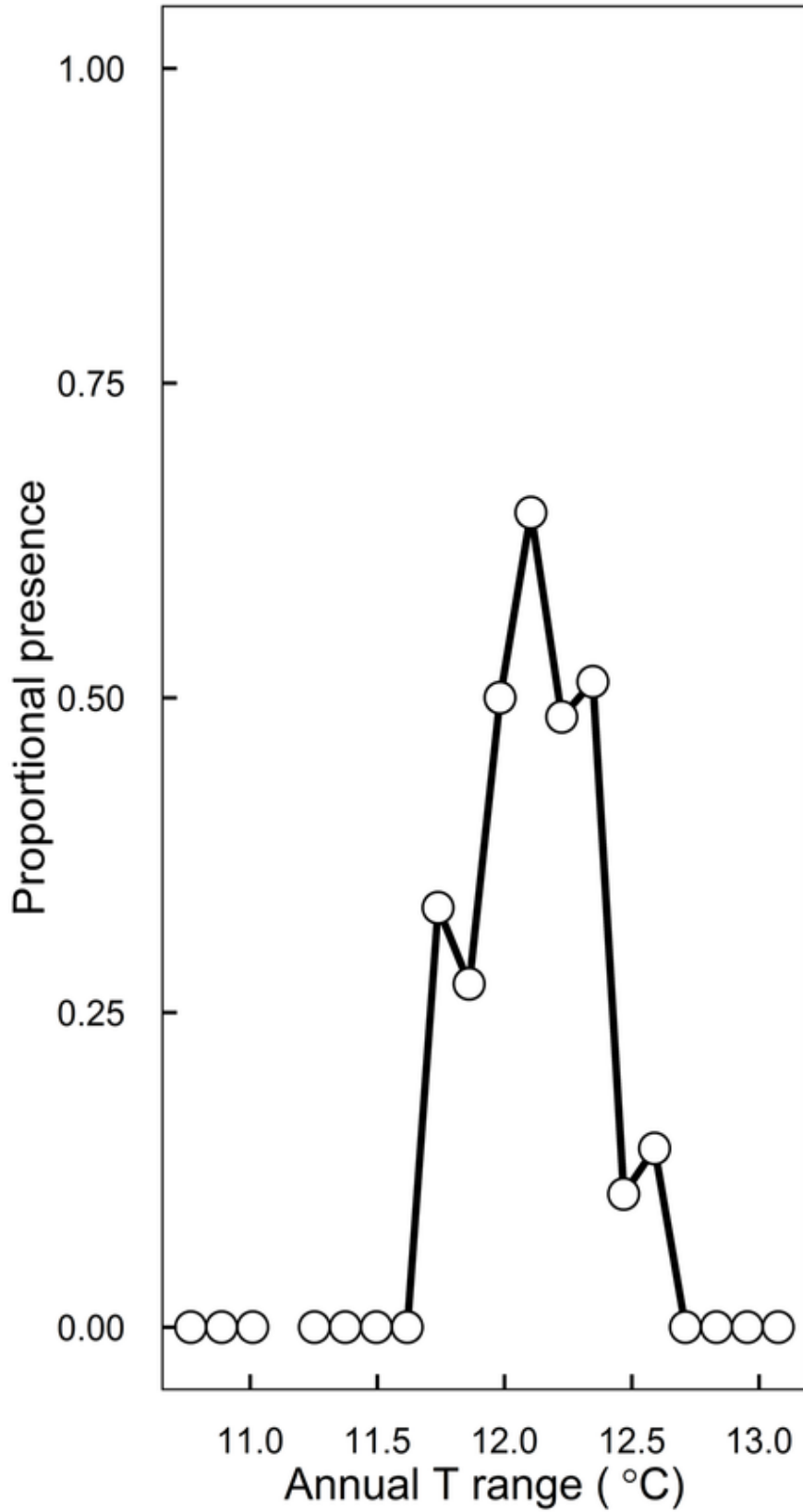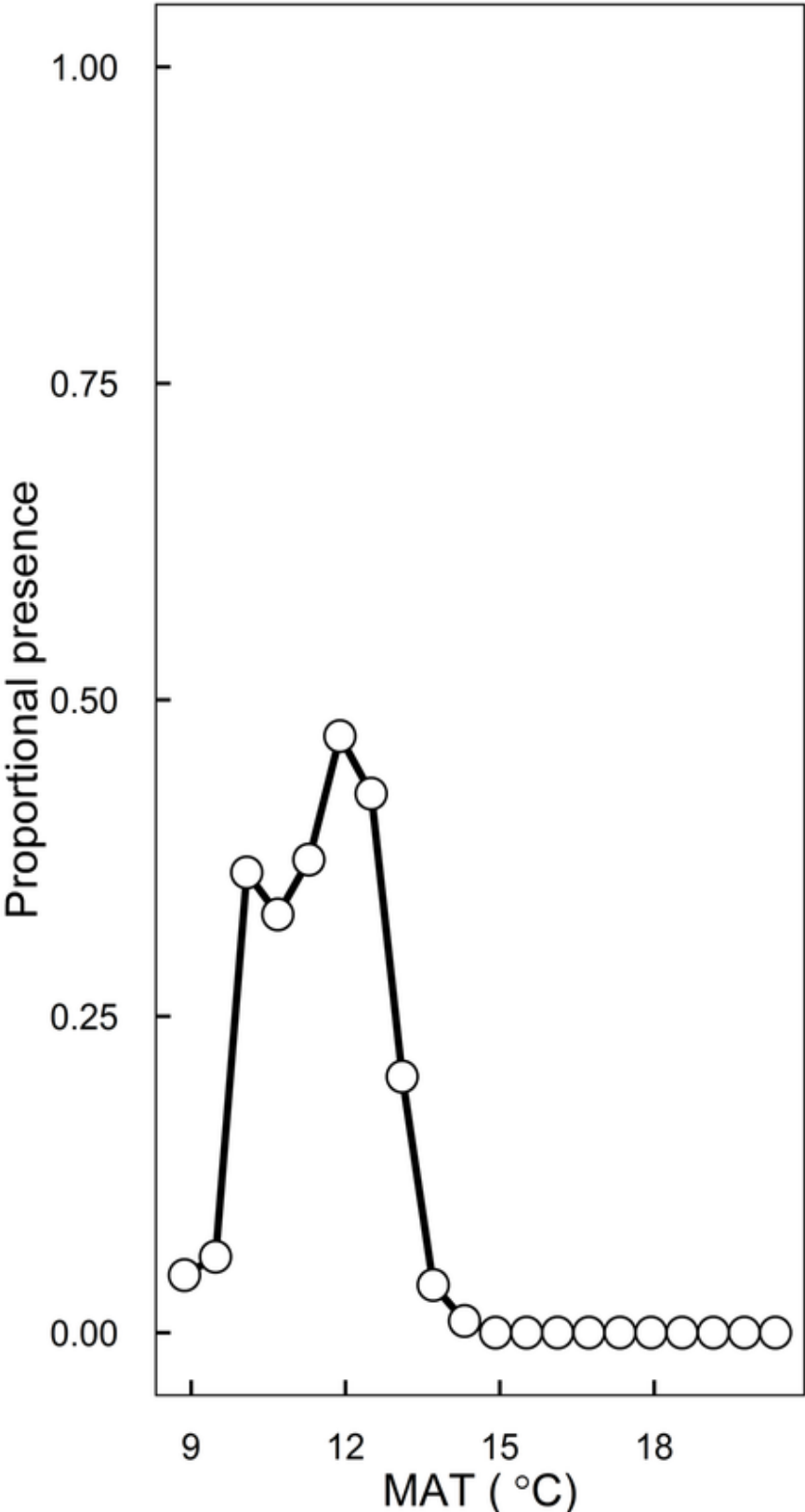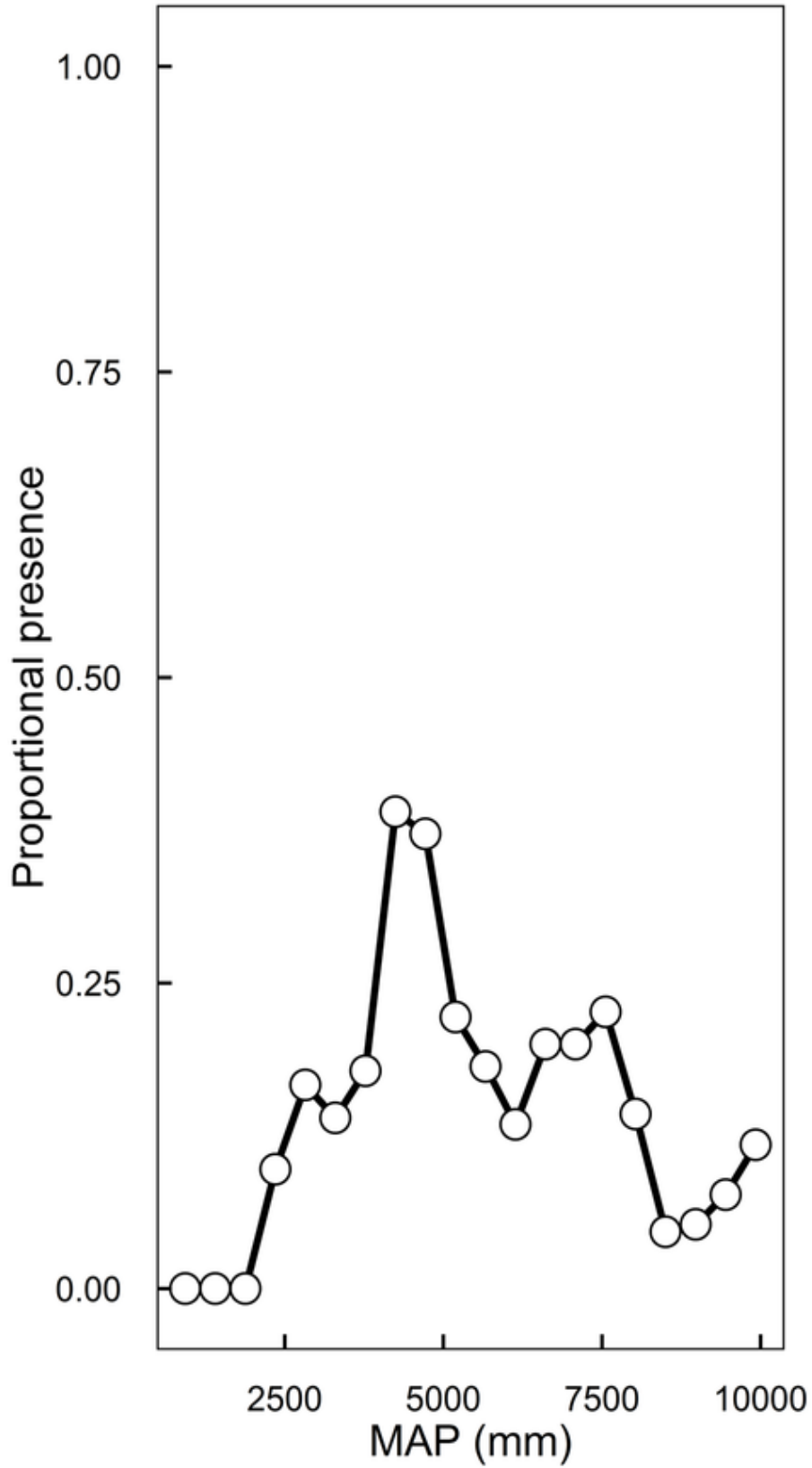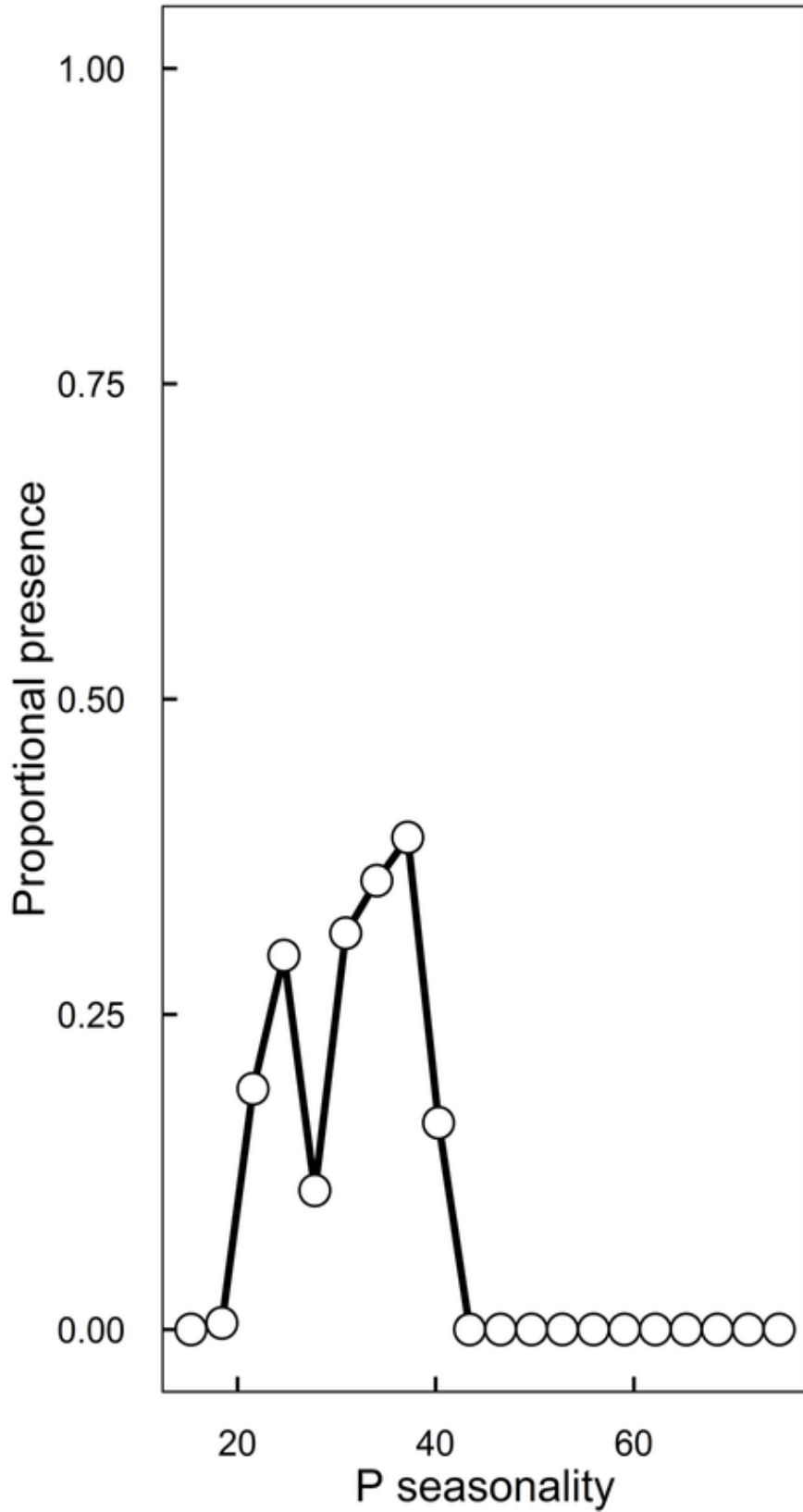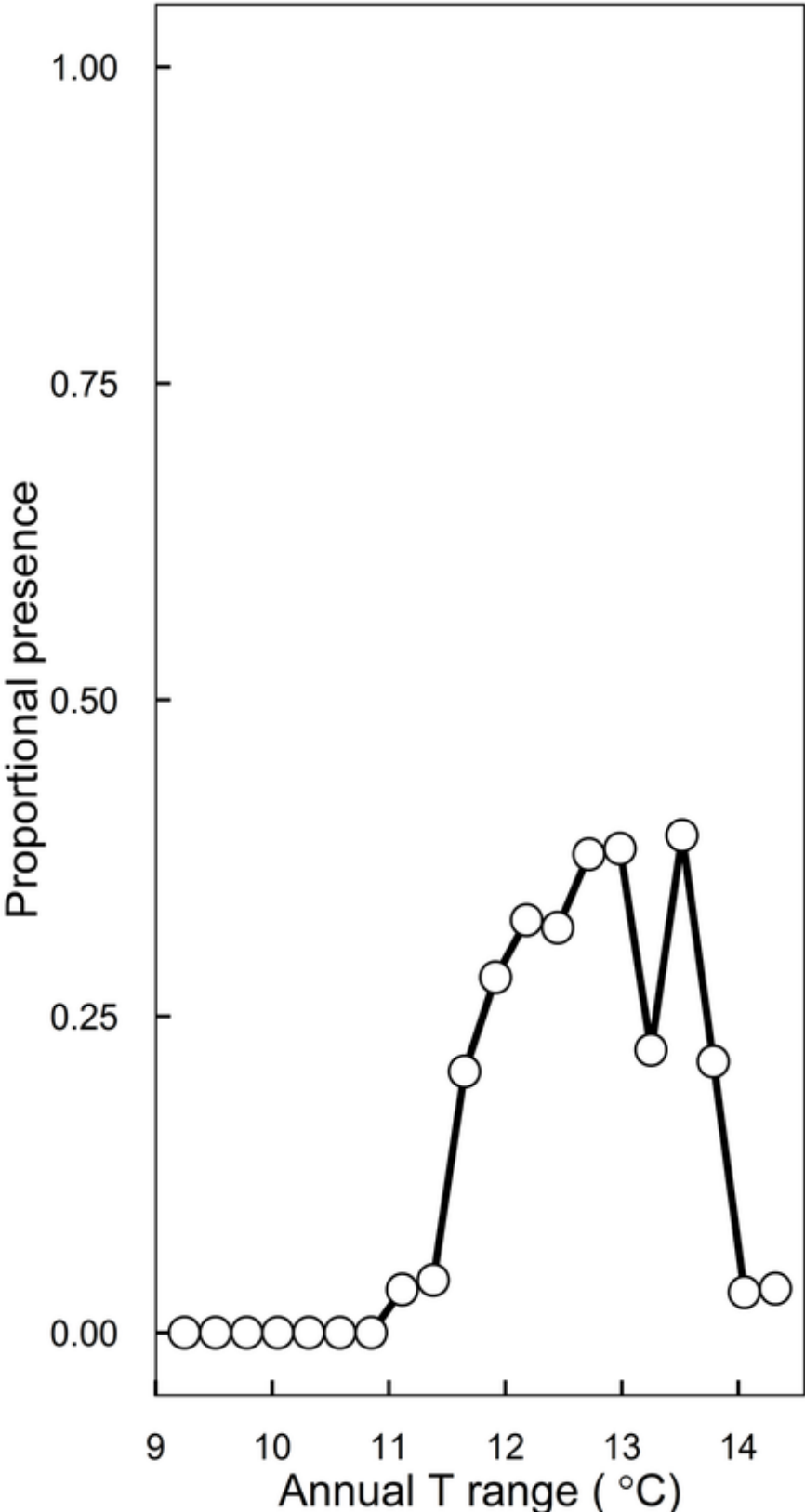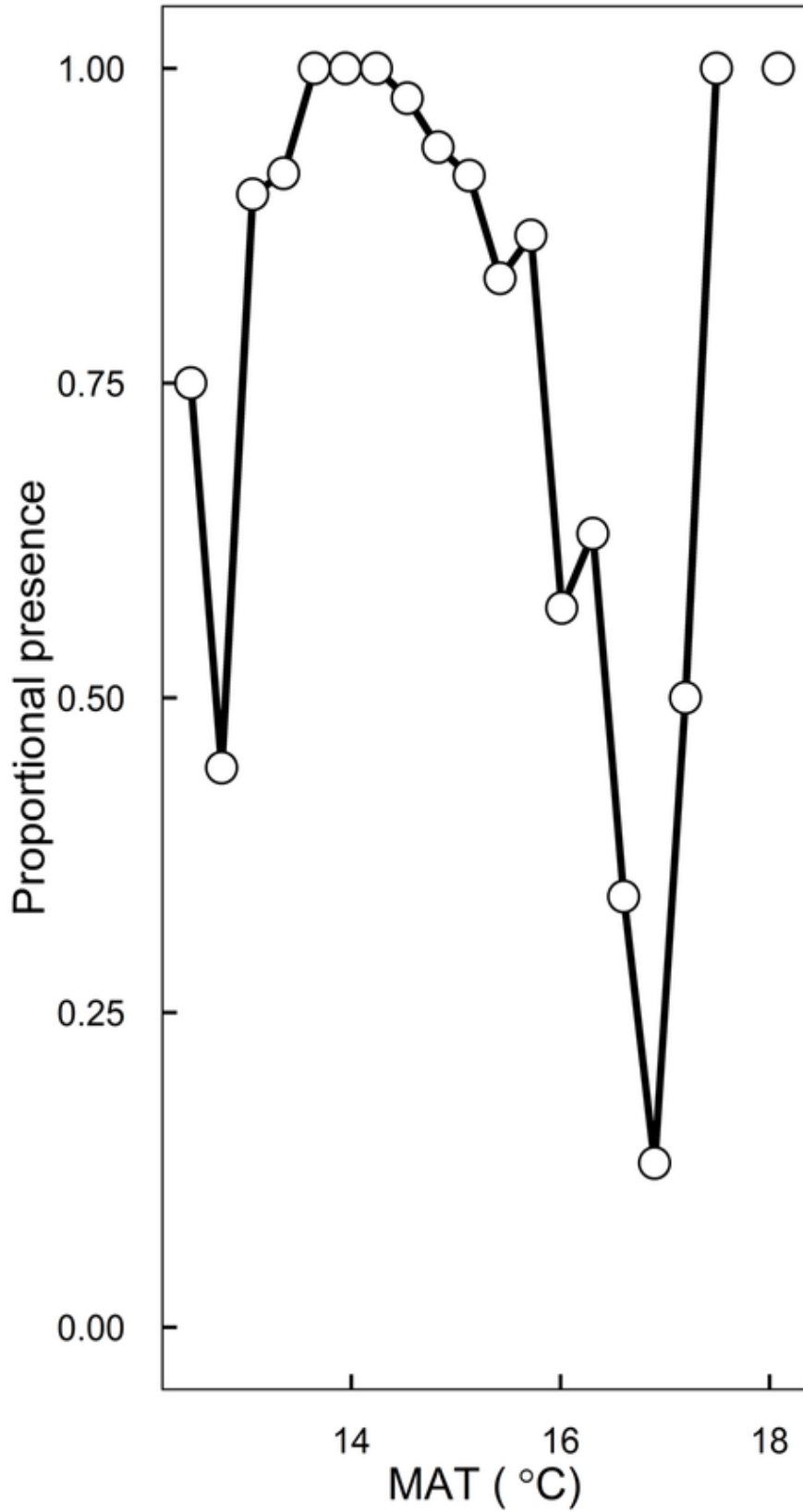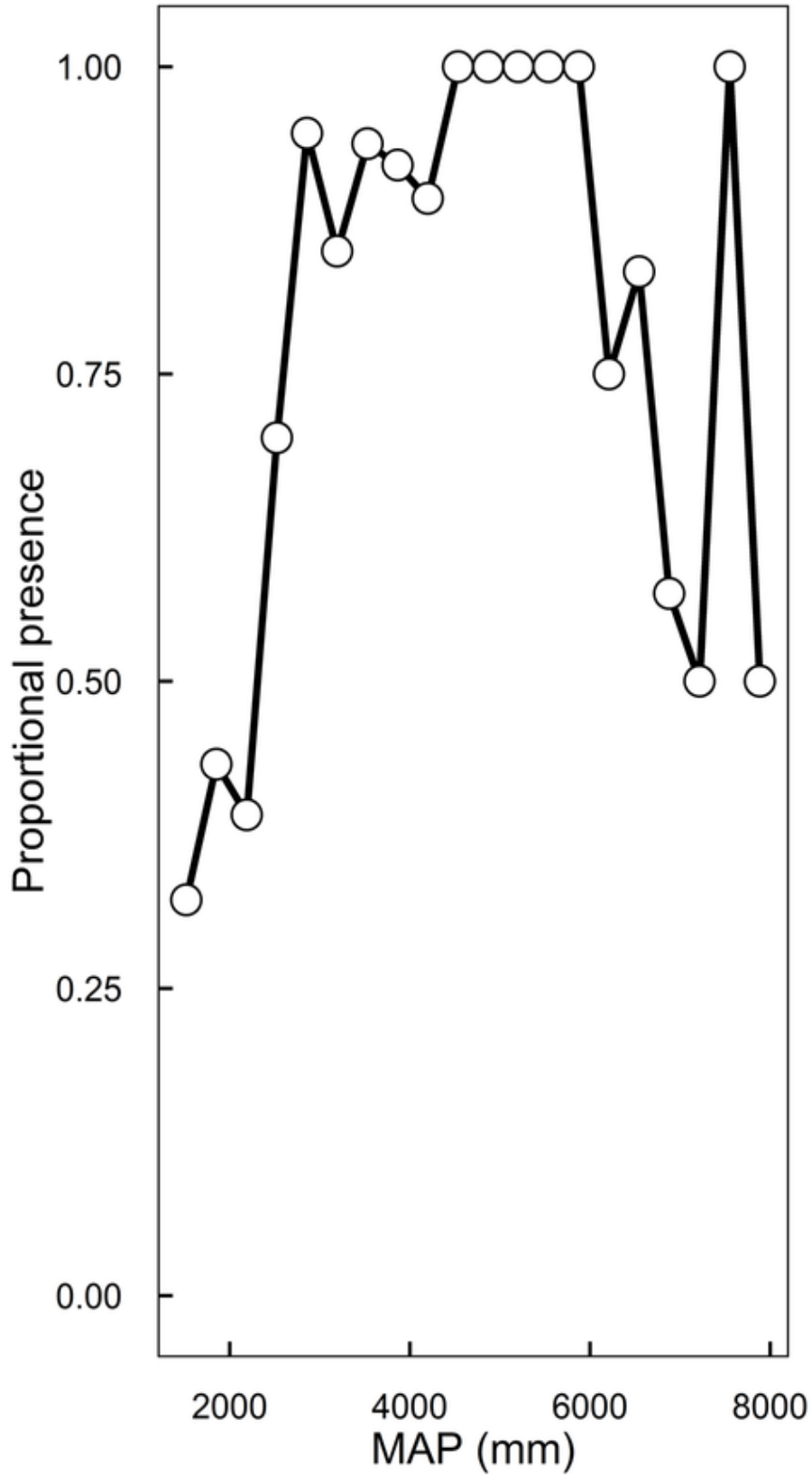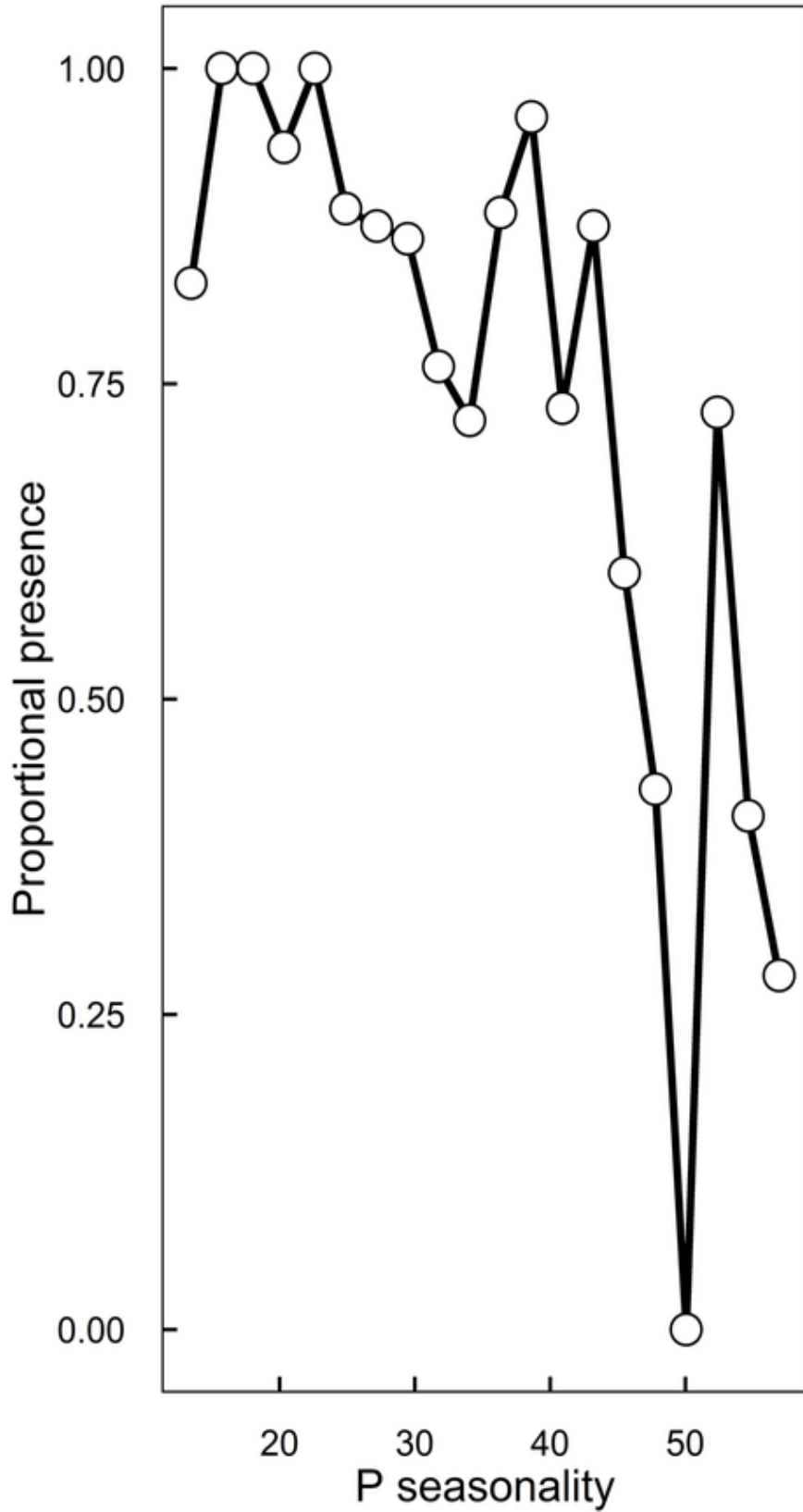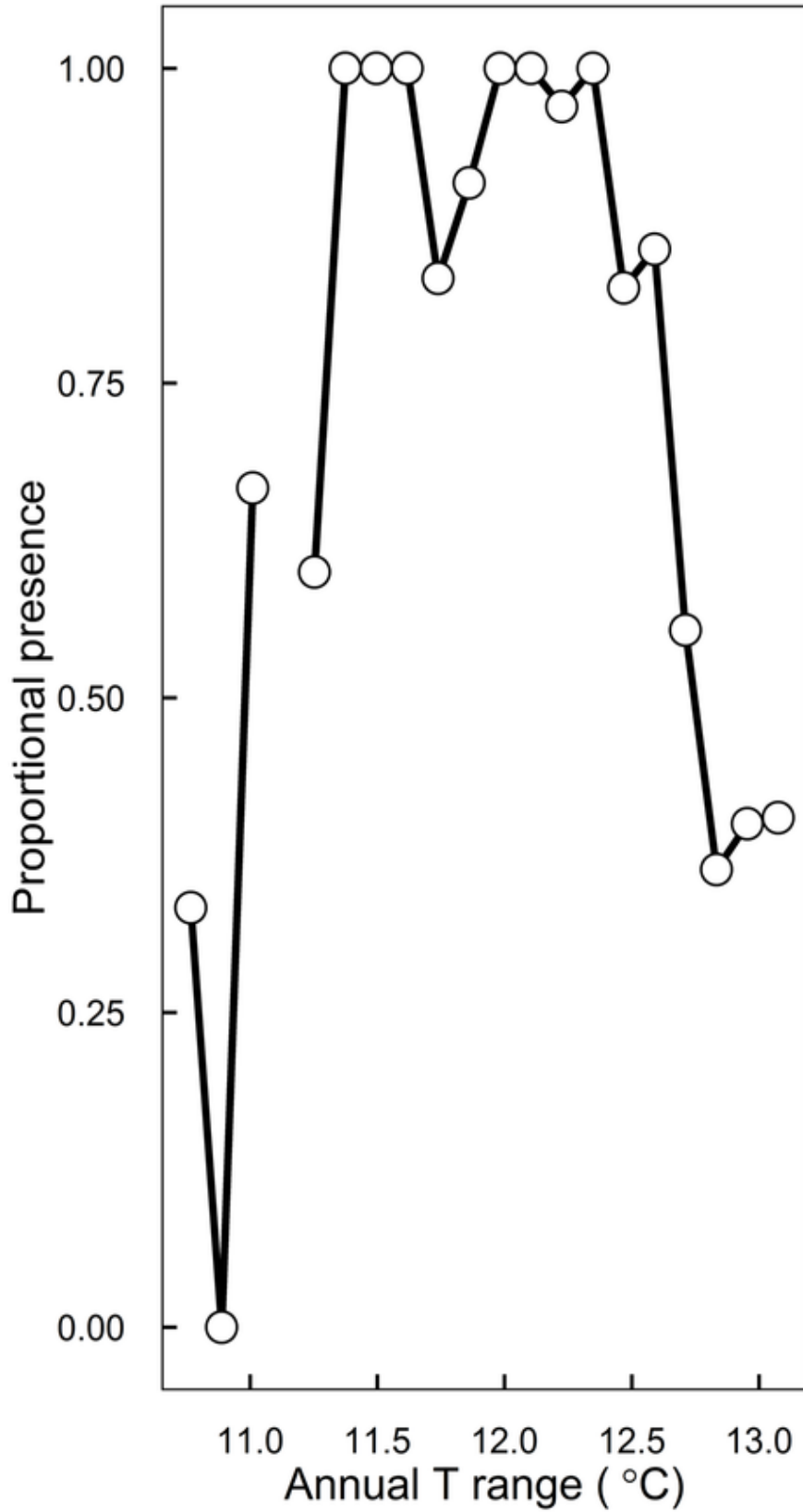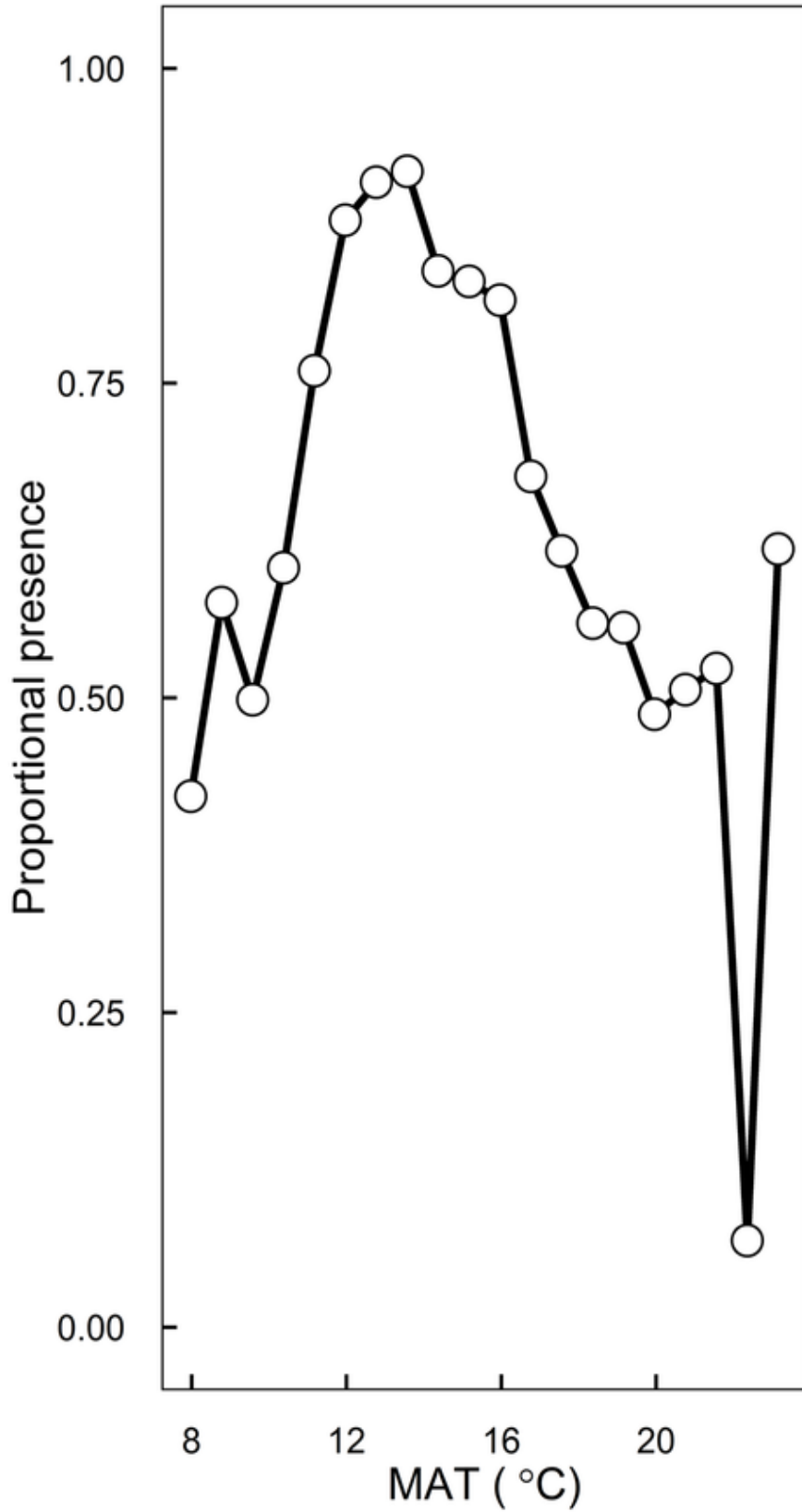
Proportional presence of species along climate gradients

Proportional presence Akekee bio15
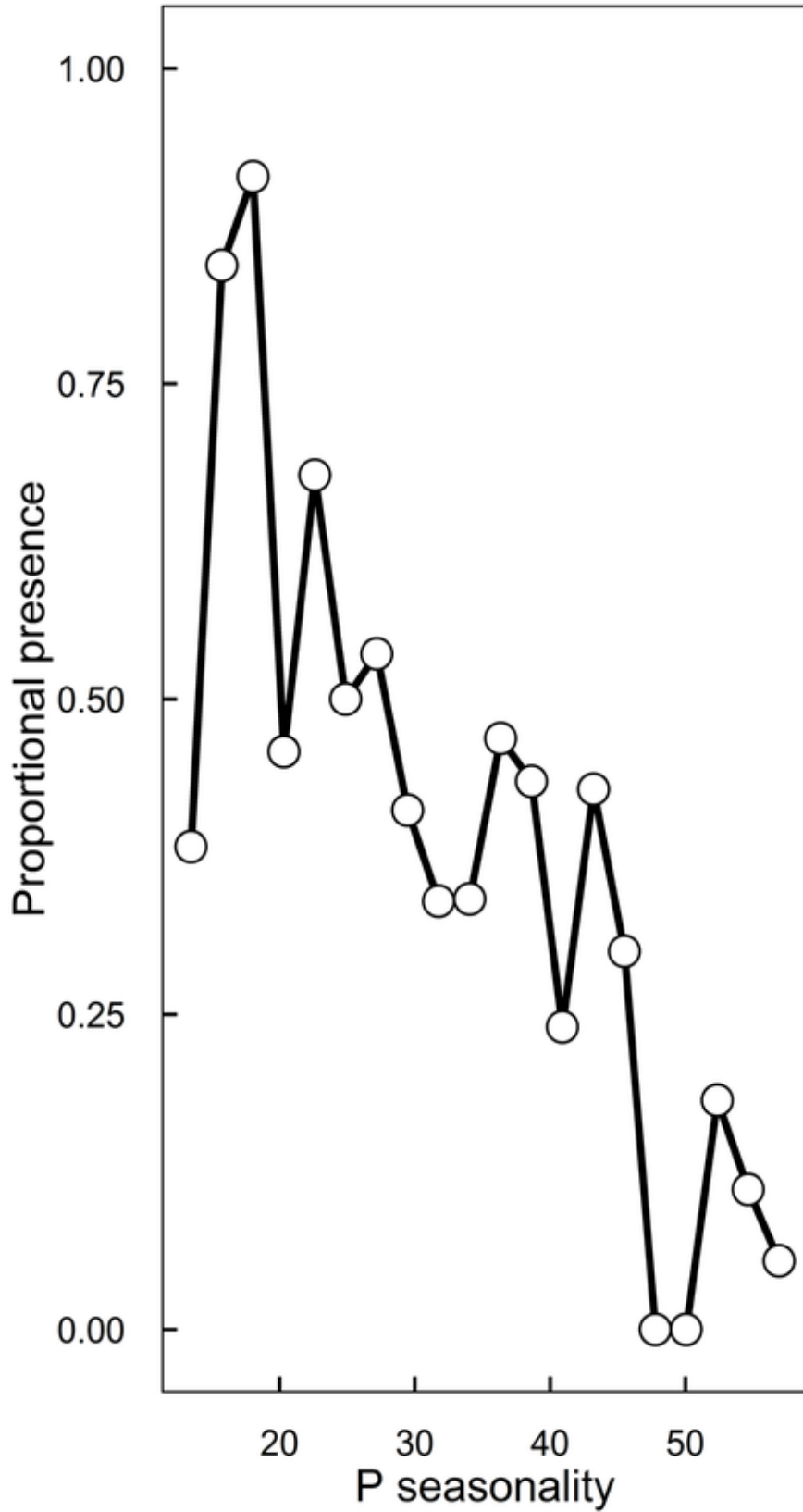
Proportional presence of species along climate gradients

Proportional presence Akekee bio7
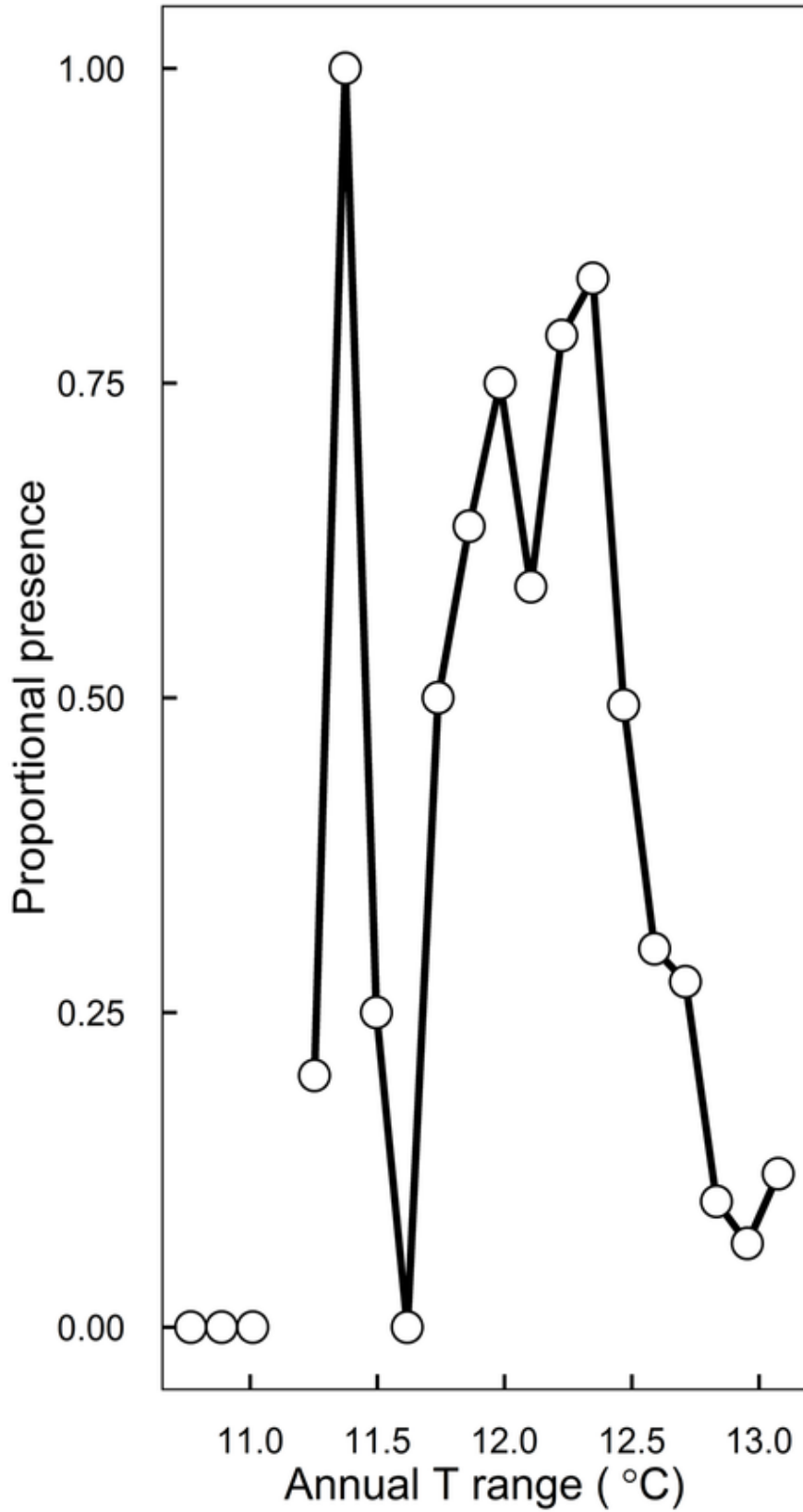
S5
Proportional presence of species along climate gradients

Proportional presence Akiapolauu bio1

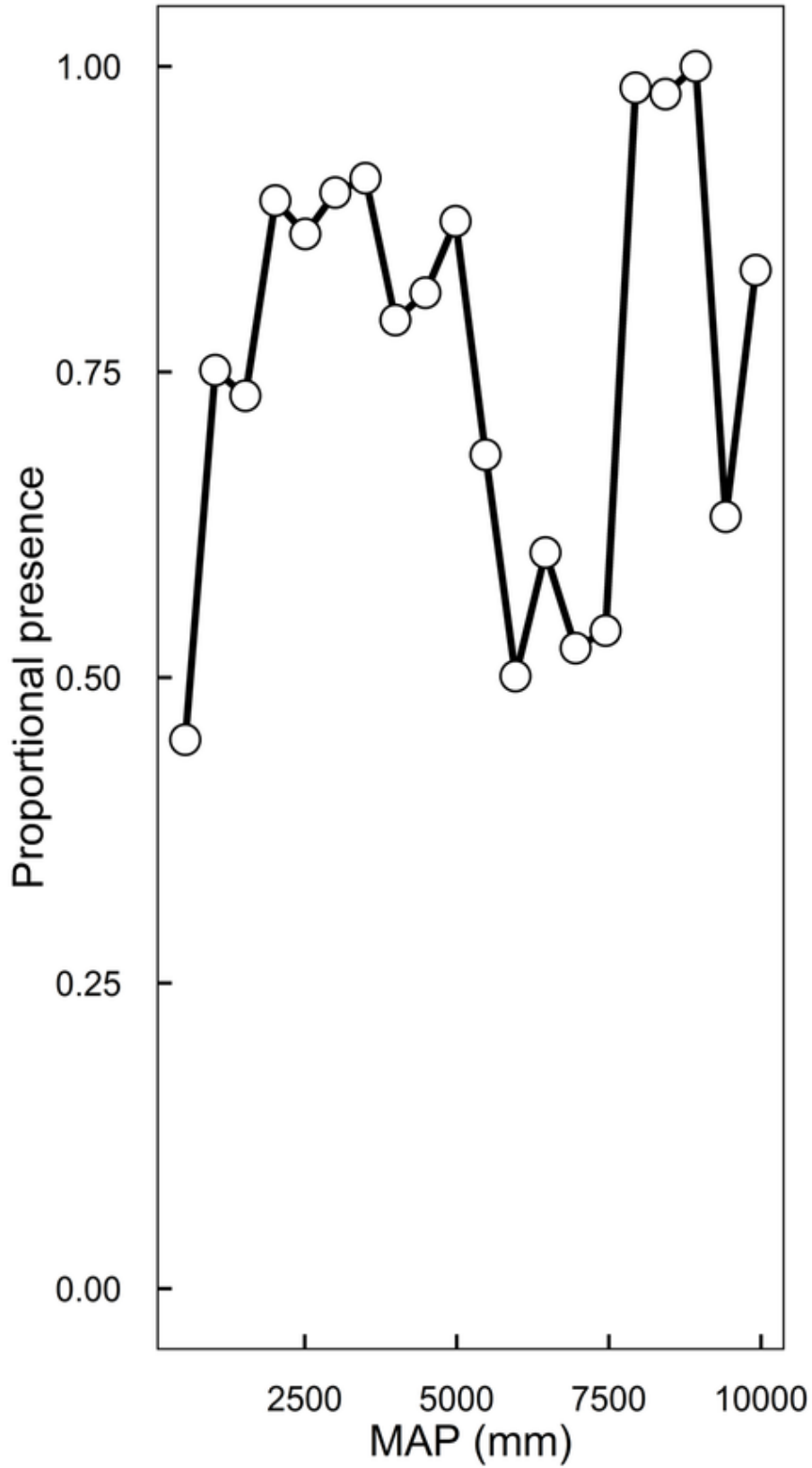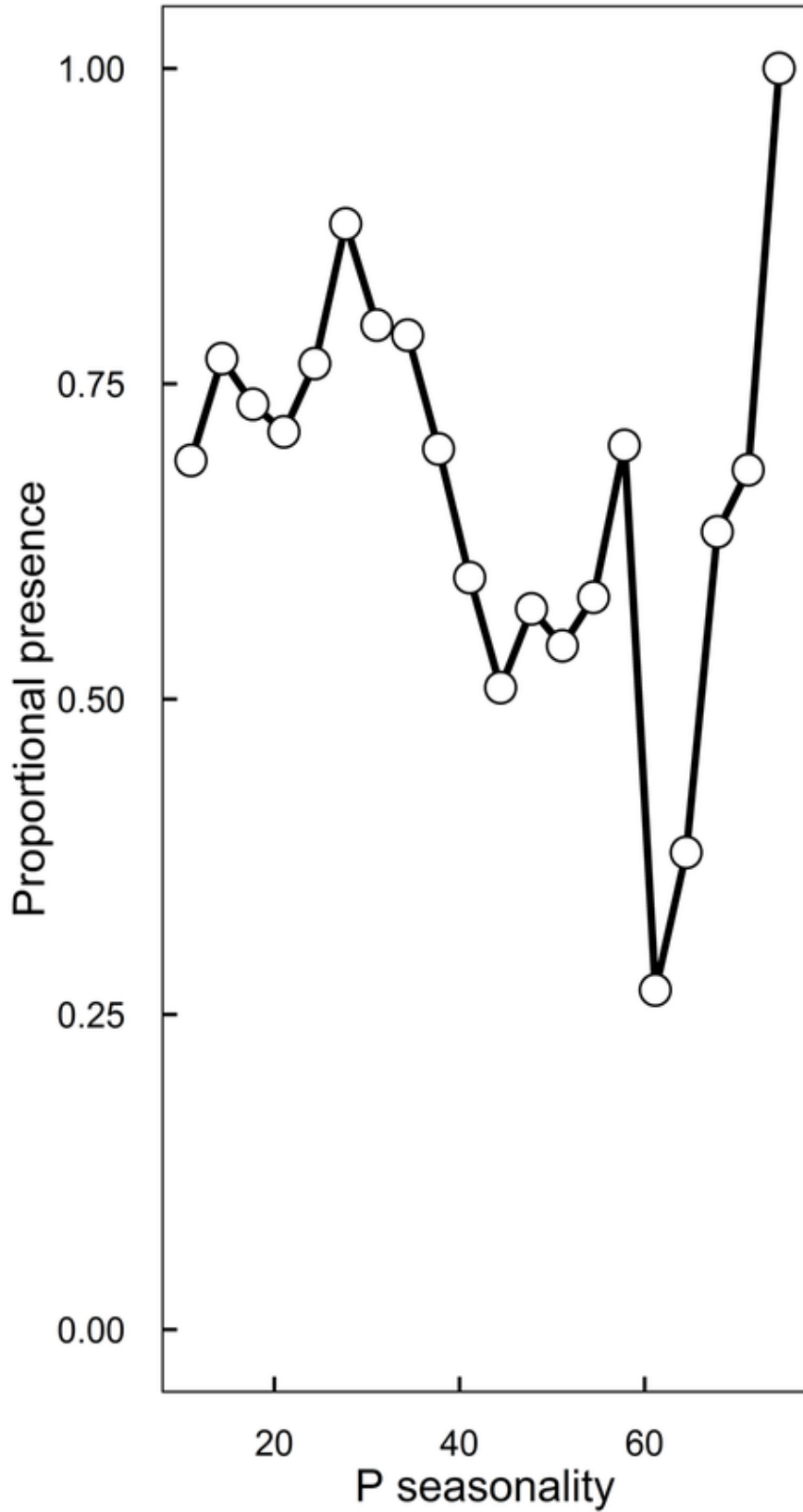S5
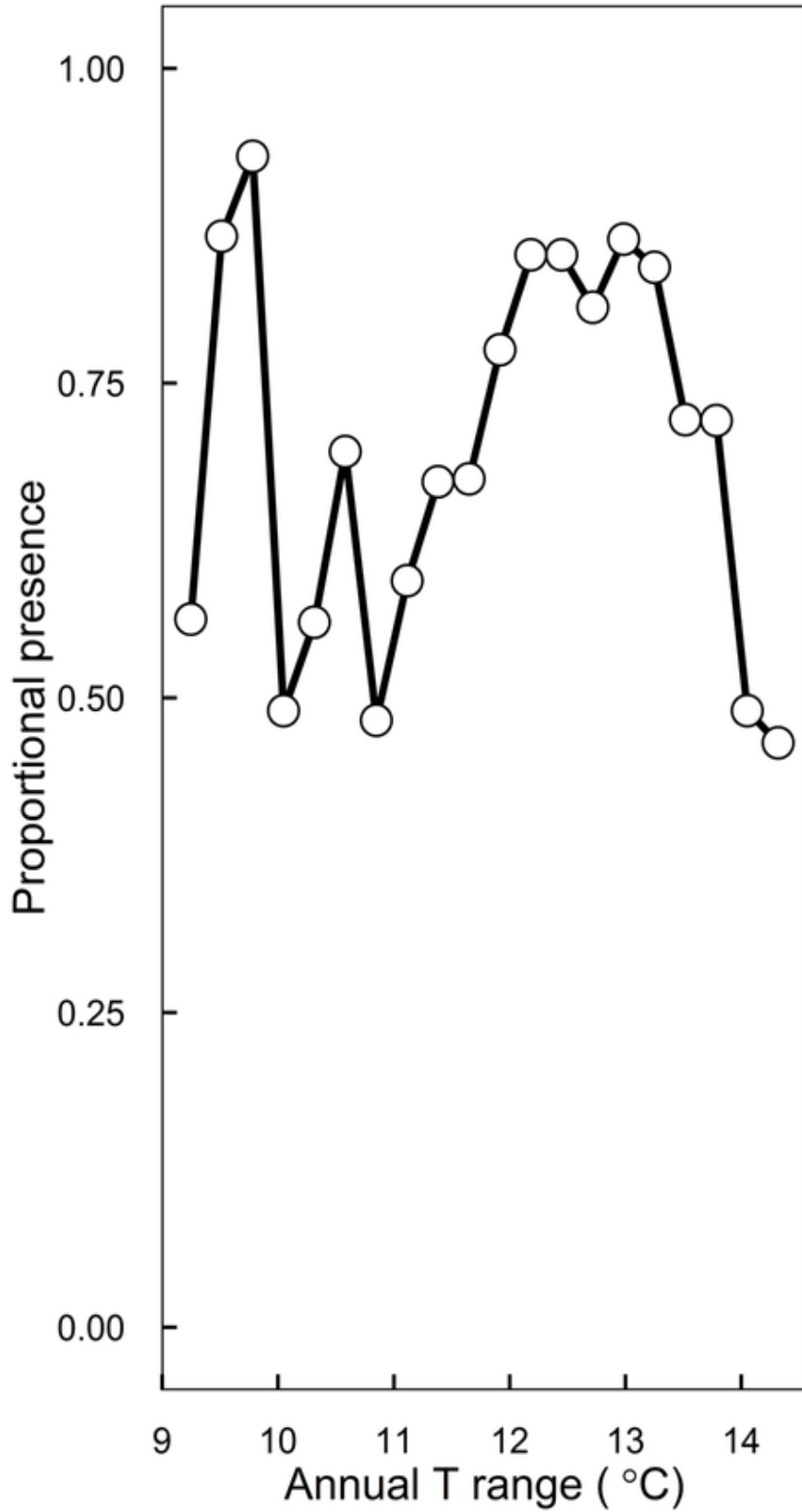Proportional presence of species along climate gradients
Proportional presence Akiapolauu bio12

S5

Proportional presence of species along climate gradients

Proportional presence Akiapolauu bio15

S5
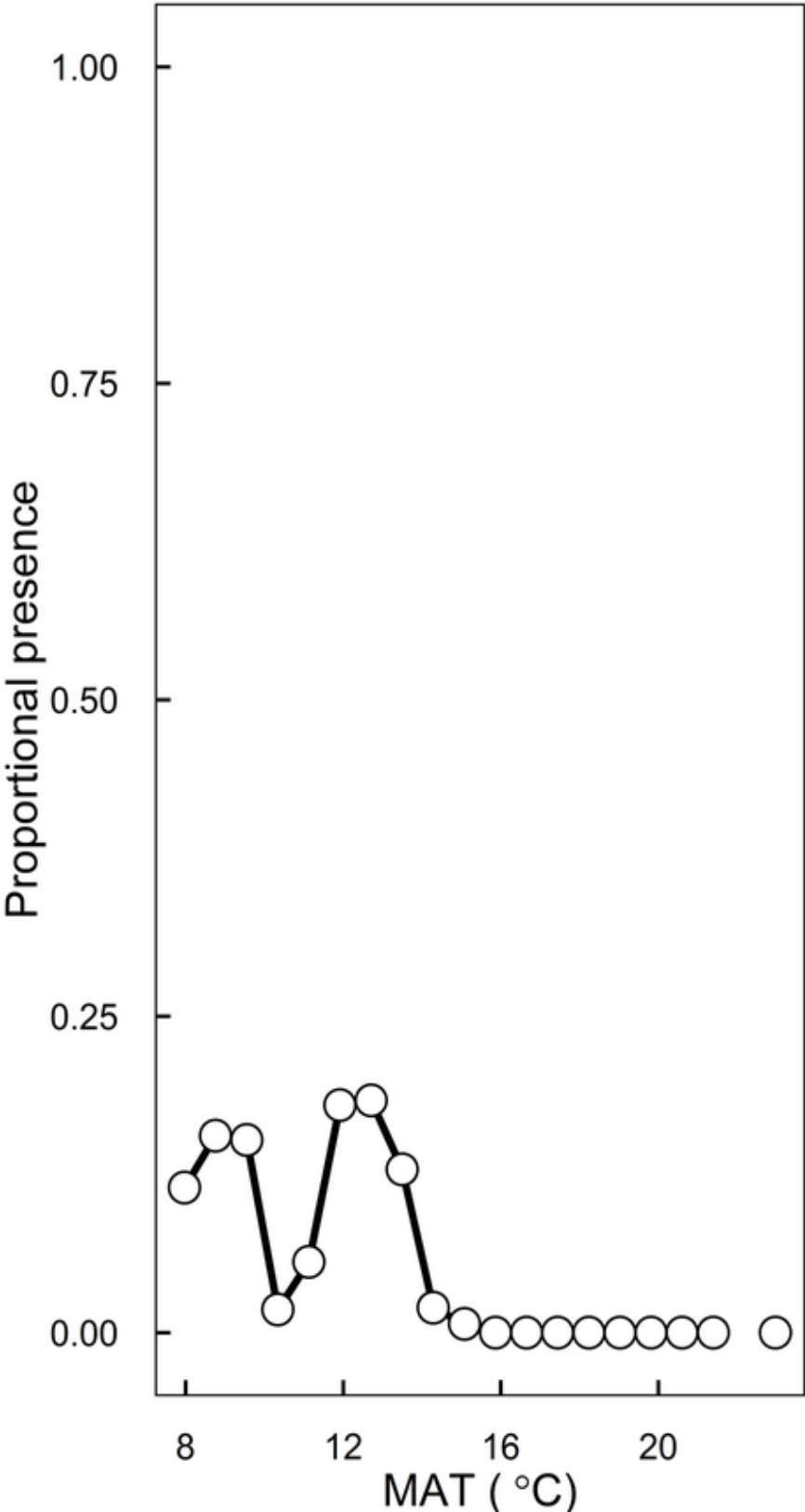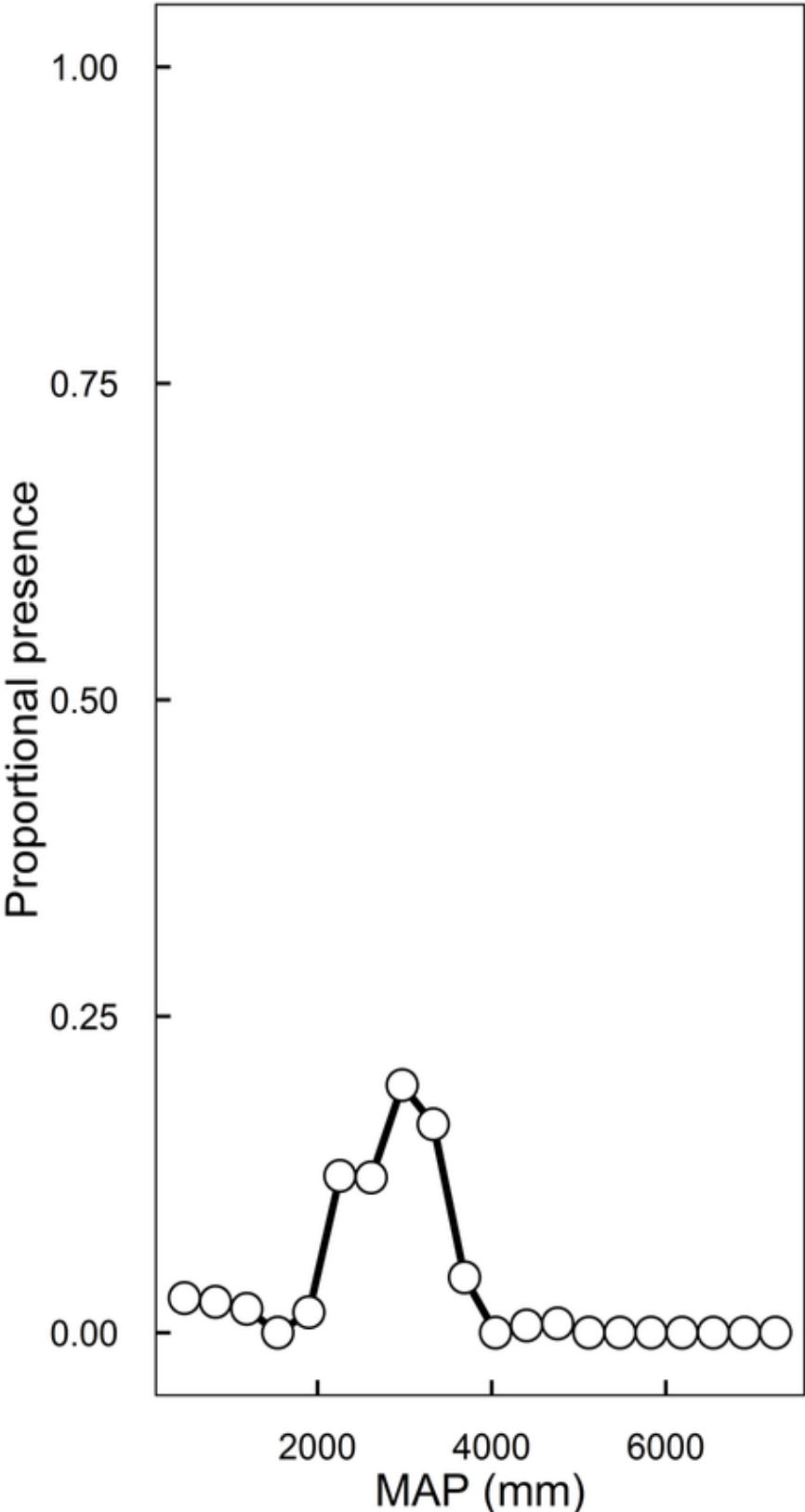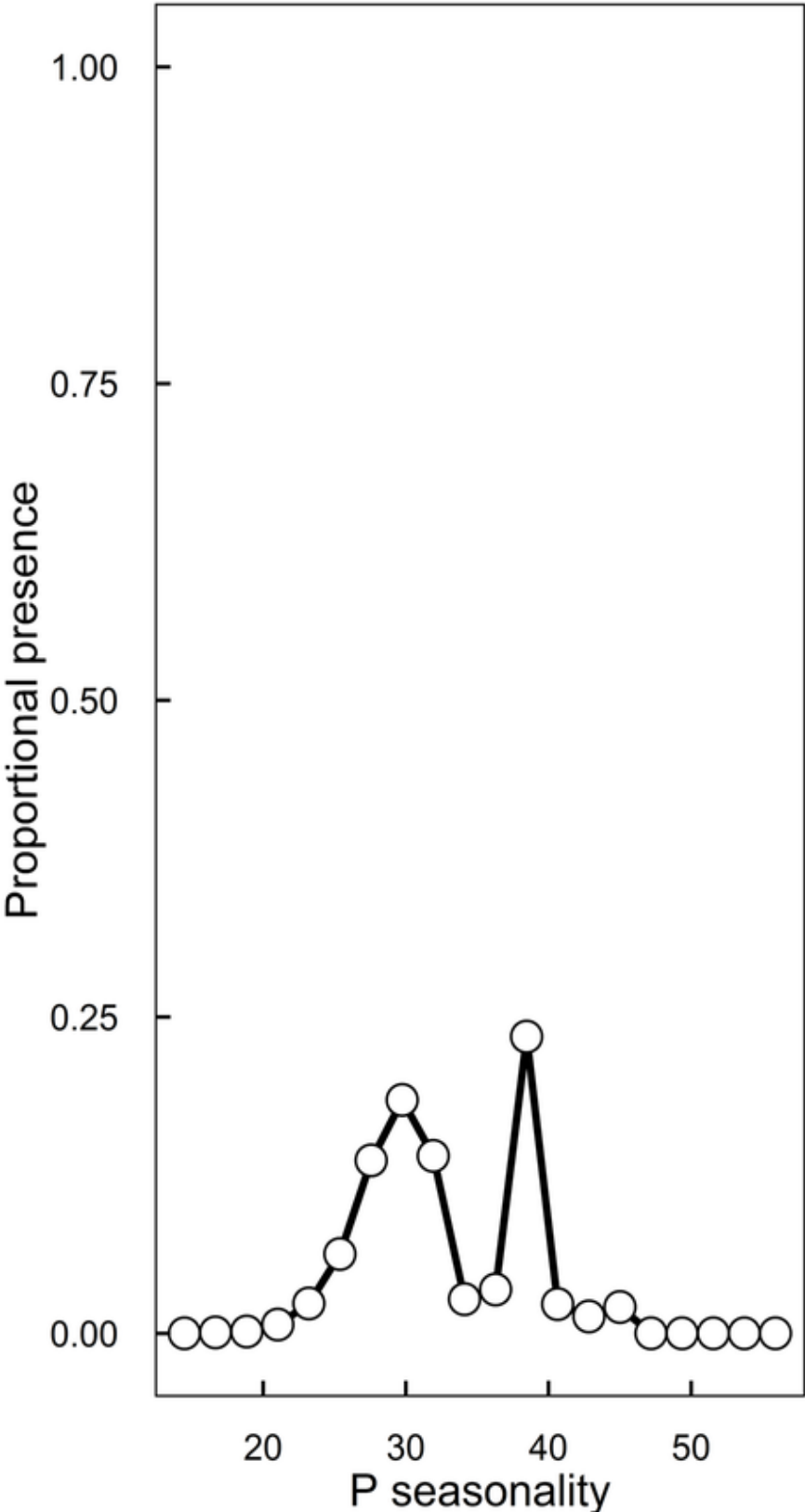
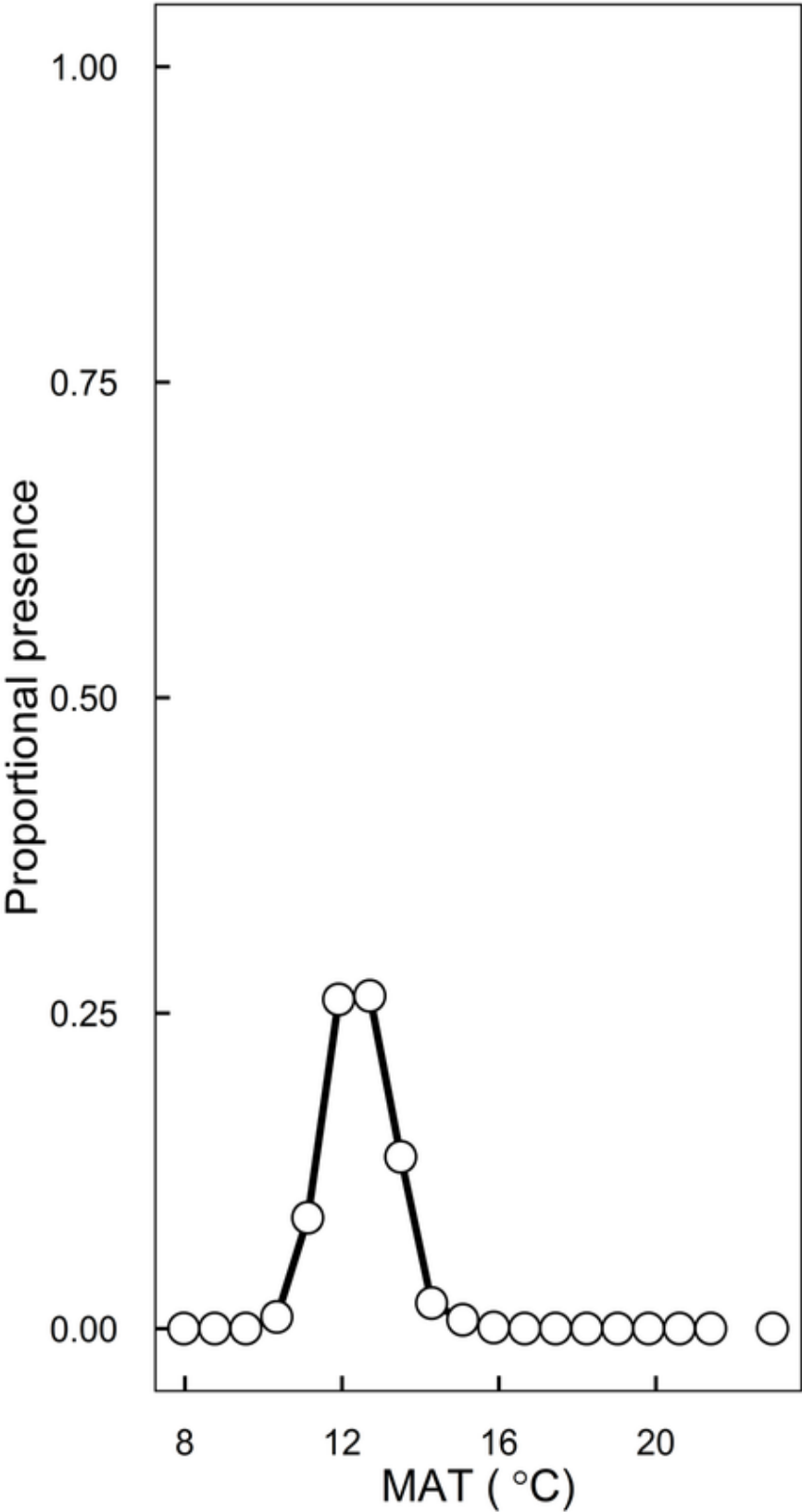Proportional presence of species along climate gradients

Proportional presence Akiapolauu bio7
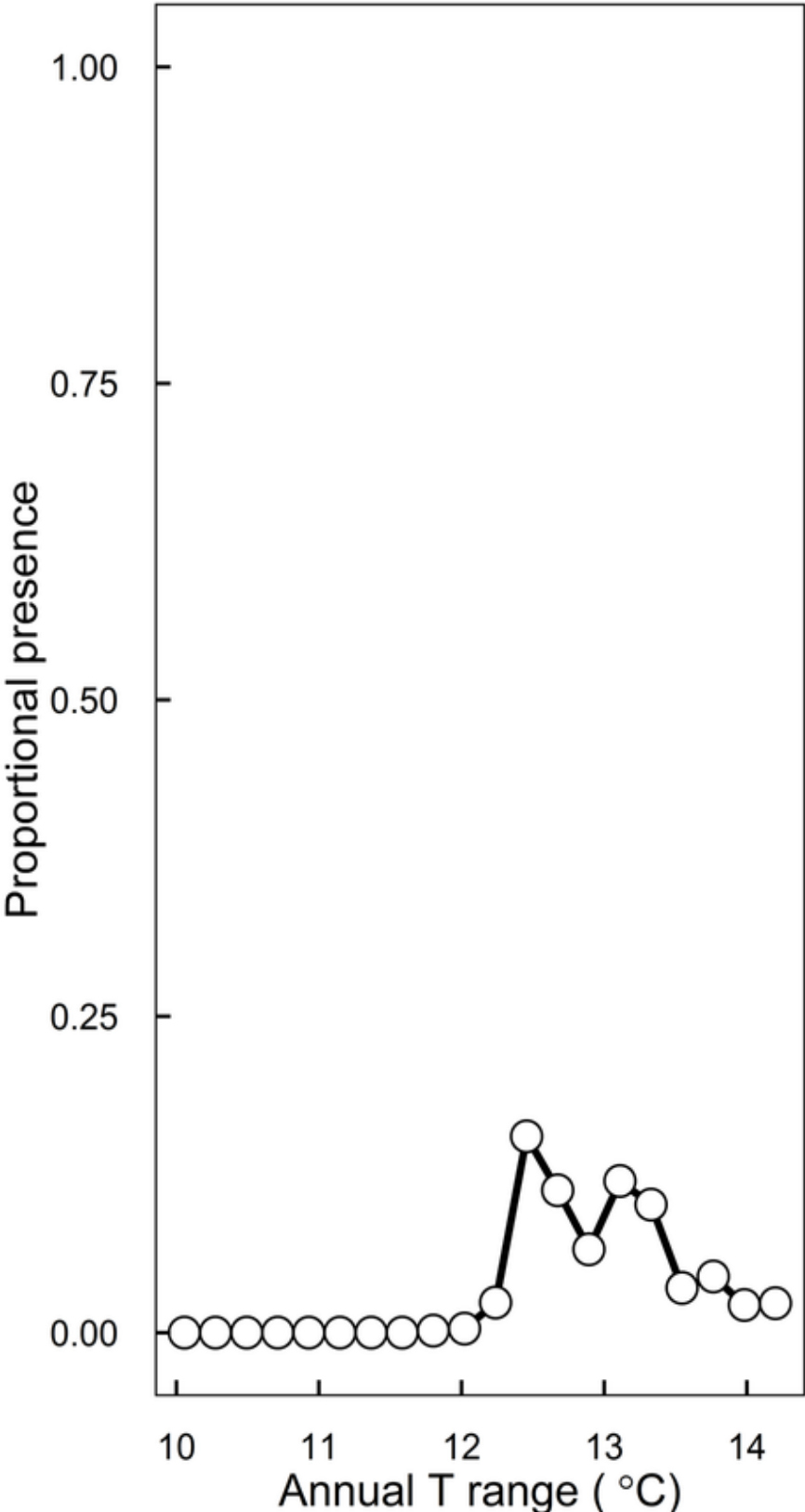
S5
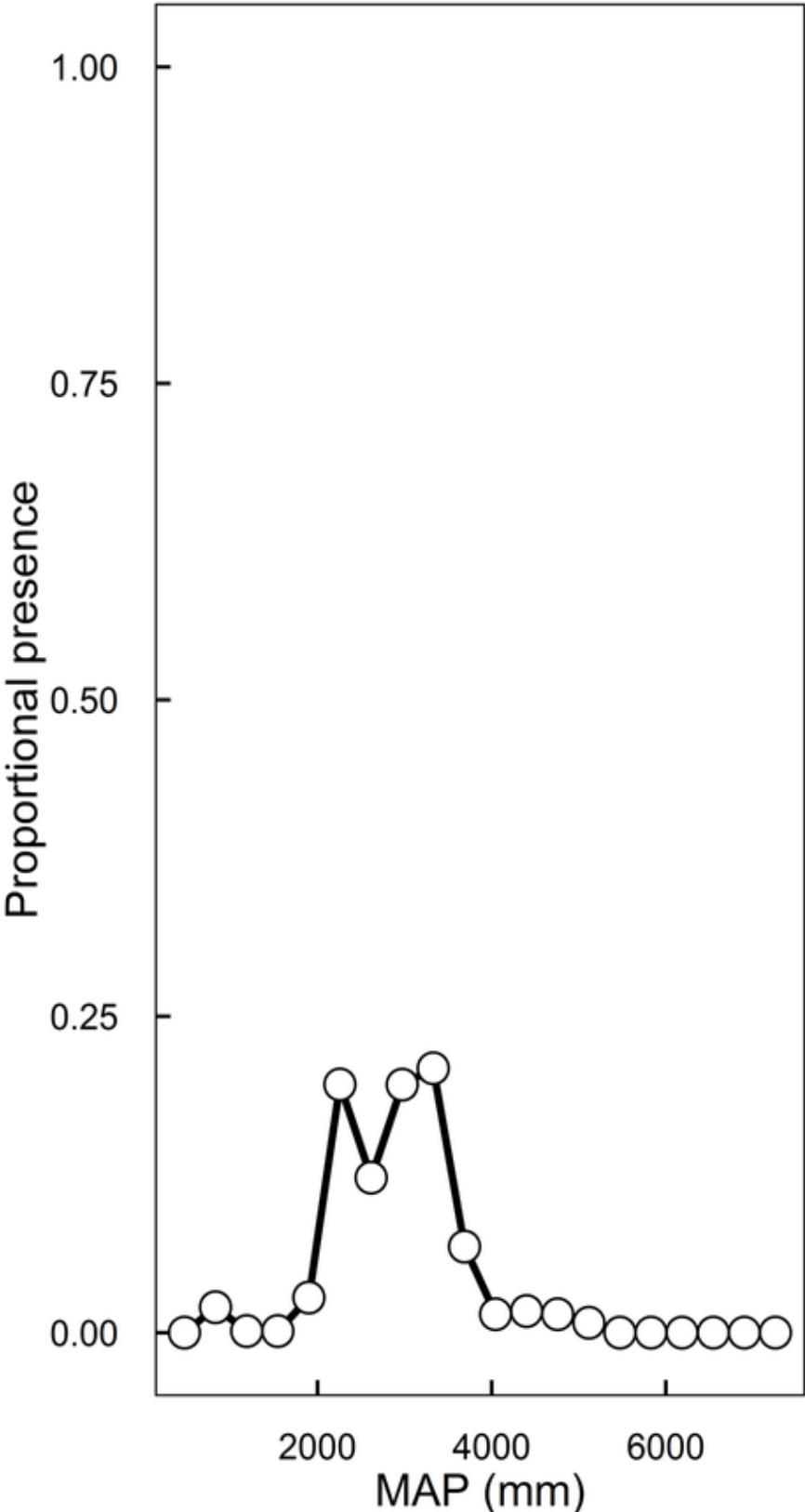Proportional presence of species along climate gradients
Proportional presence Akikiki bio1

S5
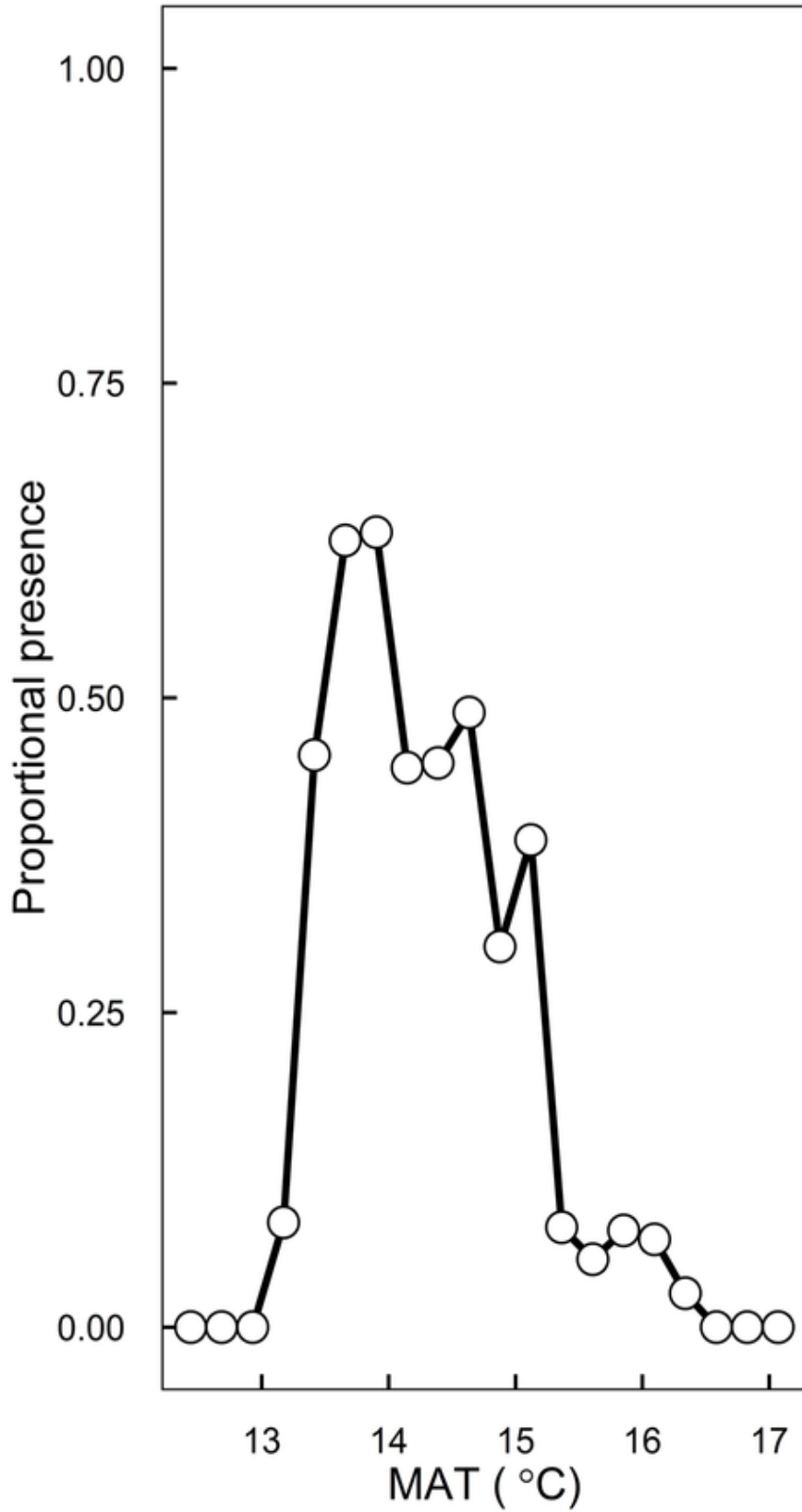
Proportional presence of species along climate gradients

Proportional presence Akikiki bio12
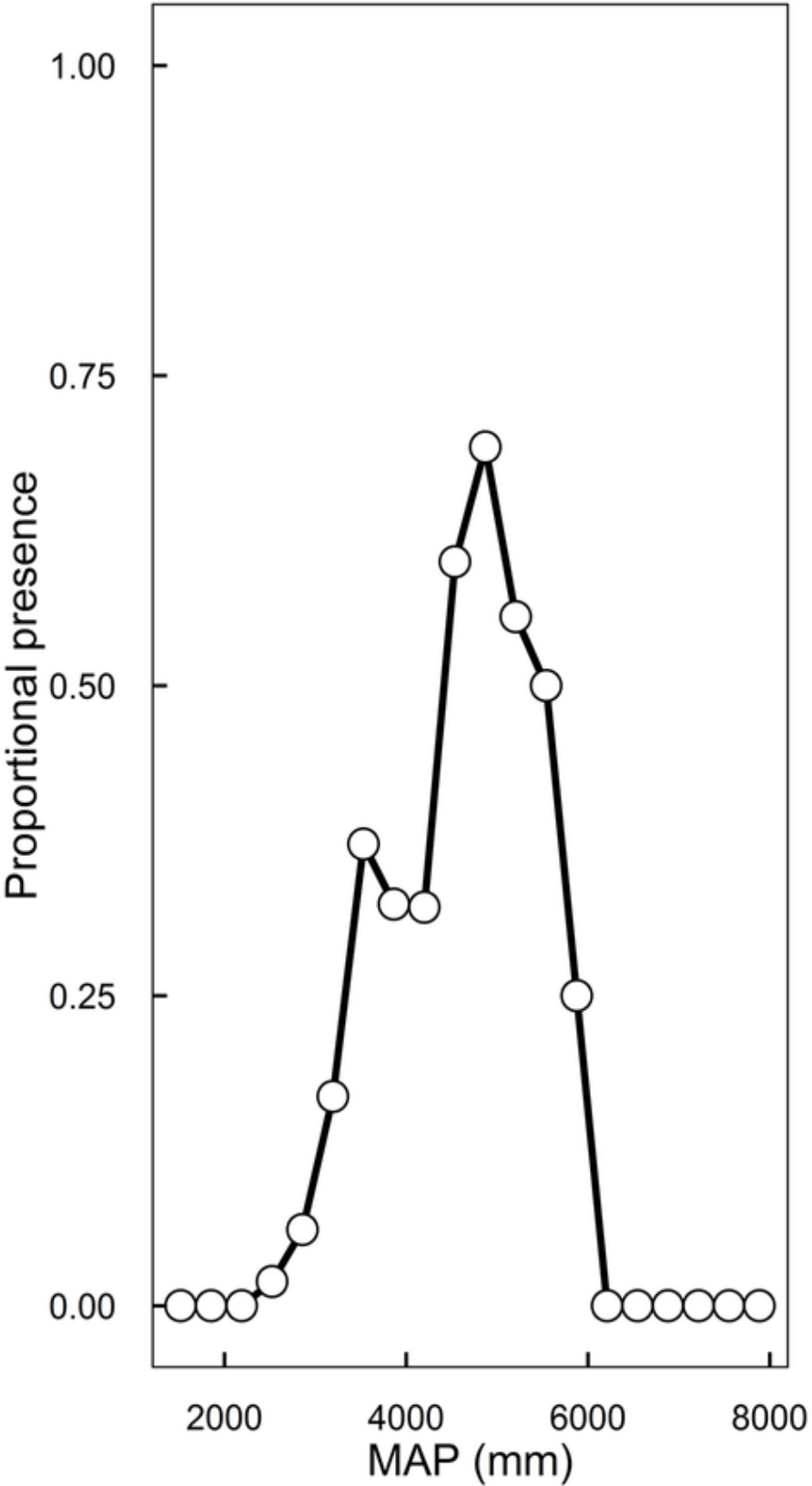
S5
Proportional presence of species along climate gradients
Proportional presence Akikiki bio15

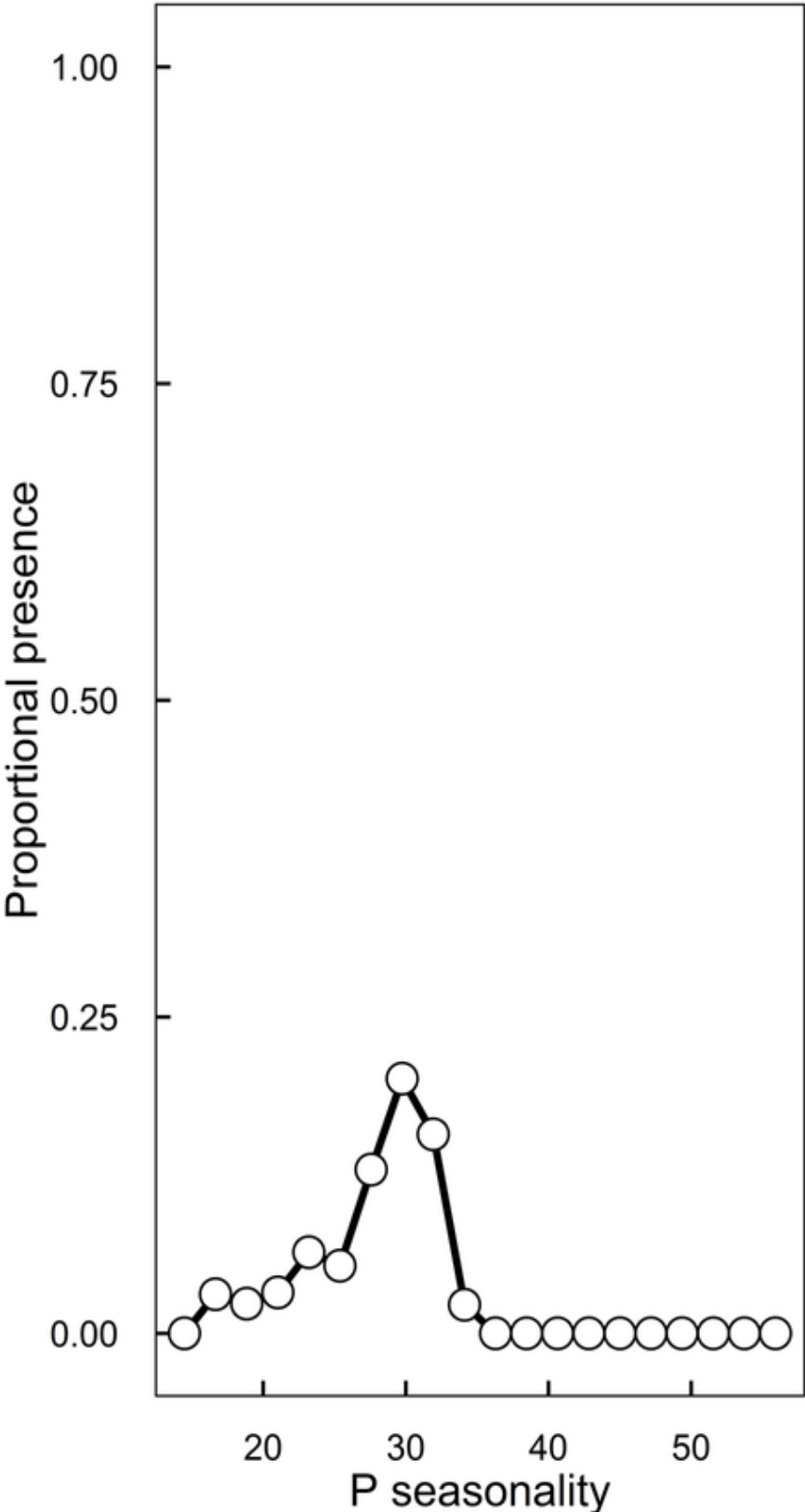S5
Proportional presence of species along climate gradients
Proportional presence Akikiki bio7

S5
Proportional presence of species along climate gradients

Proportional presence Akohekohe bio1

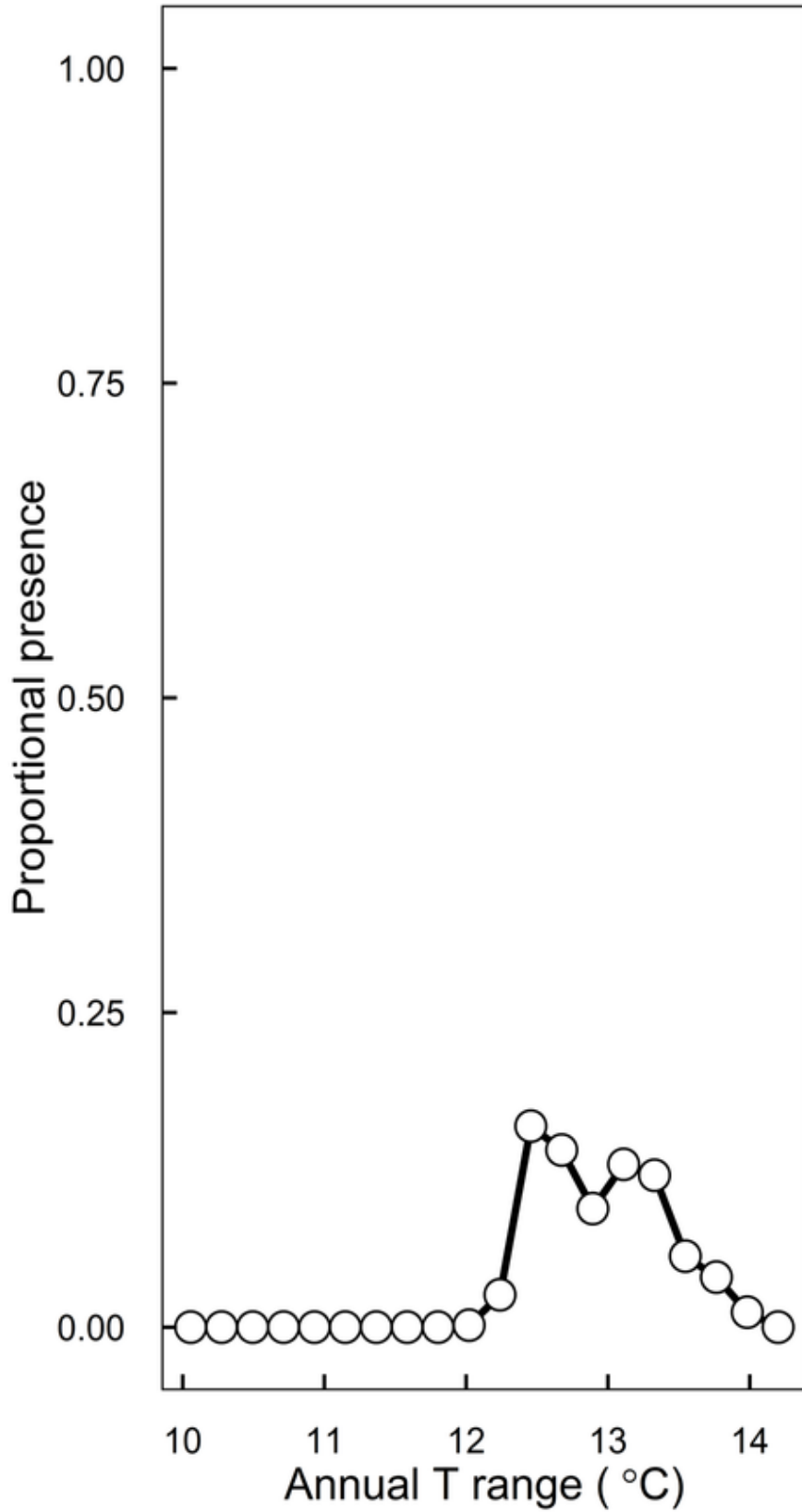S5
Proportional presence of species along climate gradients
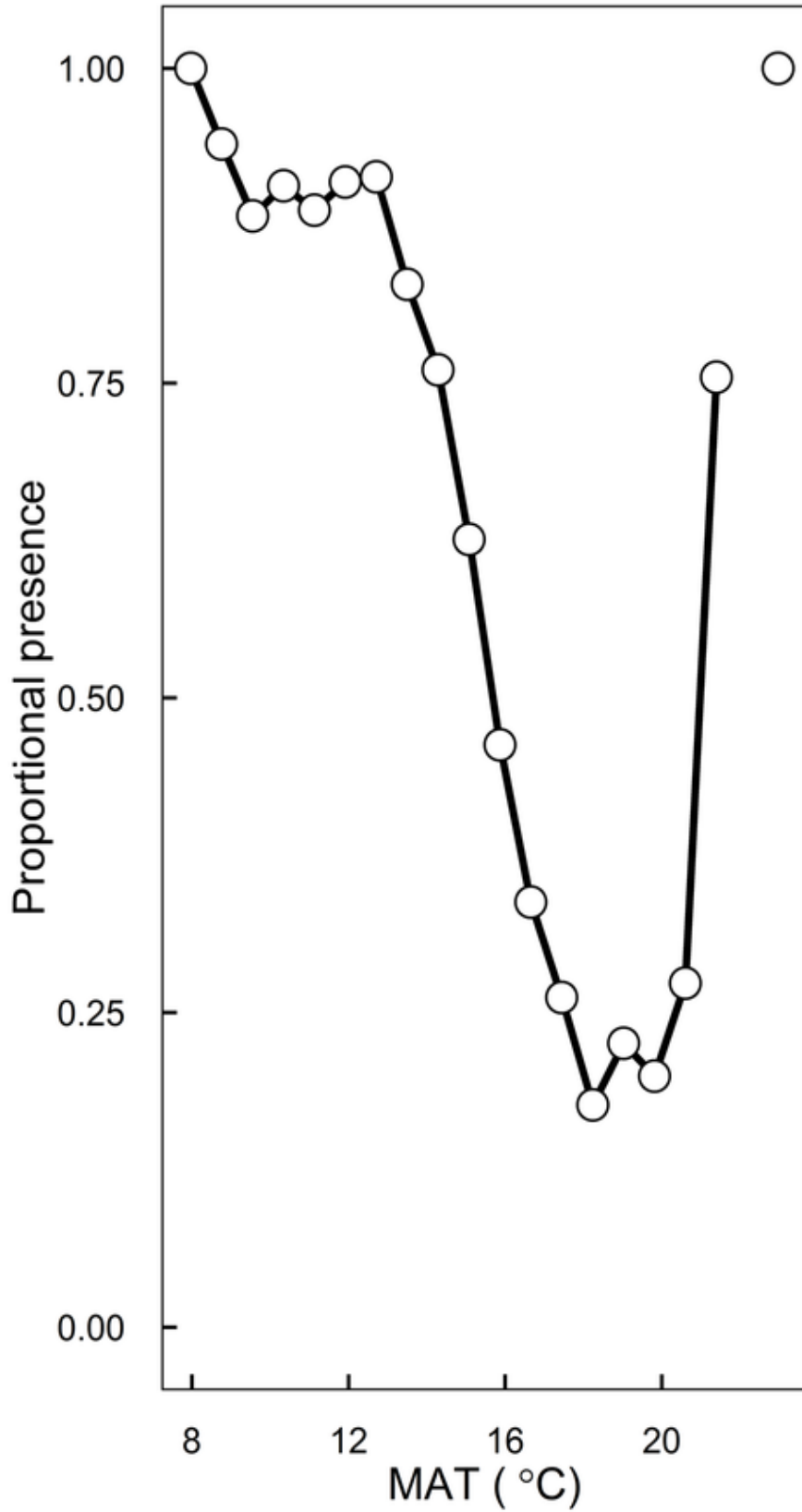
Proportional presence Akohekohe bio12

S5
Proportional presence of species along climate gradients
Proportional presence Akohekohe bio15

S5
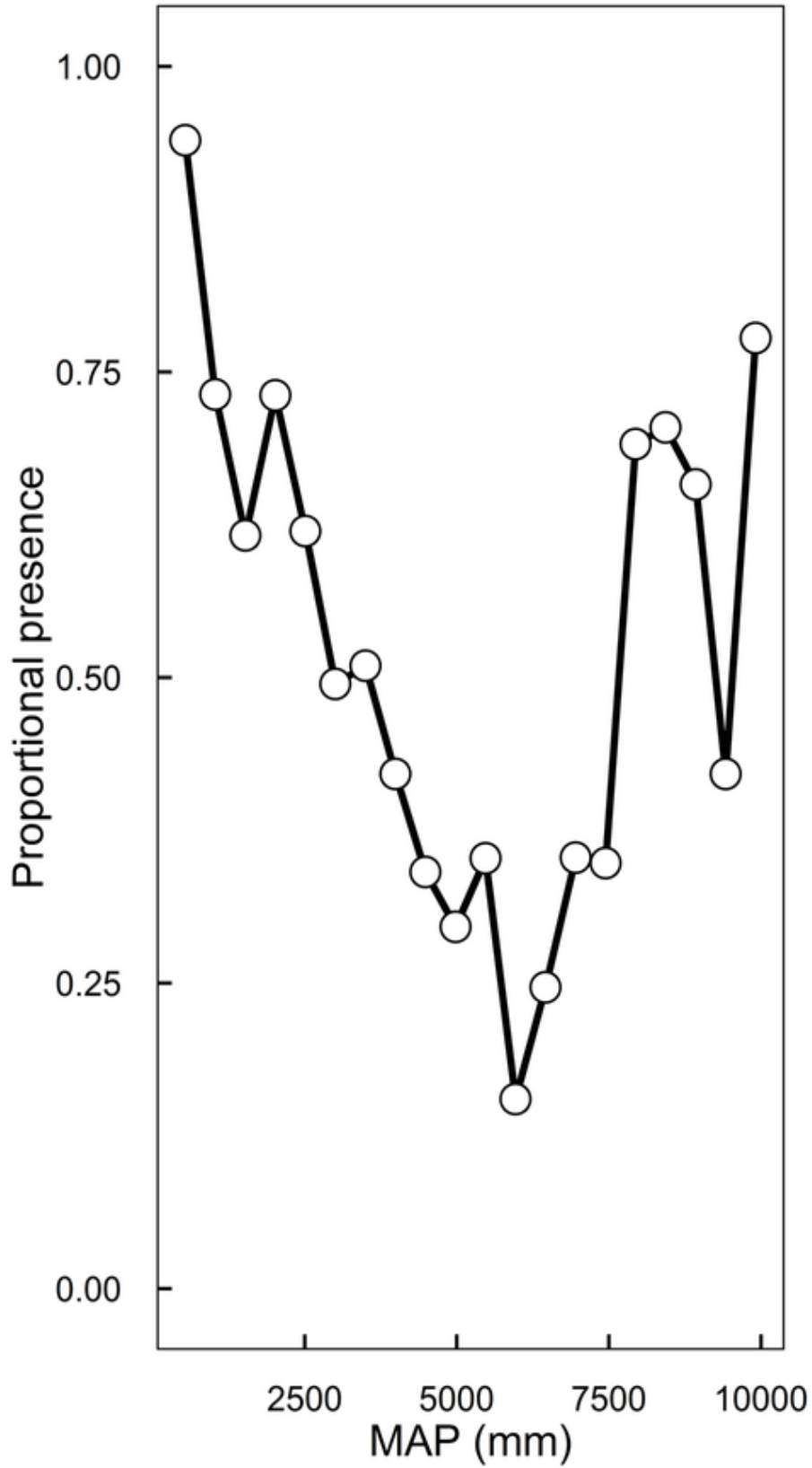
Proportional presence of species along climate gradients

Proportional presence Akohekohe bio7

Proportional presence of species along climate gradients

Proportional presence Anianiau bio1

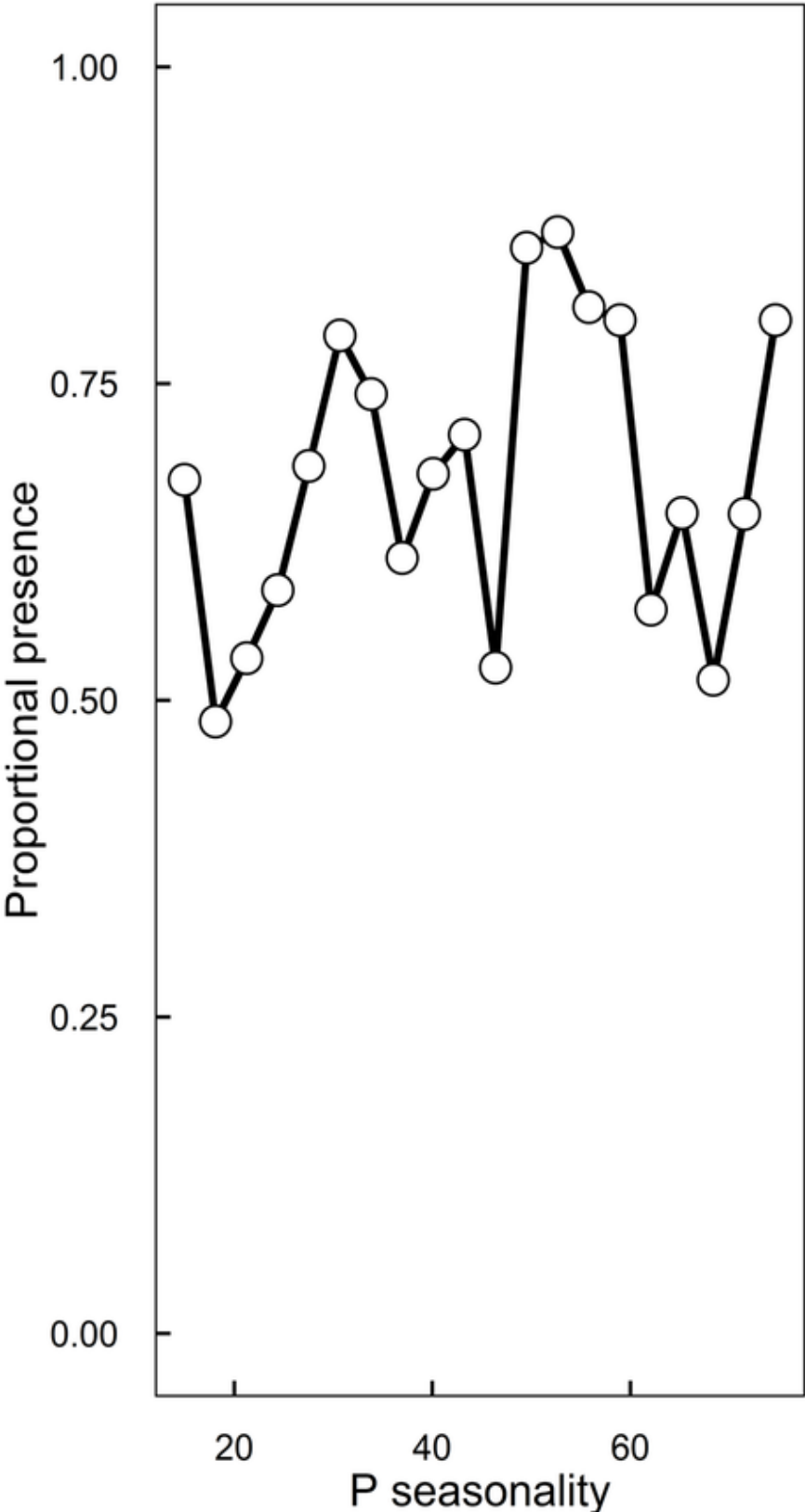S5
Proportional presence of species along climate gradients
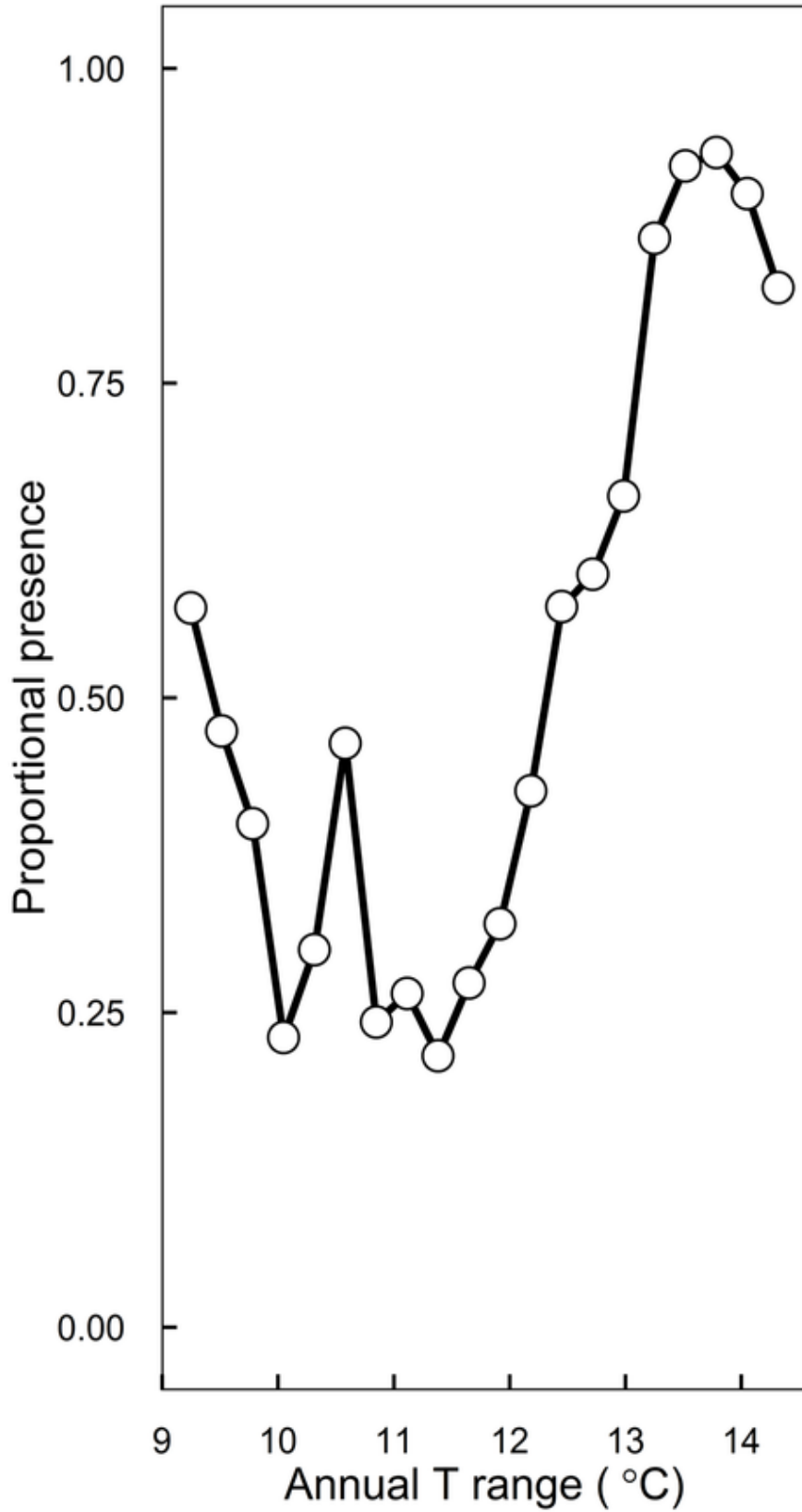Proportional presence Anianiau bio12

S5
Proportional presence of species along climate gradients

Proportional presence Anianiau bio15

S5
Proportional presence of species along climate gradients

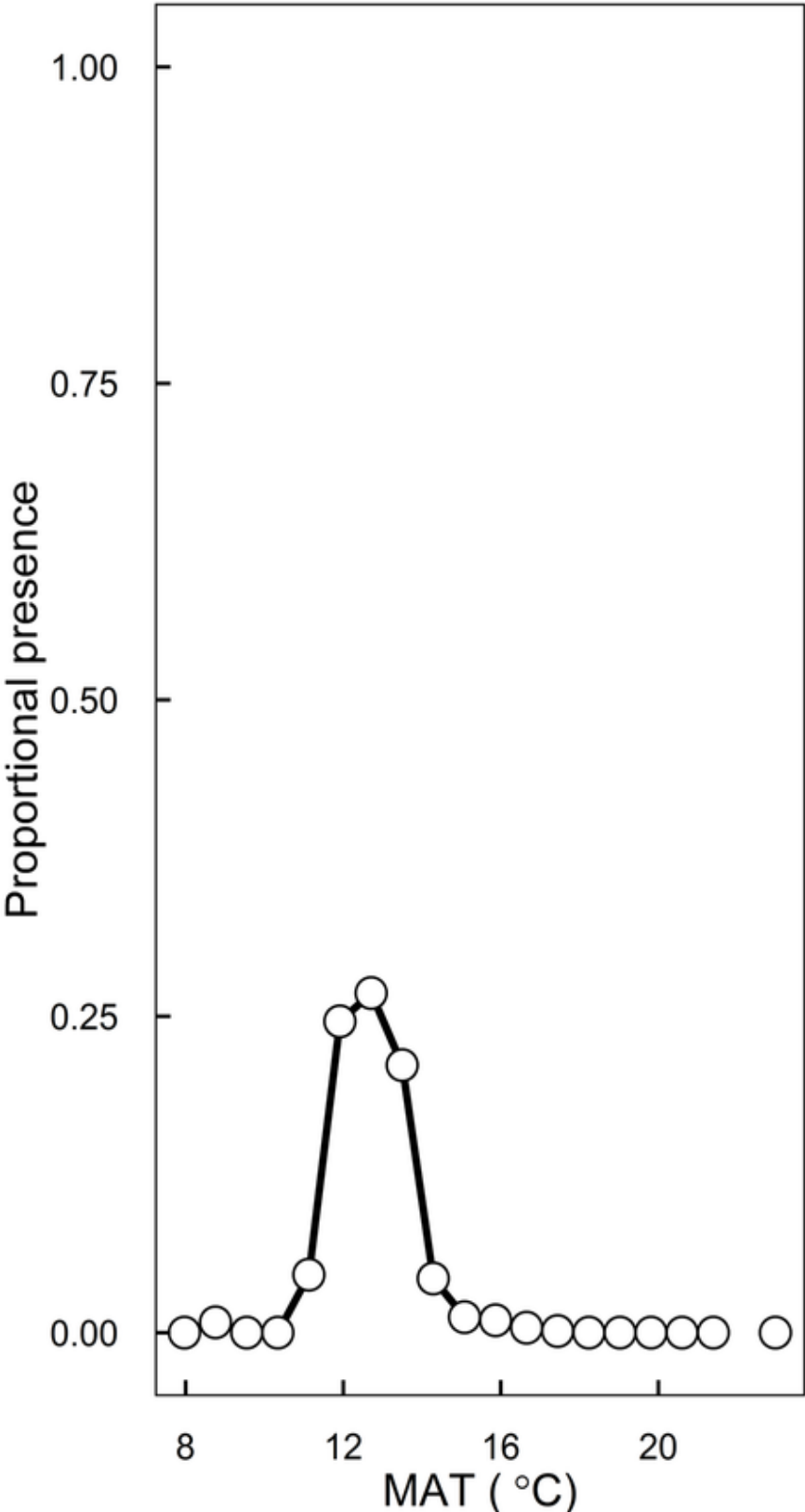Proportional presence Anianiau bio7

Proportional presence of species along climate gradients

Proportional presence Apapane bio1

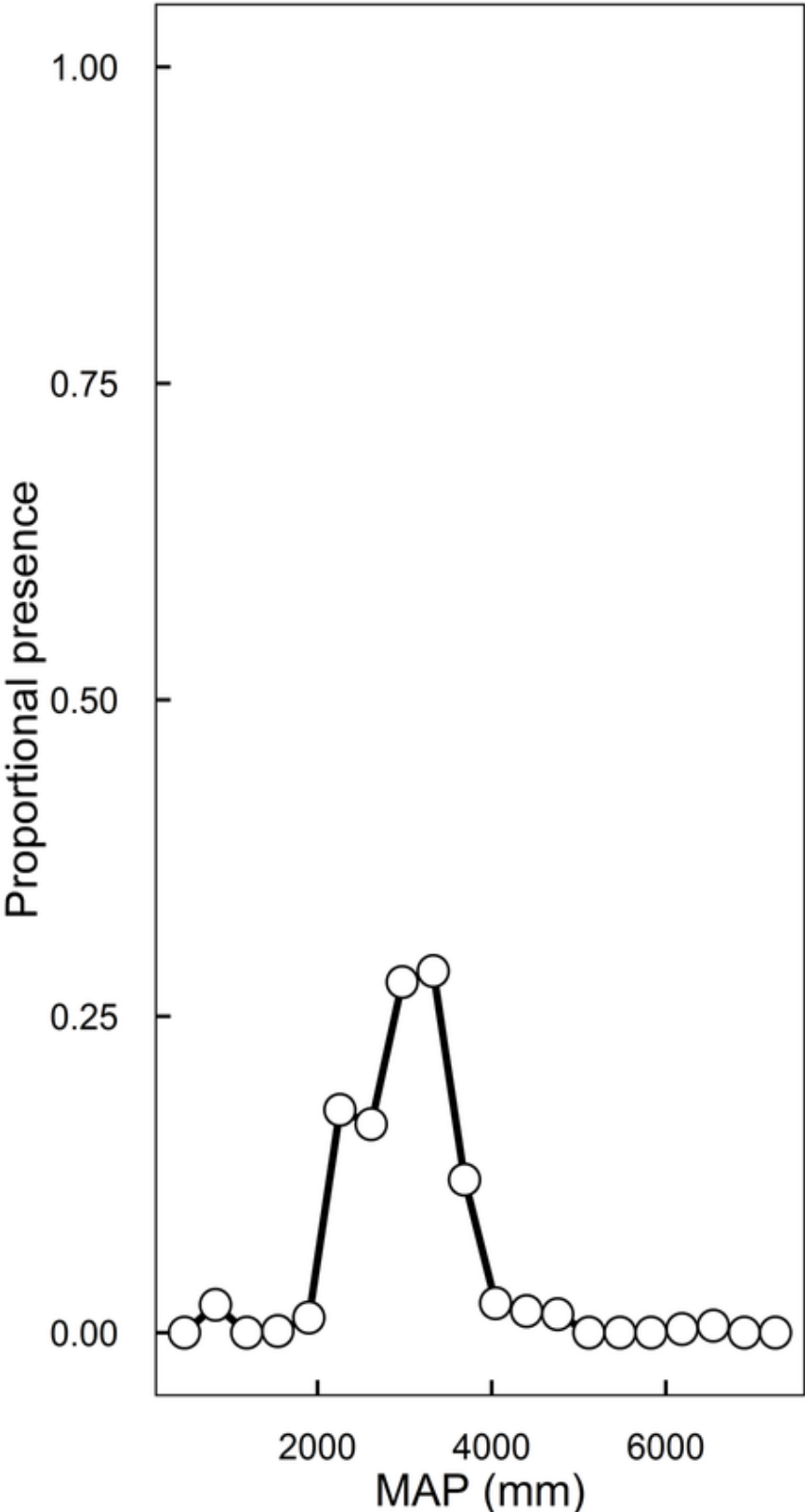S5
Proportional presence of species along climate gradients
Proportional presence Apapane bio12

S5
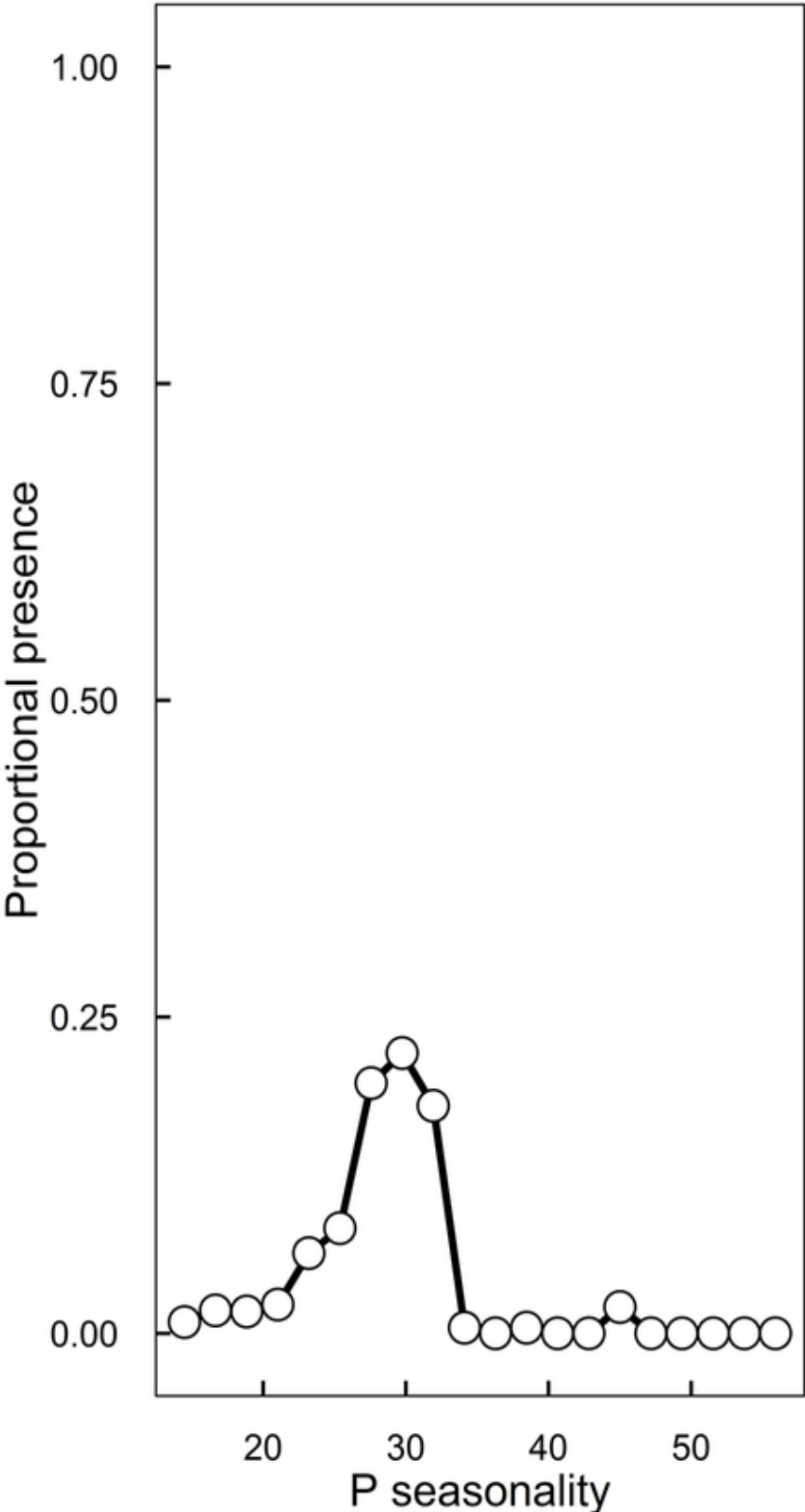
Proportional presence of species along climate gradients

Proportional presence Apapane bio15

S5
Proportional presence of species along climate gradients

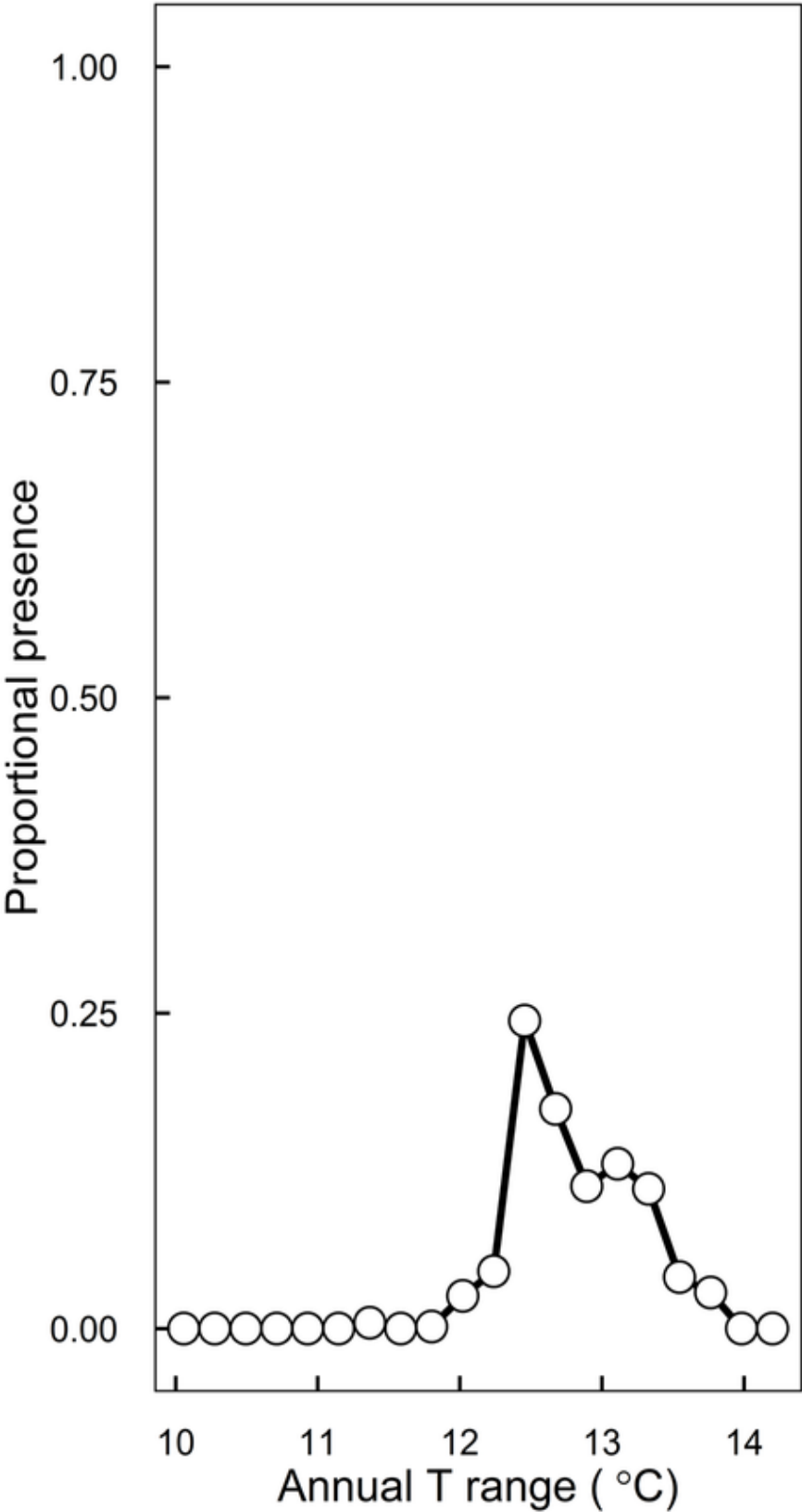Proportional presence Apapane bio7

S5
Proportional presence of species along climate gradients
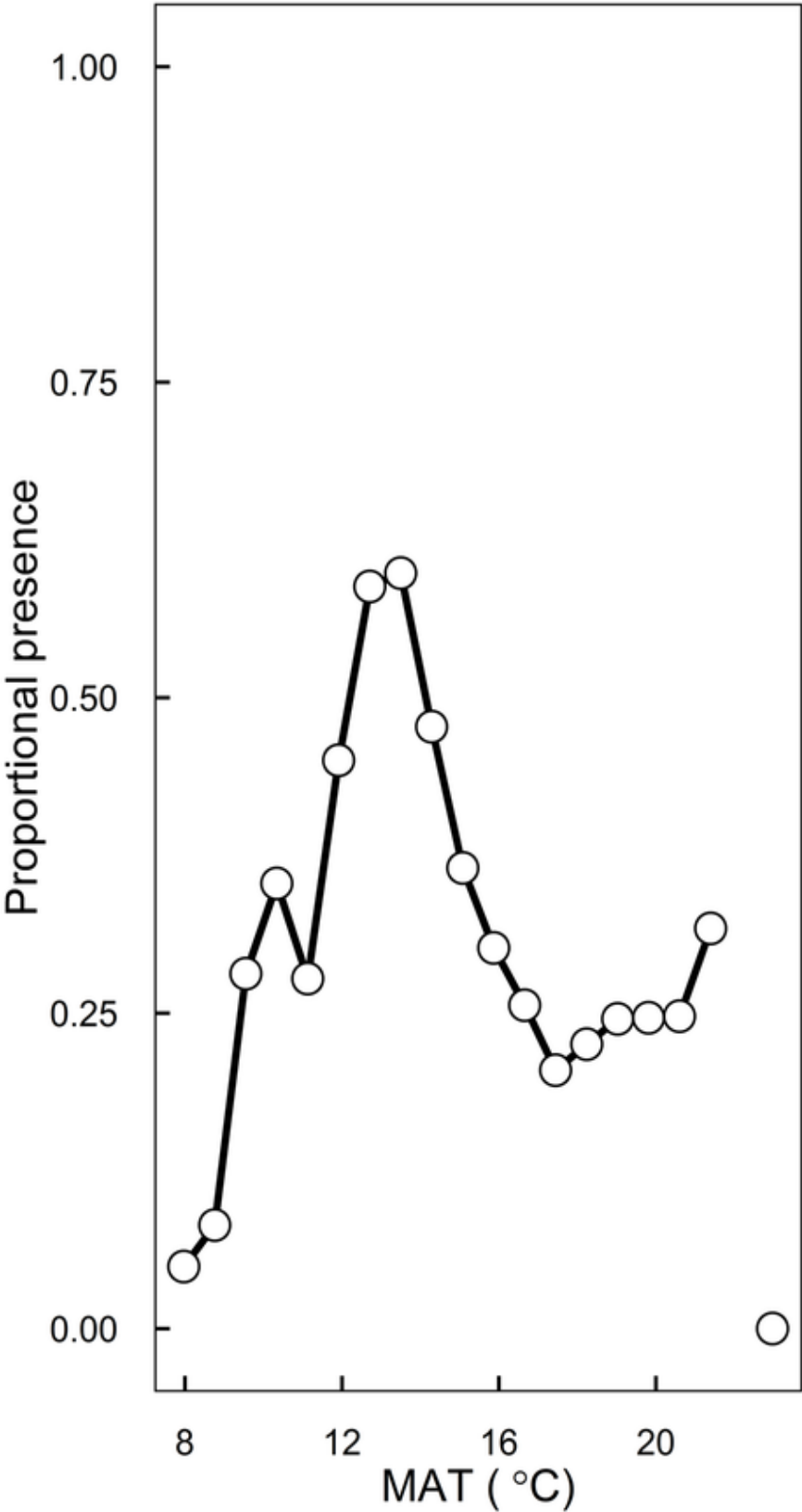Proportional presence Hawaii Akepa bio1

Proportional presence of species along climate gradients

Proportional presence Hawaii Akepa bio12

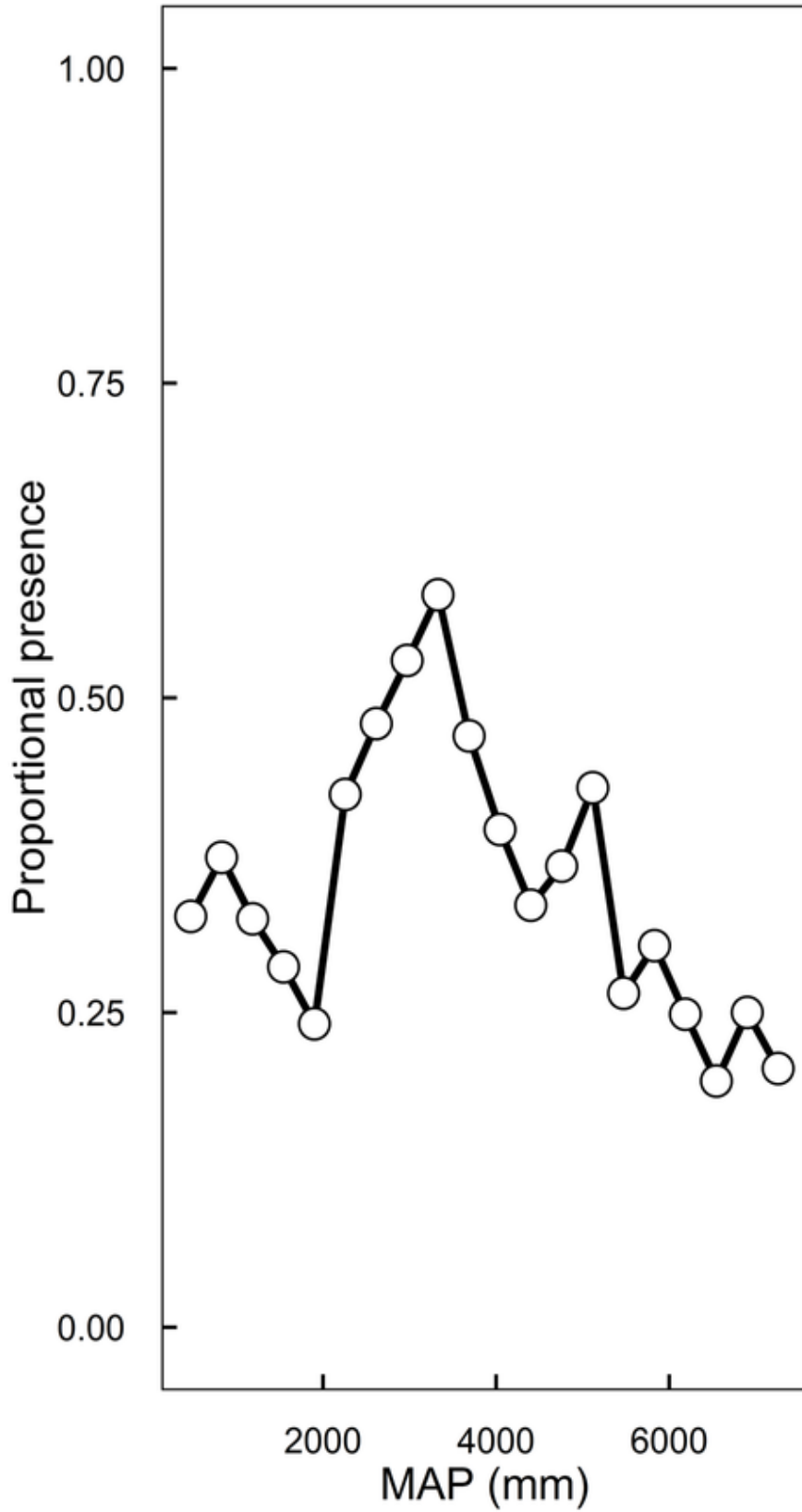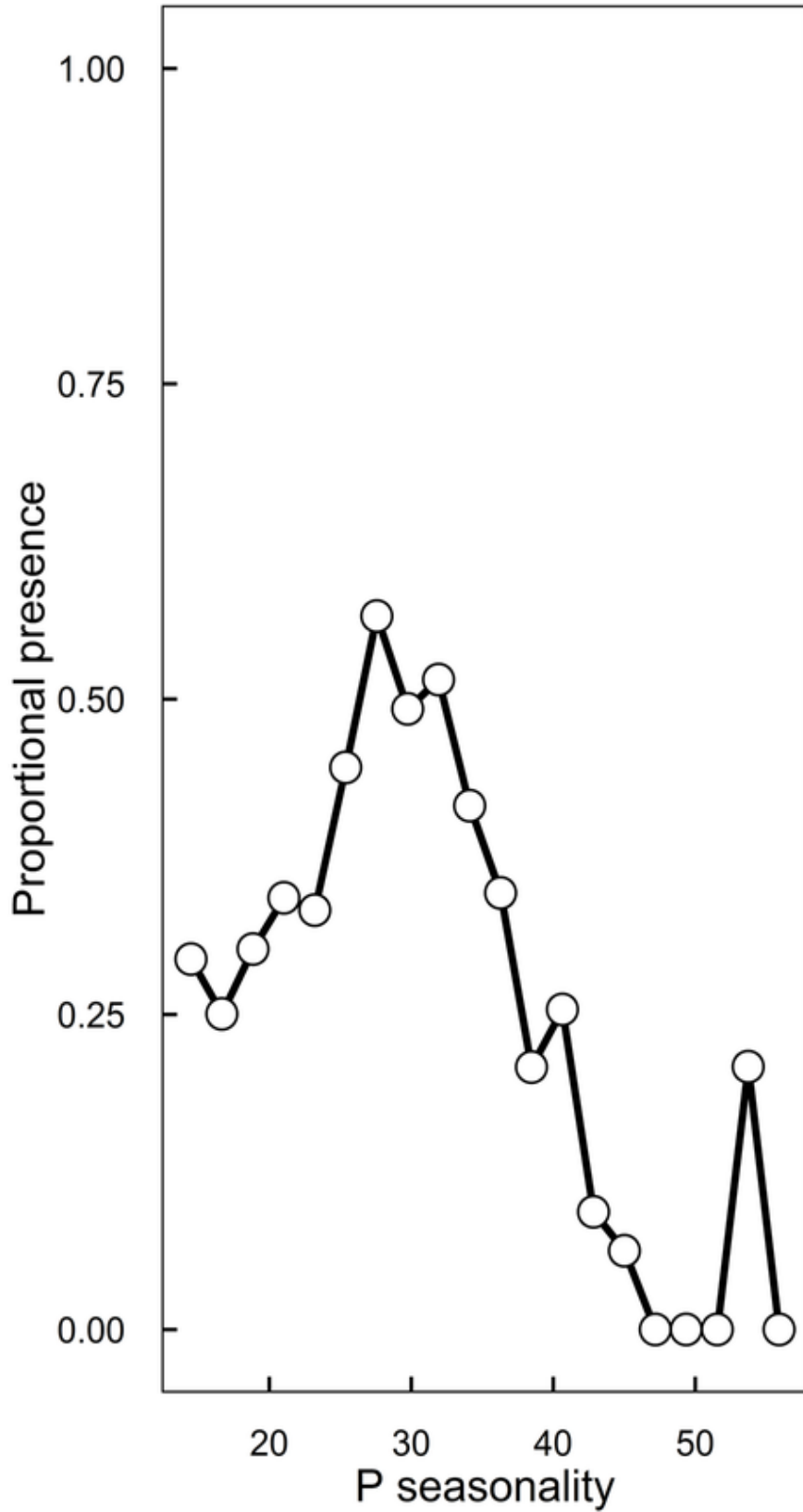S5
Proportional presence of species along climate gradients
Proportional presence Hawaii Akepa bio15

Proportional presence of species along climate gradients

Proportional presence Hawaii Akepa bio7

S5
Proportional presence of species along climate gradients
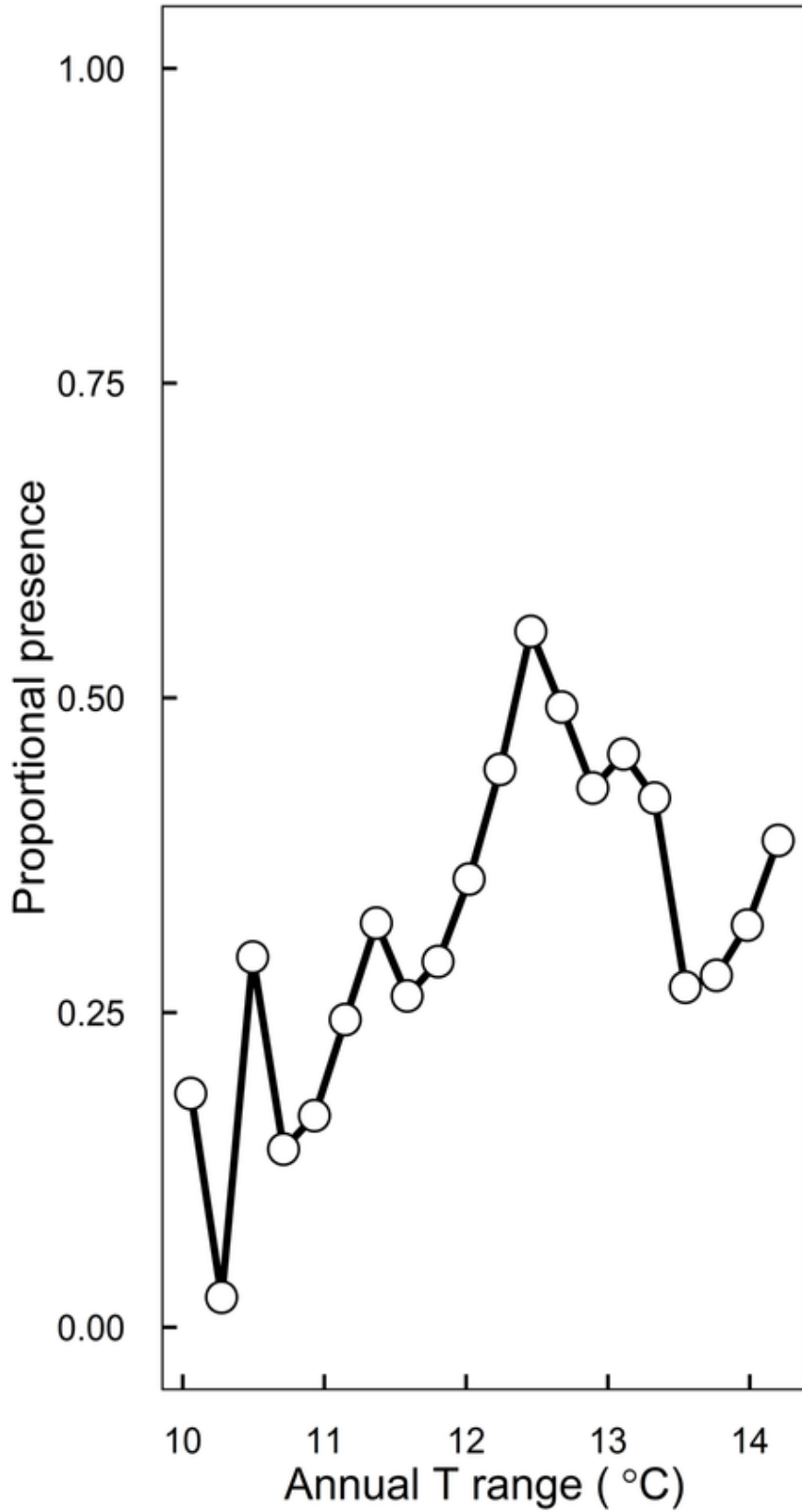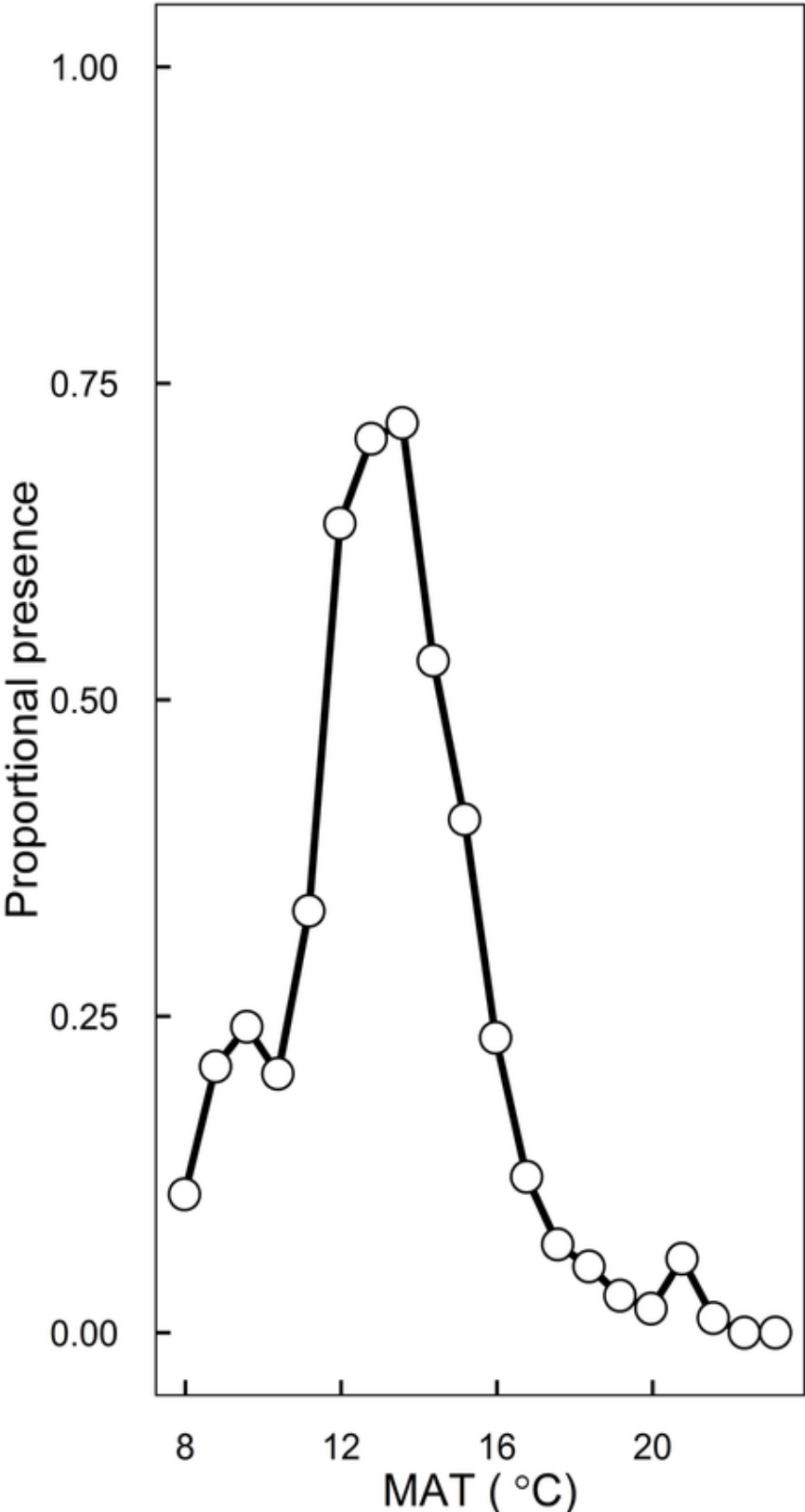Proportional presence Hawaii Amakihi bio1

S5

Proportional presence of species along climate gradients

Proportional presence Hawaii Amakihi bio12

Proportional presence of species along climate gradients

Proportional presence Hawaii Amakihi bio15

S5
Proportional presence of species along climate gradients
Proportional presence Hawaii Amakihi bio7

S5

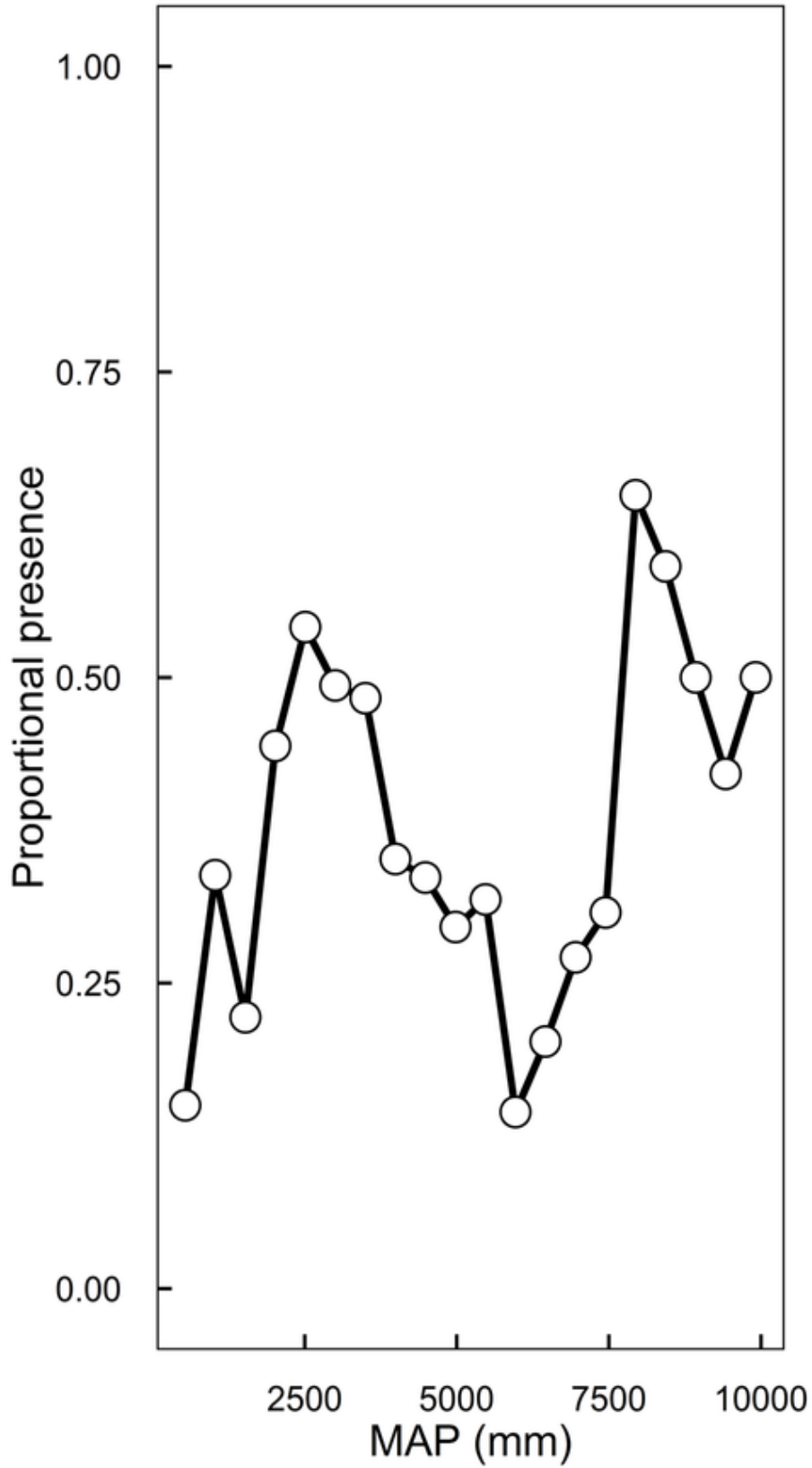Proportional presence of species along climate gradients

Proportional presence Hawaii Creeper bio1

S5

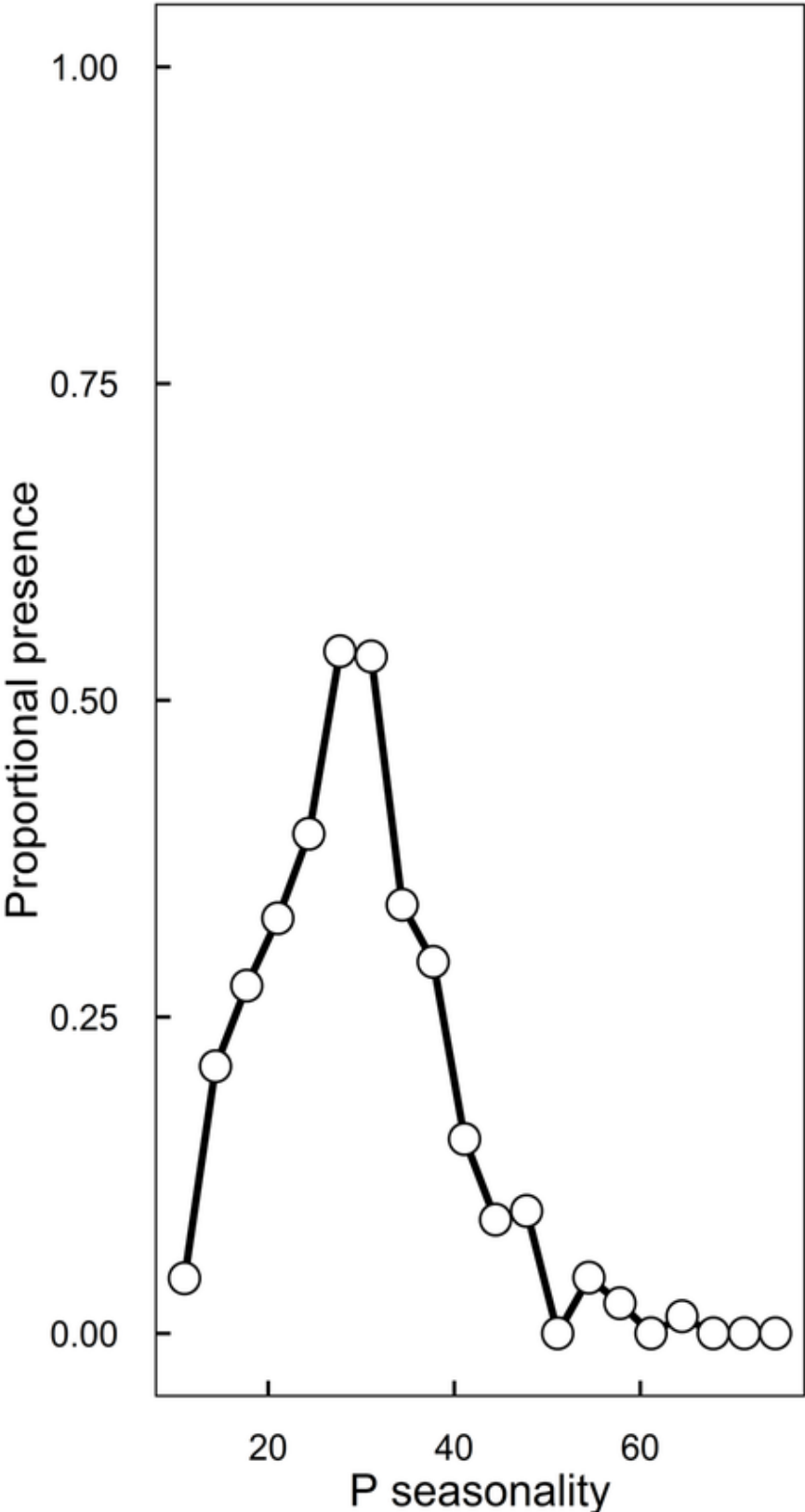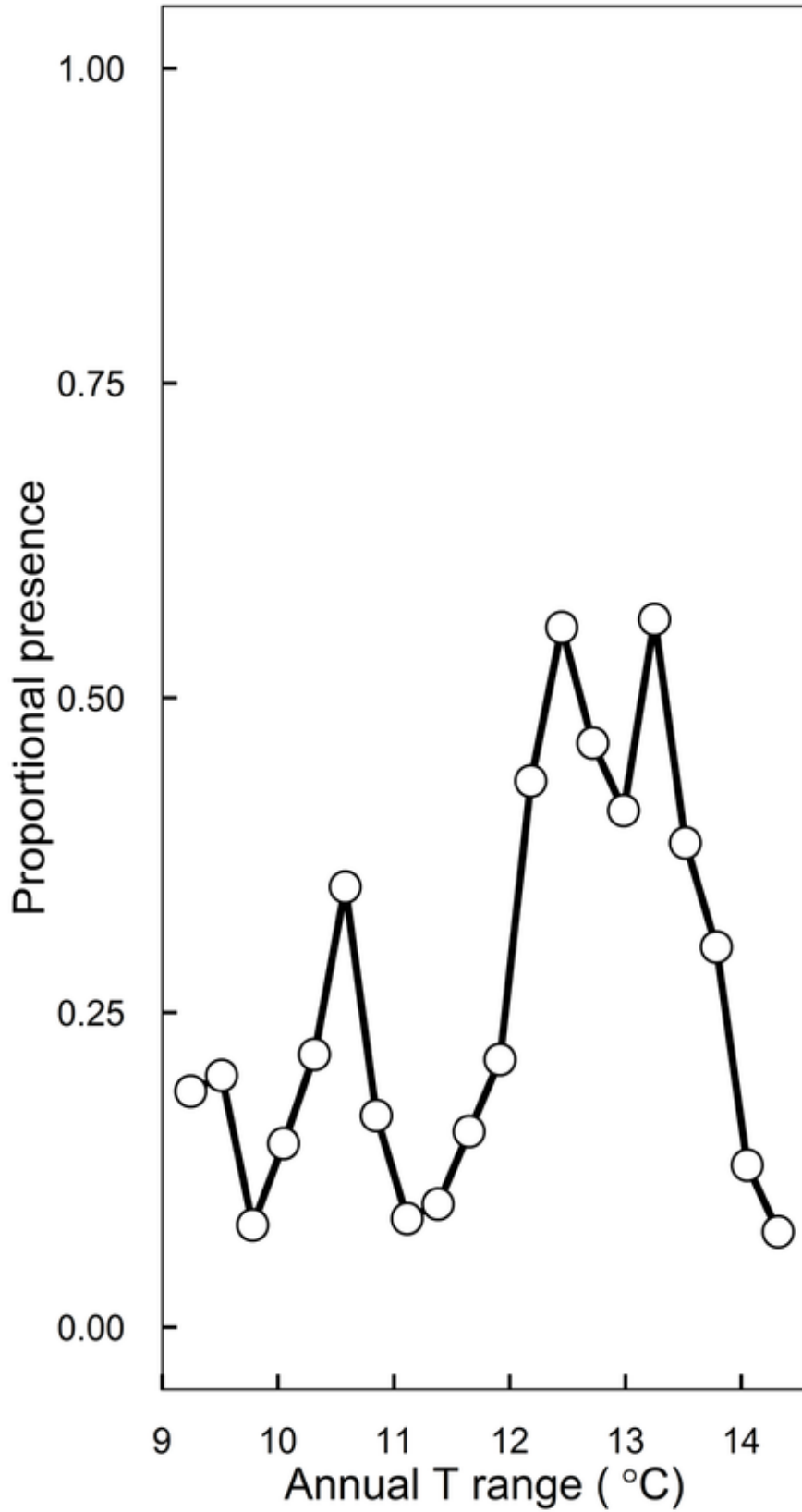Proportional presence of species along climate gradients

Proportional presence Hawaii Creeper bio12

S5

Proportional presence of species along climate gradients

Proportional presence Hawaii Creeper bio15

S5
Proportional presence of species along climate gradients
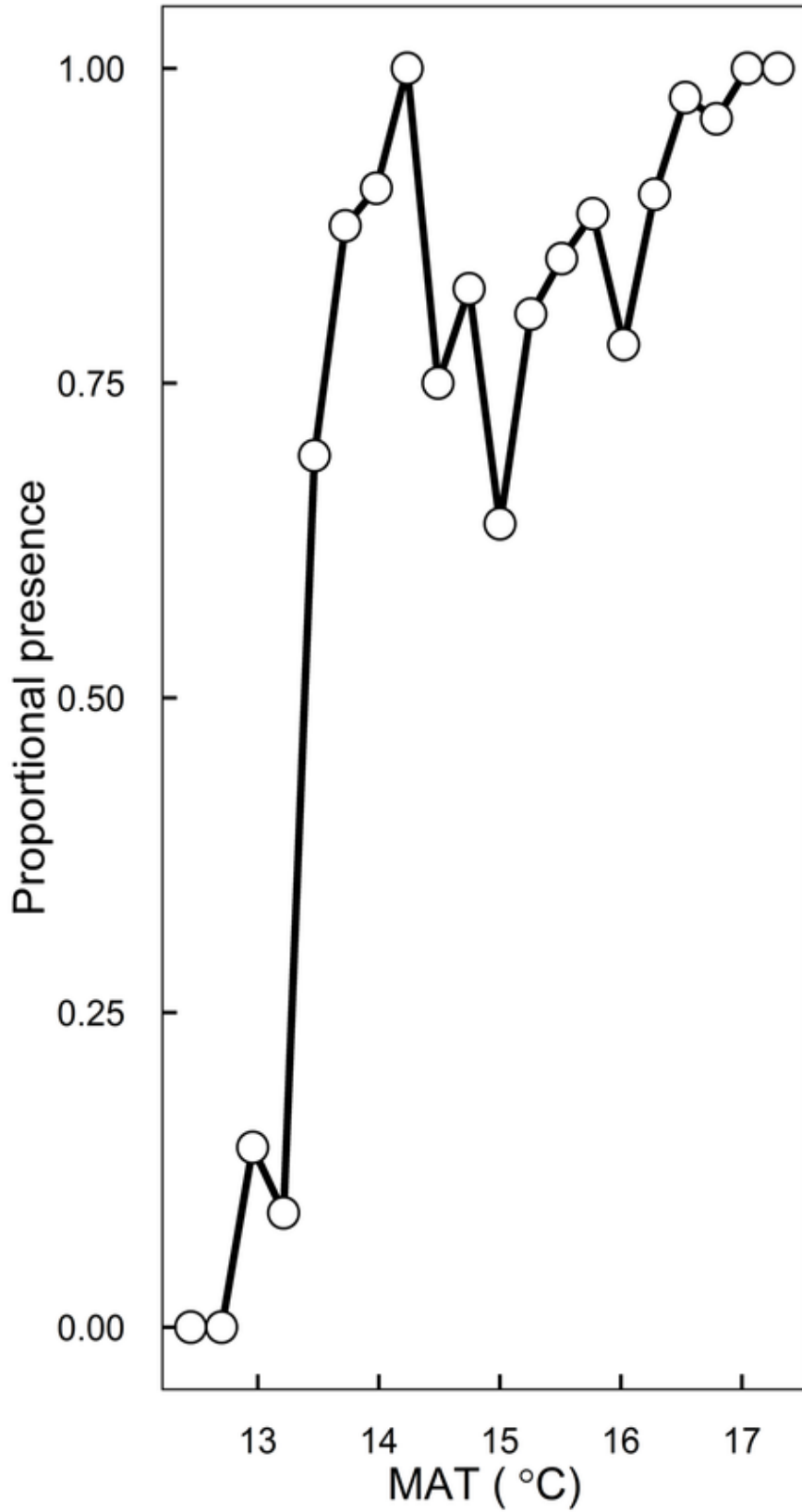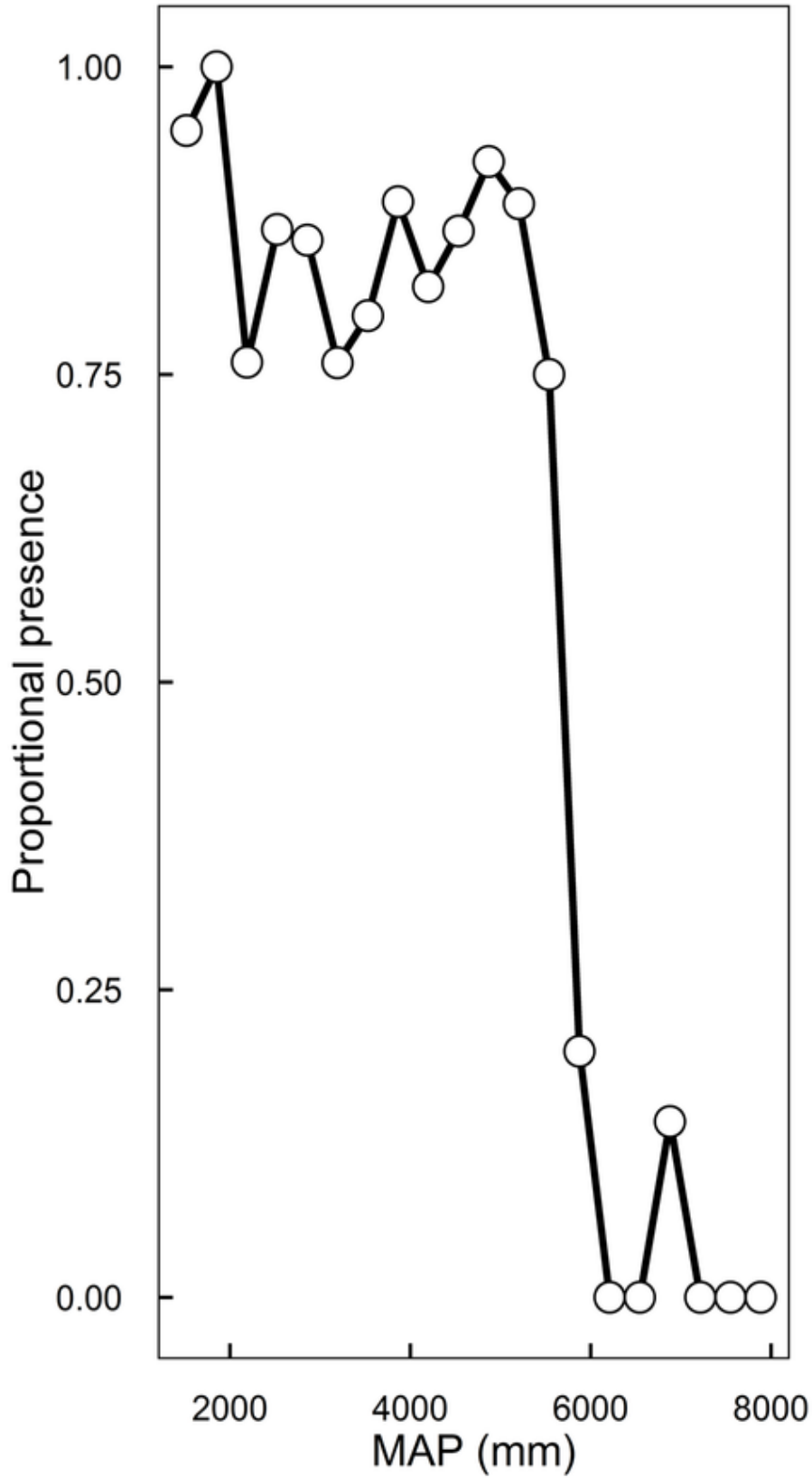
Proportional presence Hawaii Creeper bio7

S5
Proportional presence of species along climate gradients

Proportional presence Hawaii Elepaio bio1

S5

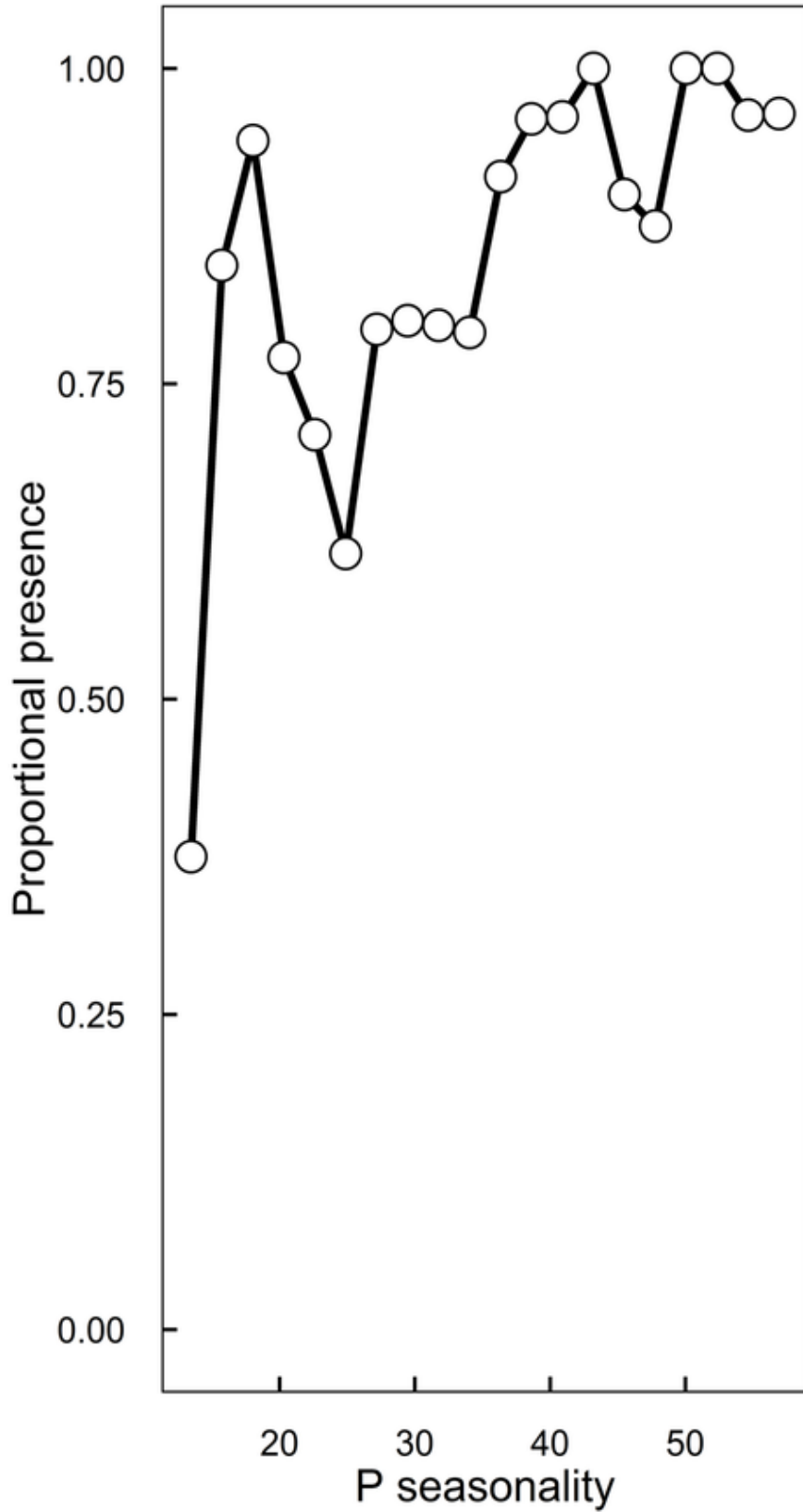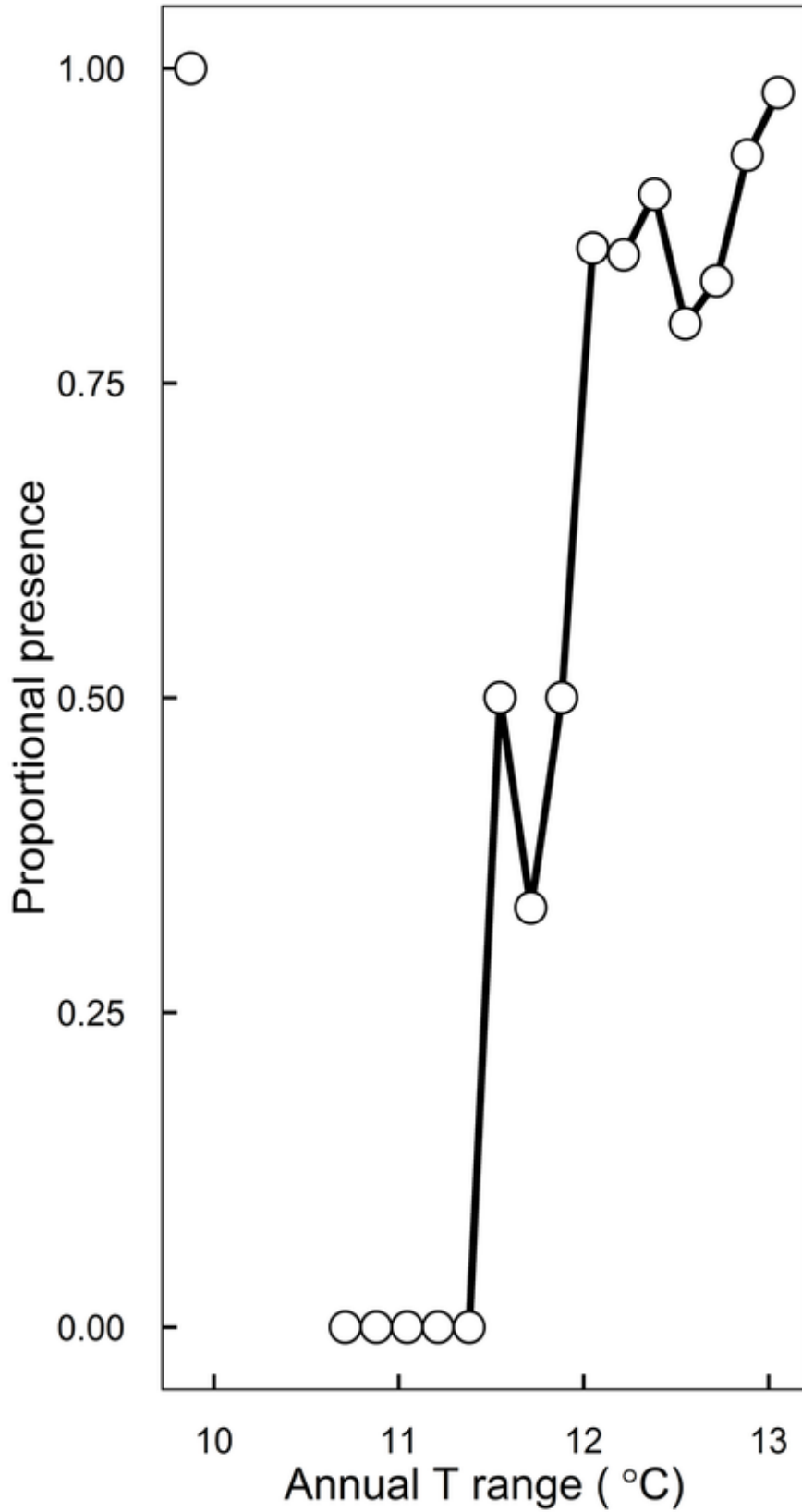Proportional presence of species along climate gradients

Proportional presence Hawaii Elepaio bio12

S5

Proportional presence of species along climate gradients

Proportional presence Hawaii Elepaio bio15

S5
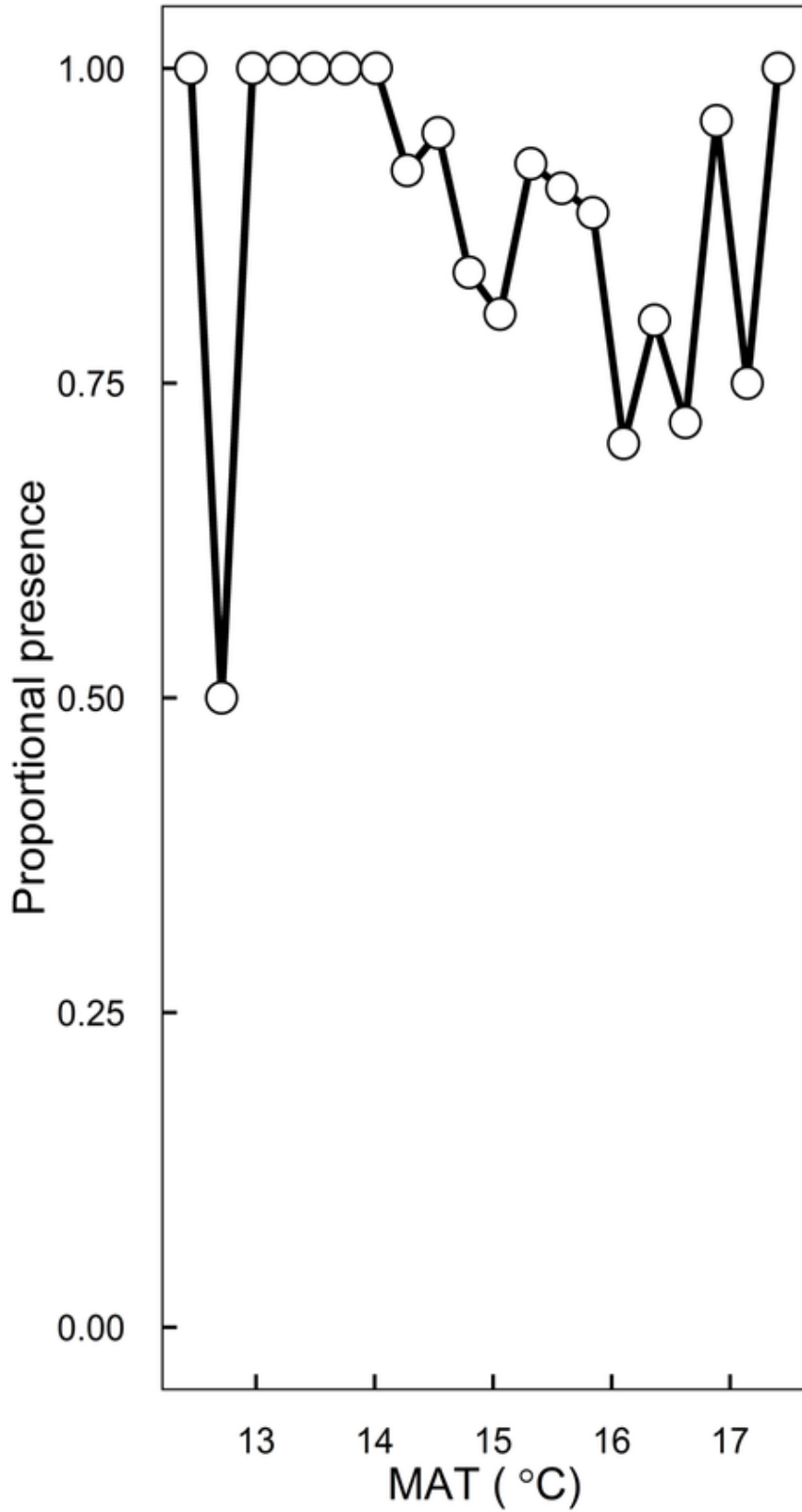Proportional presence of species along climate gradients
Proportional presence Hawaii Elepaio bio7

Proportional presence of species along climate gradients

Proportional presence Iiwi bio1

S5

Proportional presence of species along climate gradients

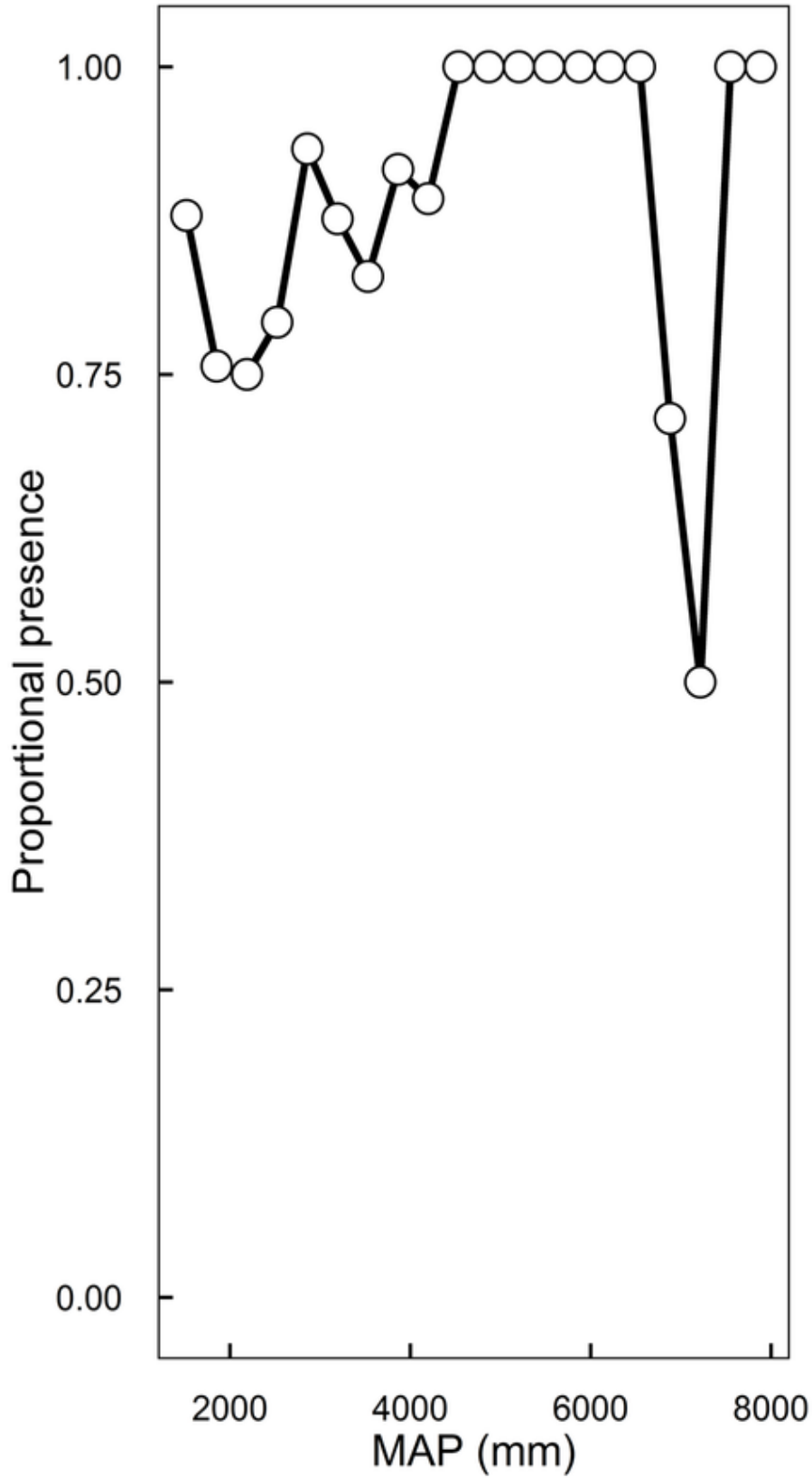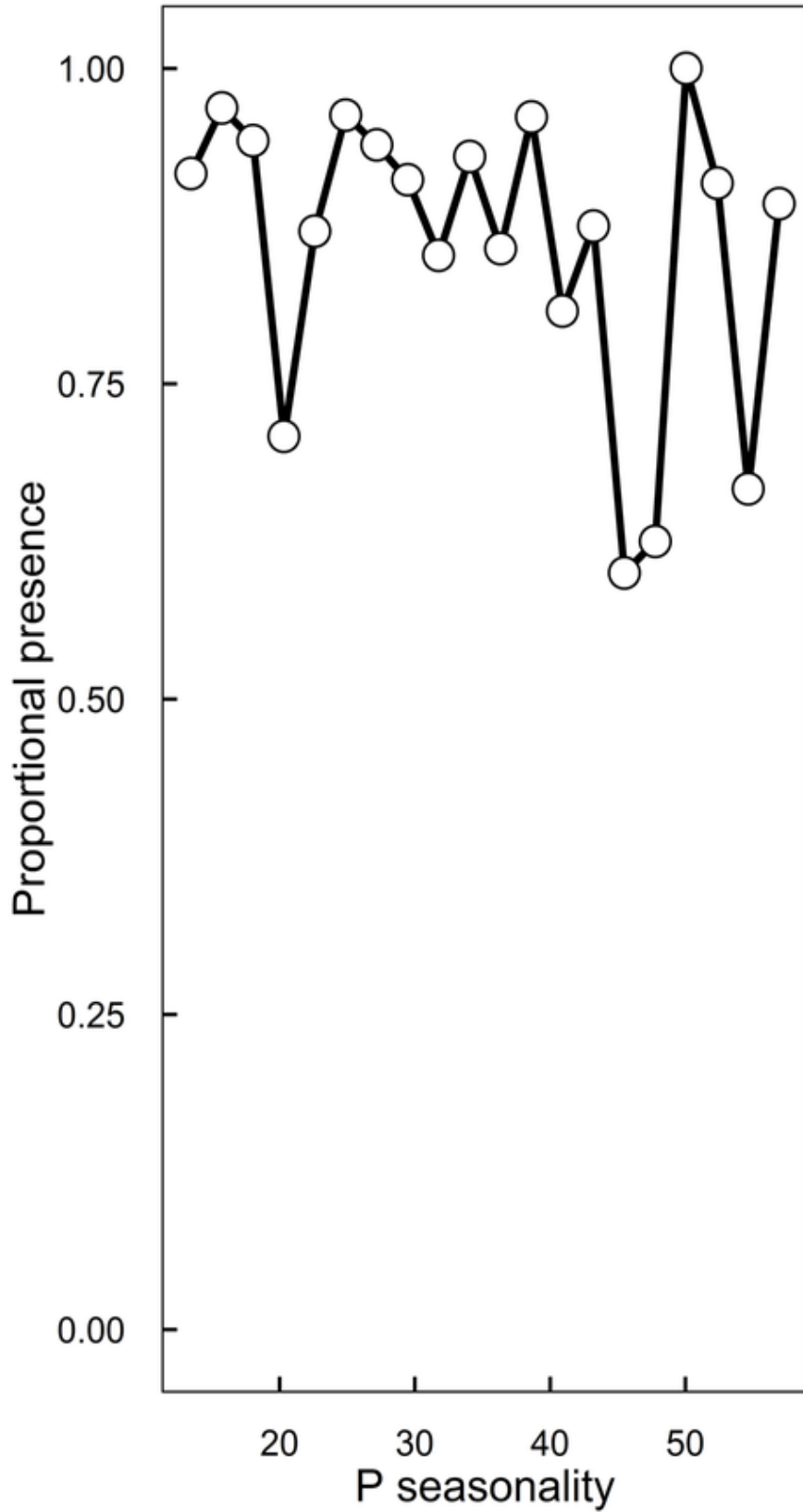Proportional presence Iiwi bio12

S5
Proportional presence of species along climate gradients

Proportional presence Iiwi bio15

S5
Proportional presence of species along climate gradients
Proportional presence Iiwi bio7

S5
Proportional presence of species along climate gradients

Proportional presence Kauai Amakihi bio1

S5
Proportional presence of species along climate gradients
Proportional presence Kauai Amakihi bio12

S5
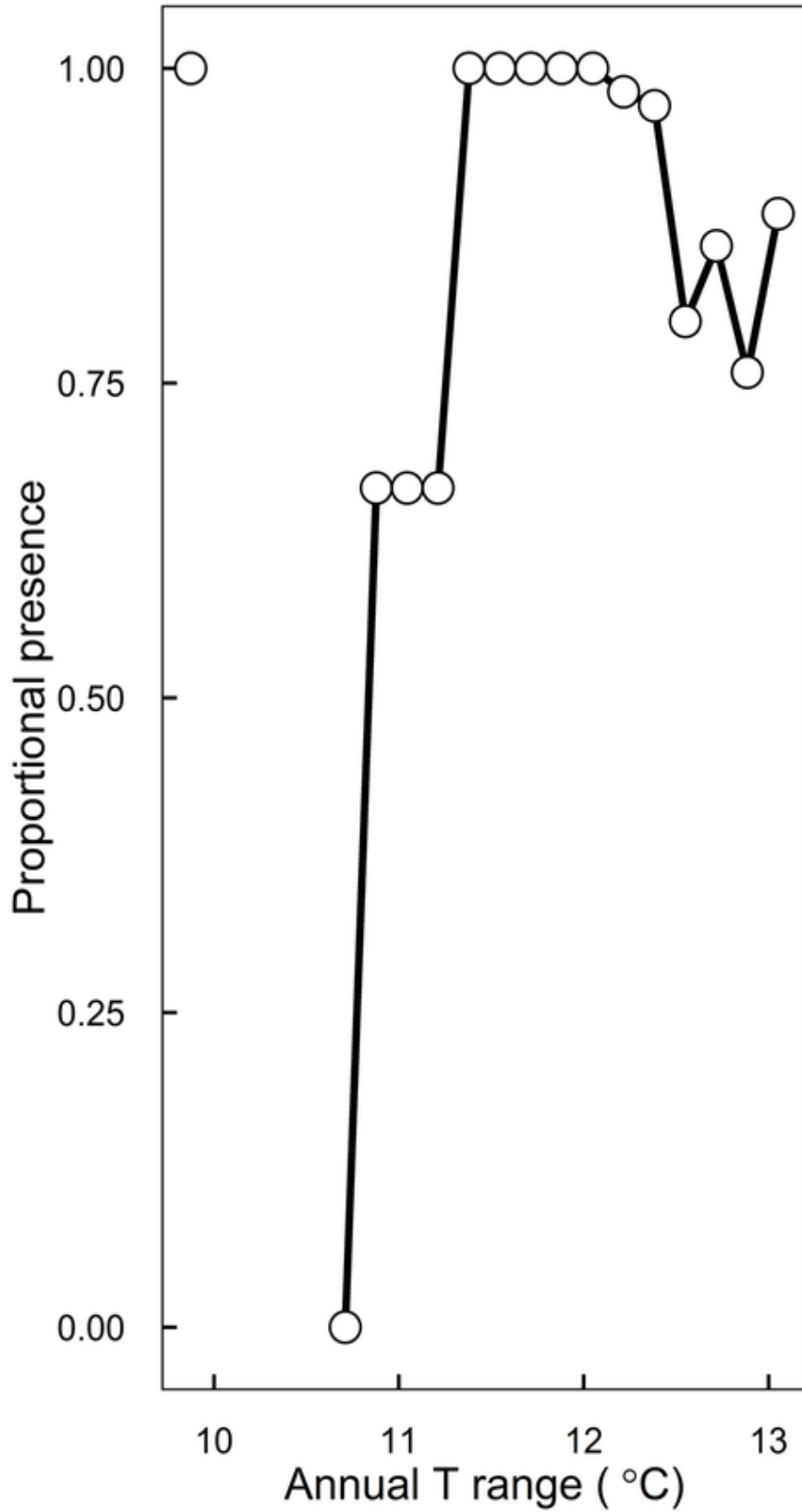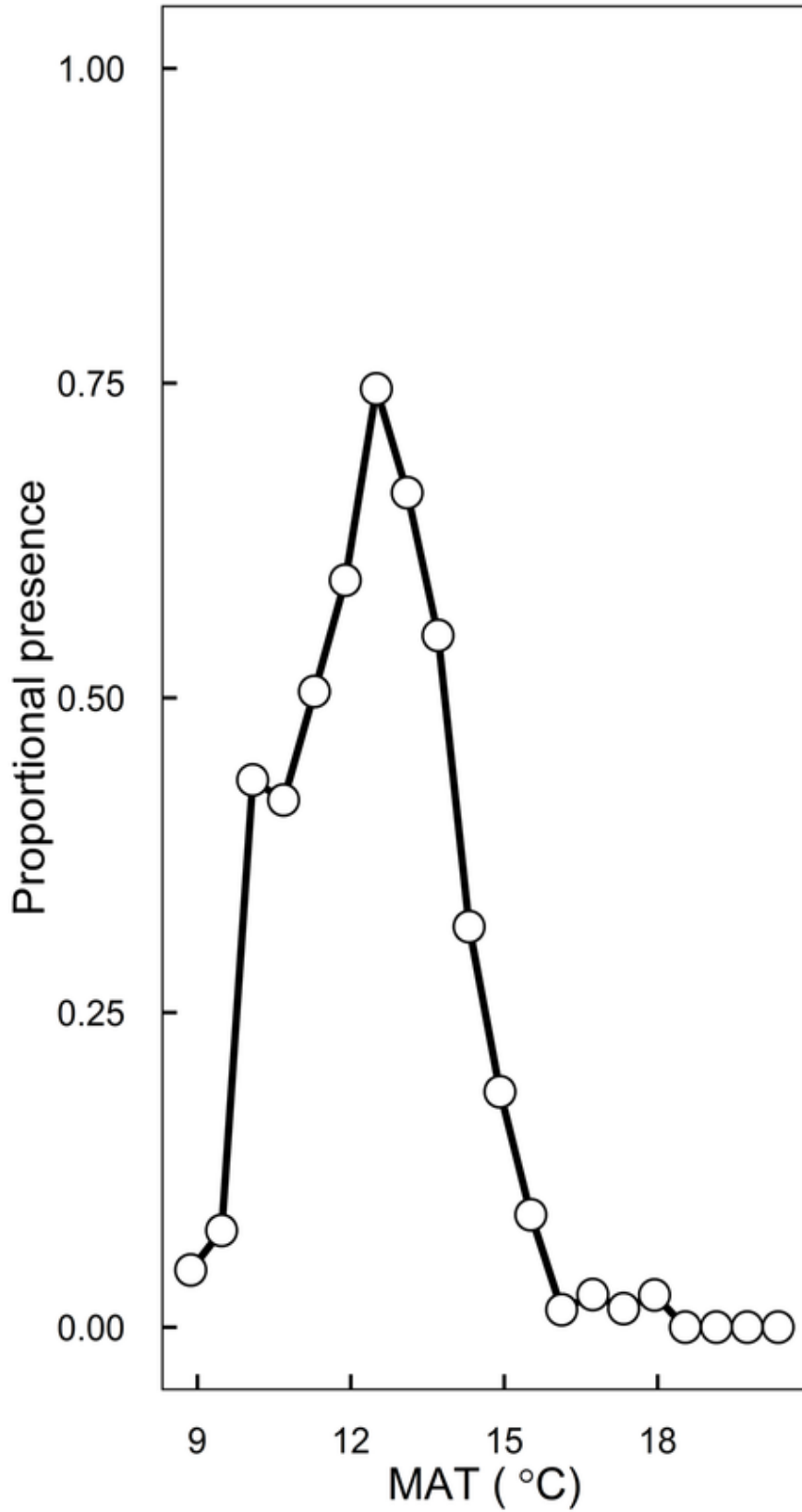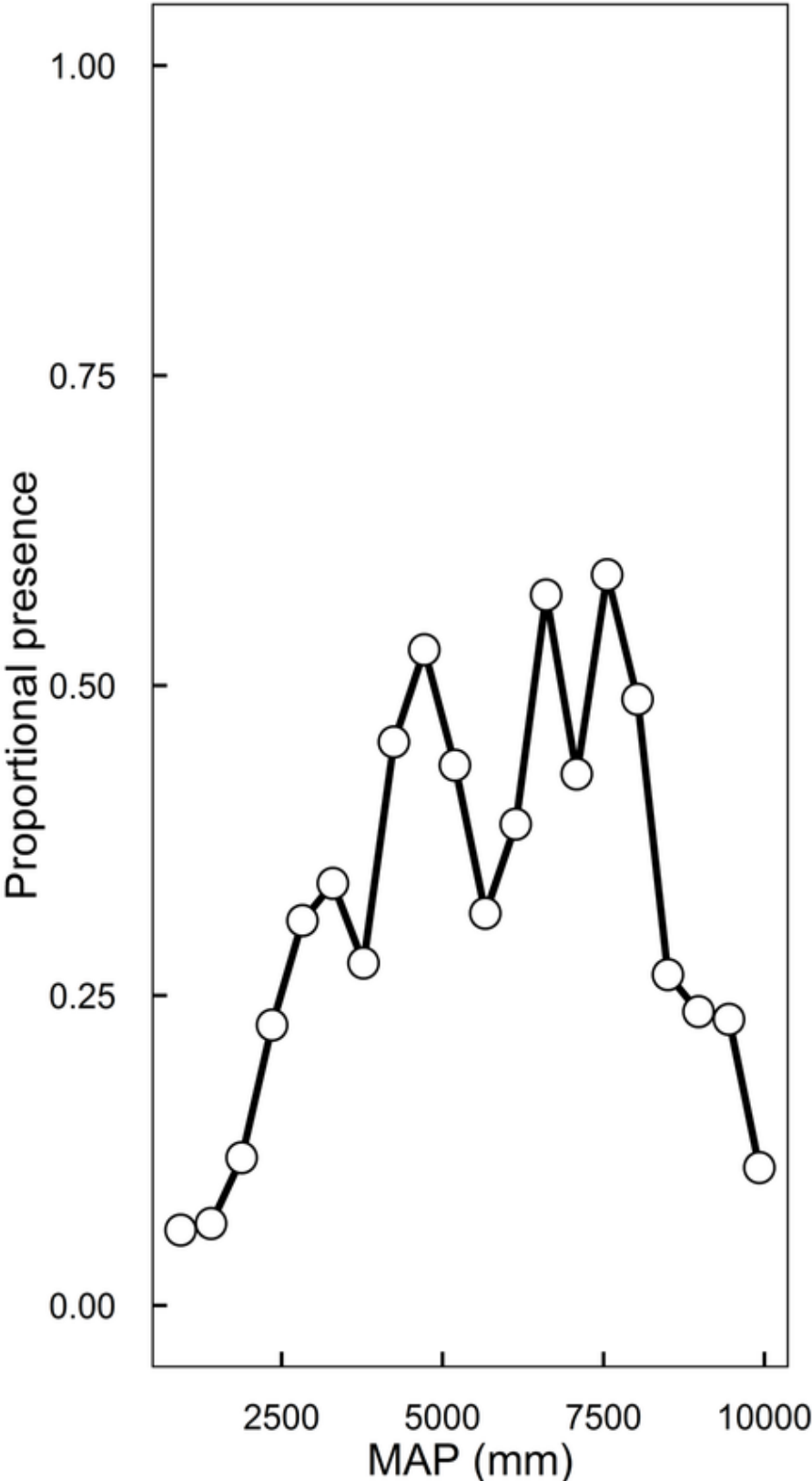Proportional presence of species along climate gradients
Proportional presence Kauai Amakihi bio15

S5
Proportional presence of species along climate gradients
Proportional presence Kauai Amakihi bio7

S5
Proportional presence of species along climate gradients
Proportional presence Kauai Elepaio bio1

S5
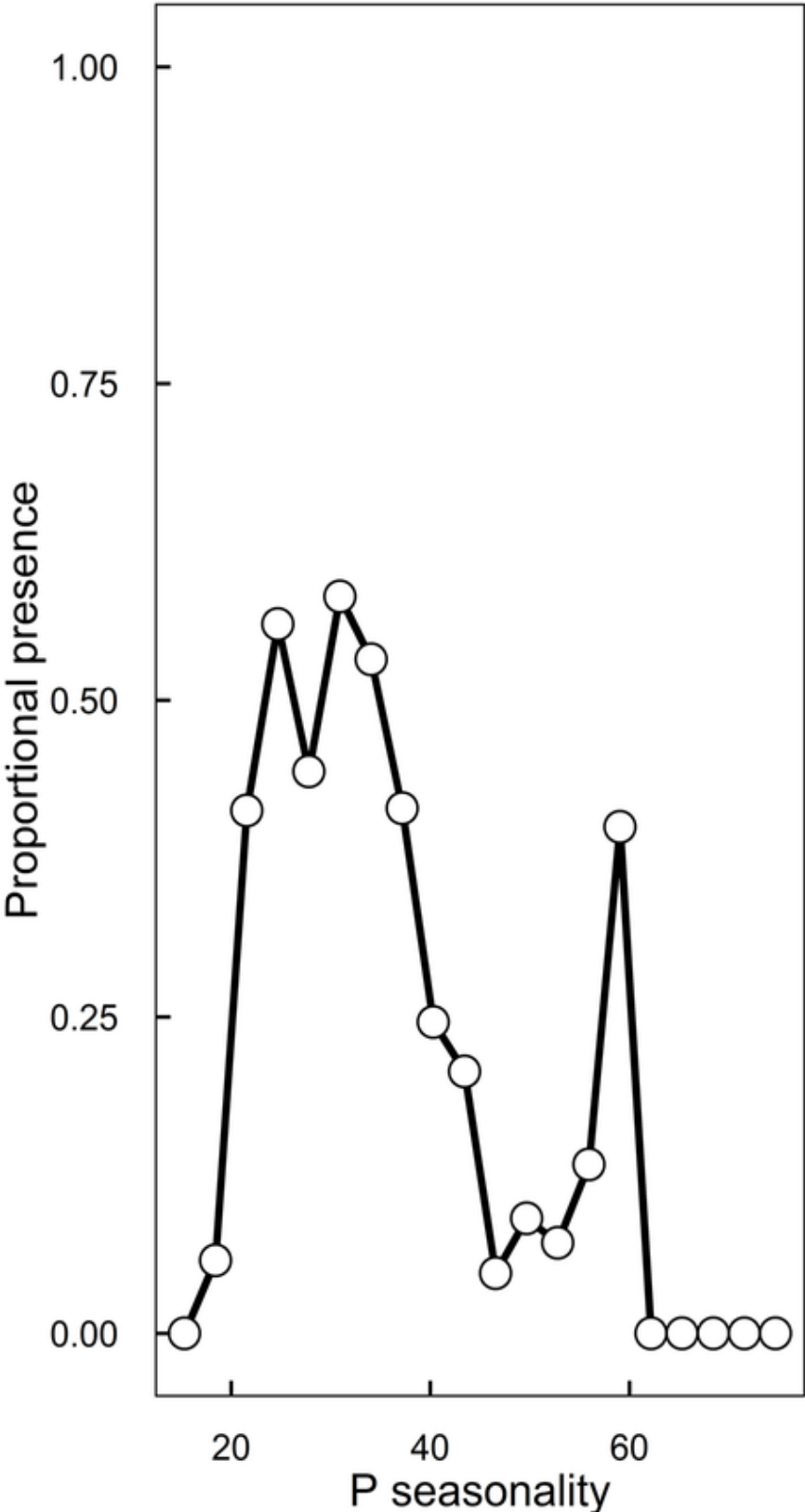Proportional presence of species along climate gradients
Proportional presence Kauai Elepaio bio12

S5

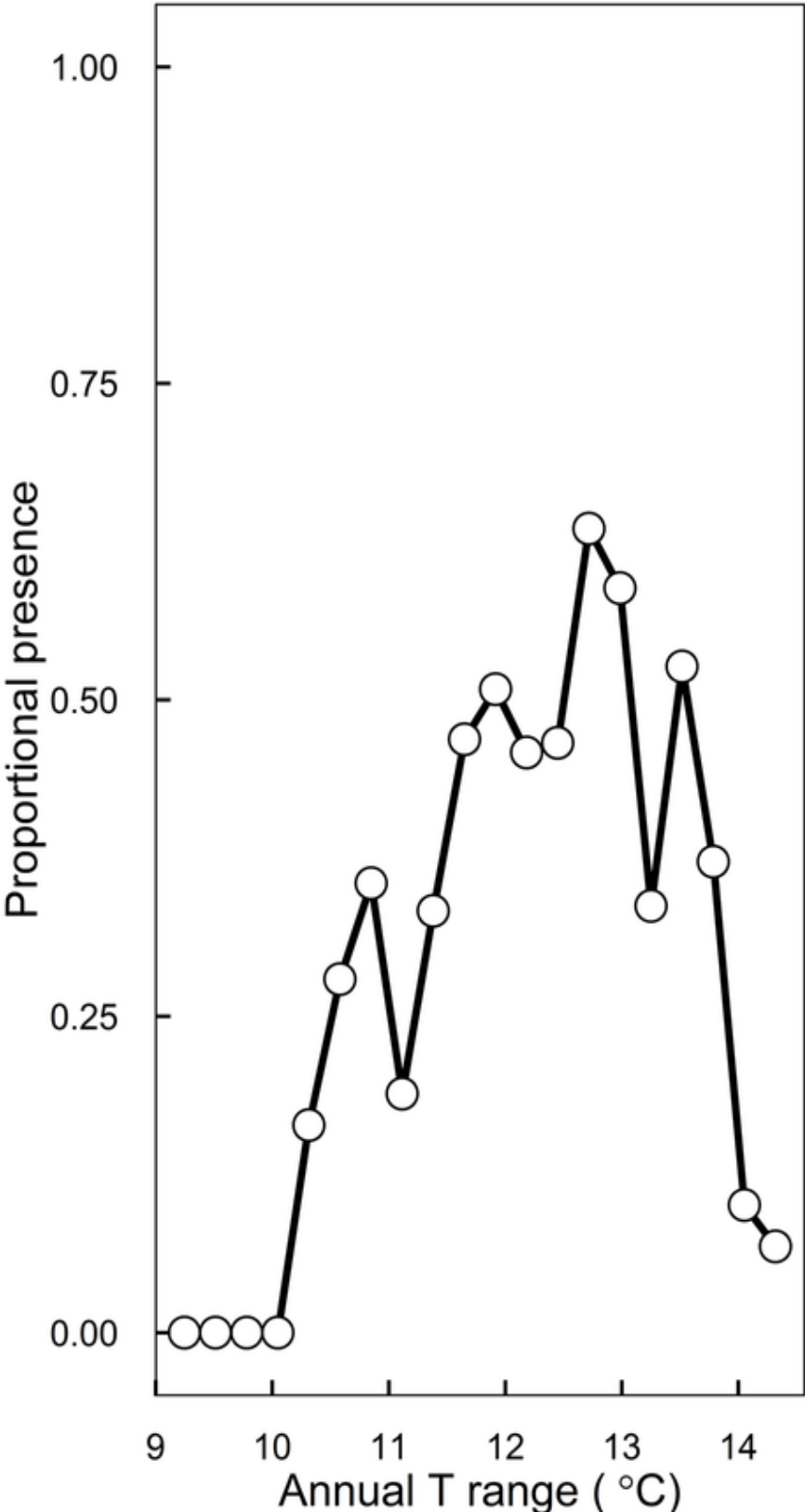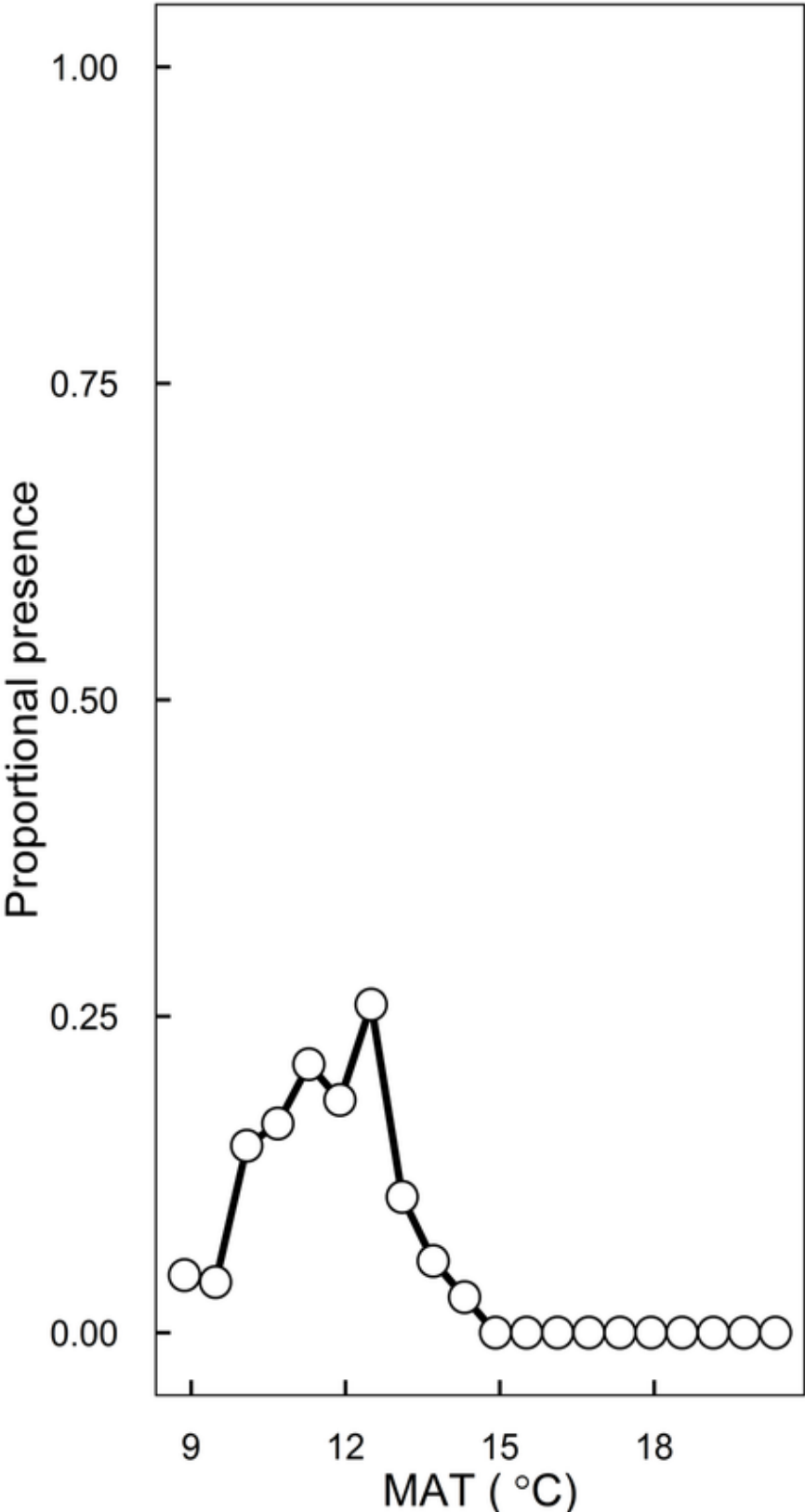Proportional presence of species along climate gradients

Proportional presence Kauai Elepaio bio15

S5
Proportional presence of species along climate gradients

Proportional presence Kauai Elepaio bio7

S5
Proportional presence of species along climate gradients

Proportional presence Maui Alauahio bio1

S5
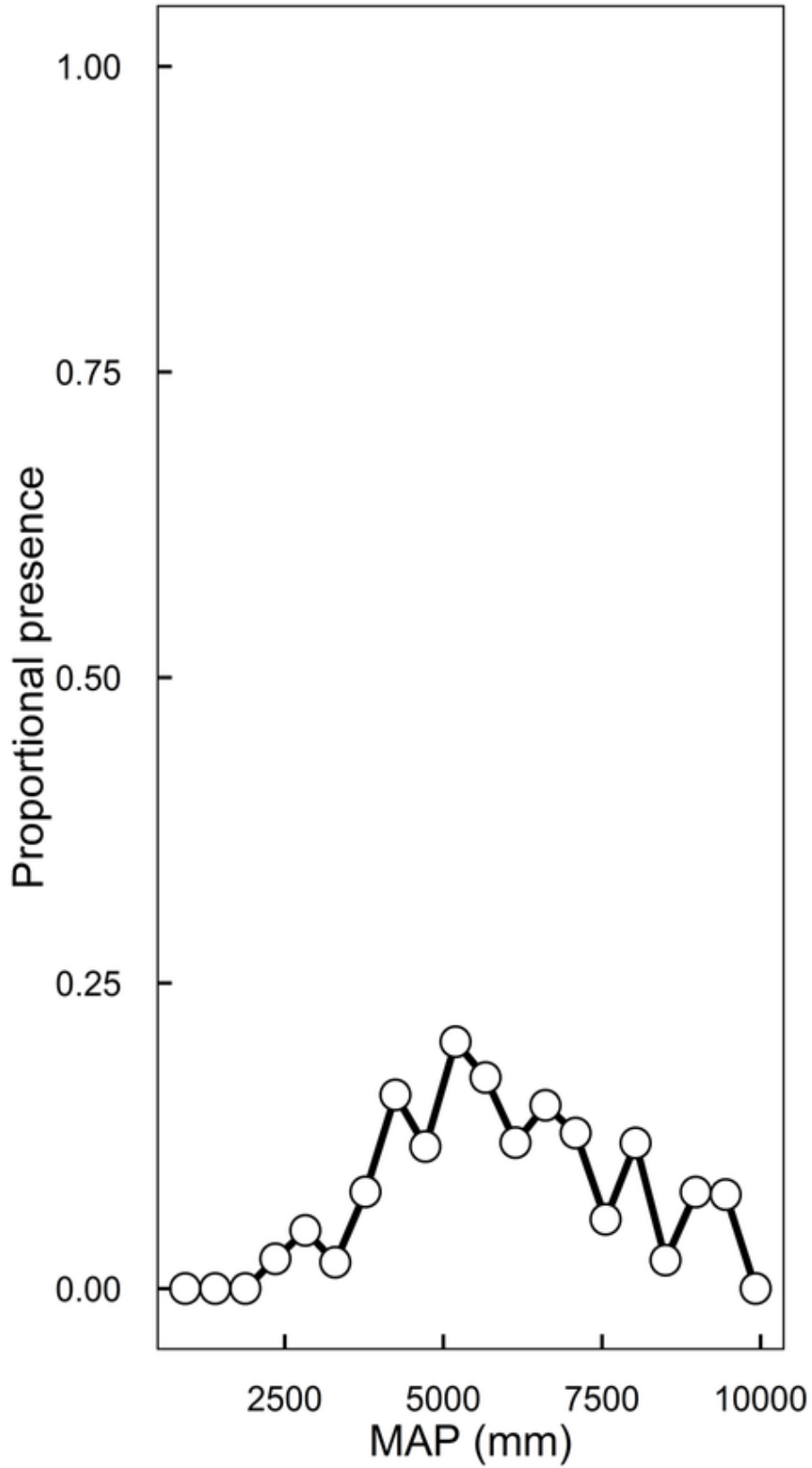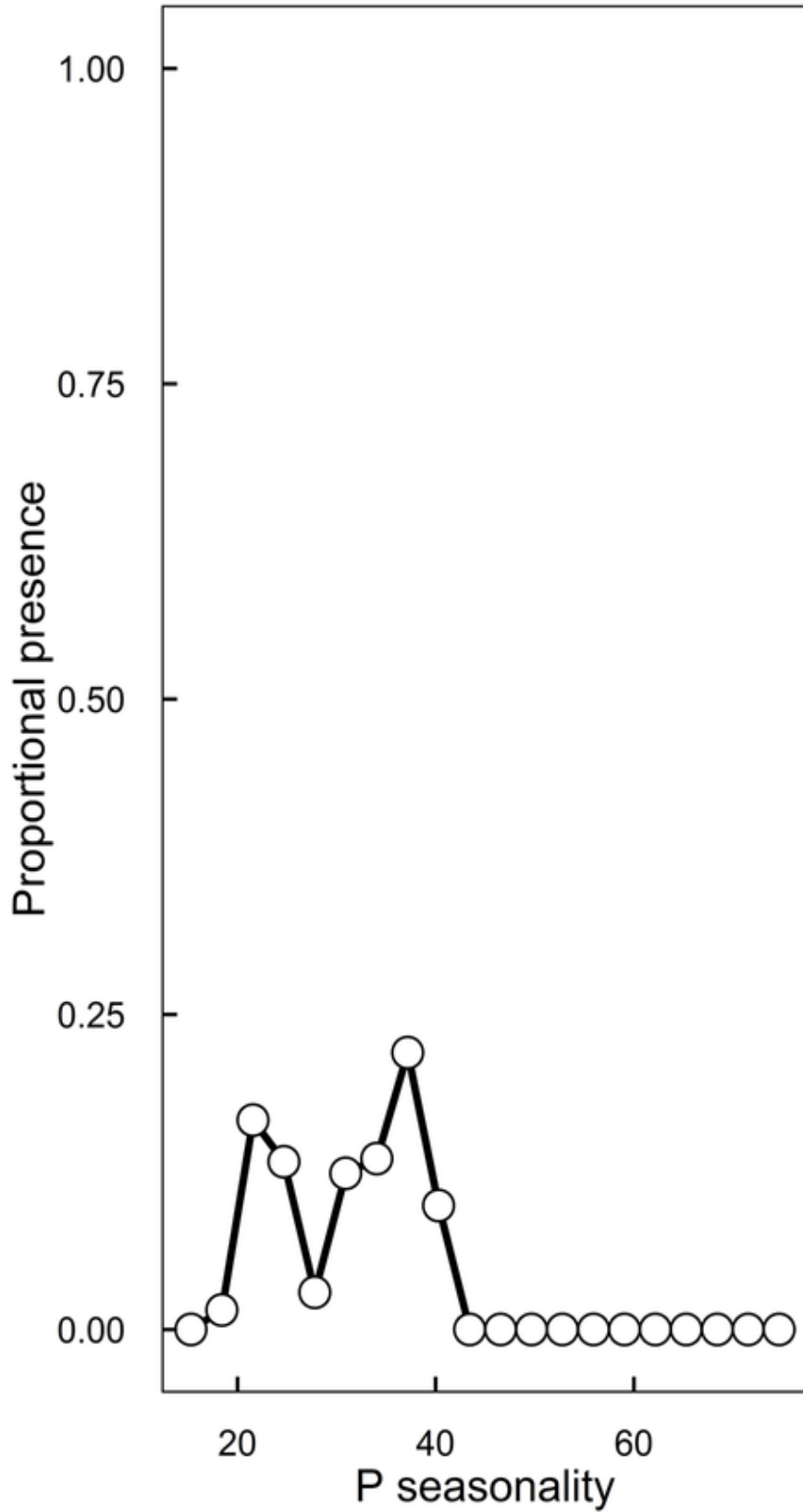Proportional presence of species along climate gradients
Proportional presence Maui Alauahio bio12

S5

Proportional presence of species along climate gradients

Proportional presence Maui Alauahio bio15

S5

Proportional presence of species along climate gradients

Proportional presence Maui Alauahio bio7

S5

Proportional presence of species along climate gradients

Proportional presence Maui Parrotbill bio1

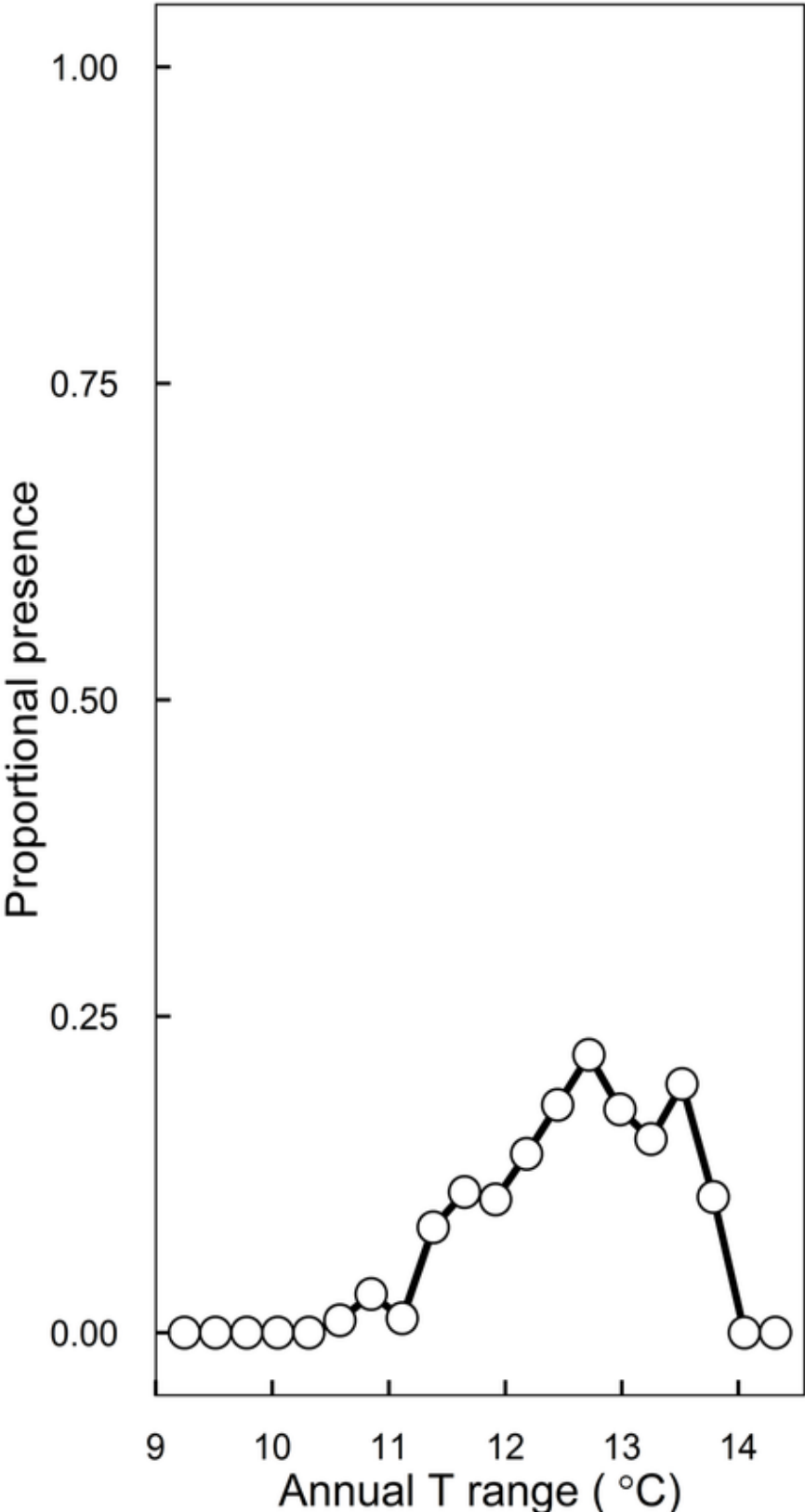S5
Proportional presence of species along climate gradients
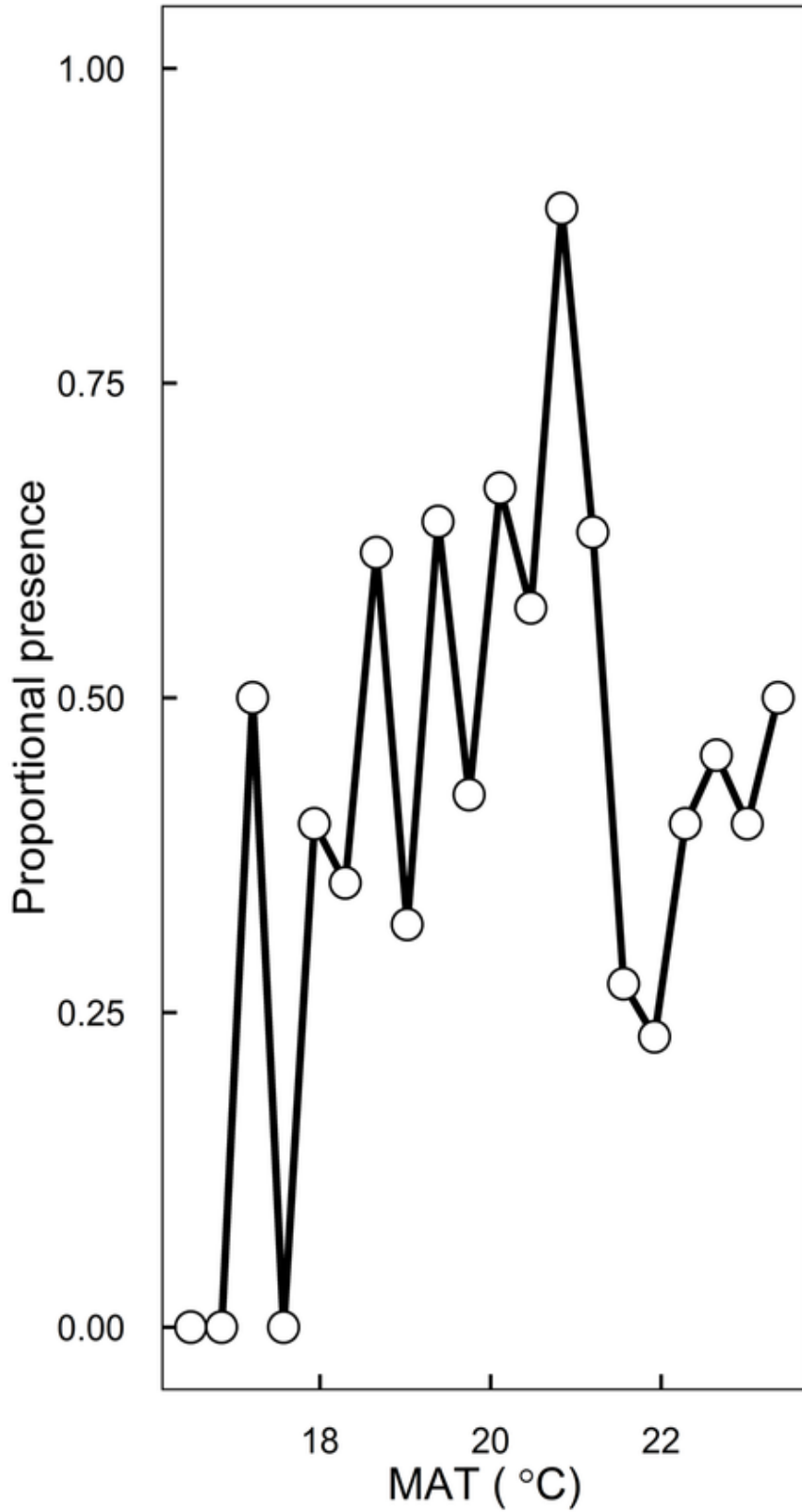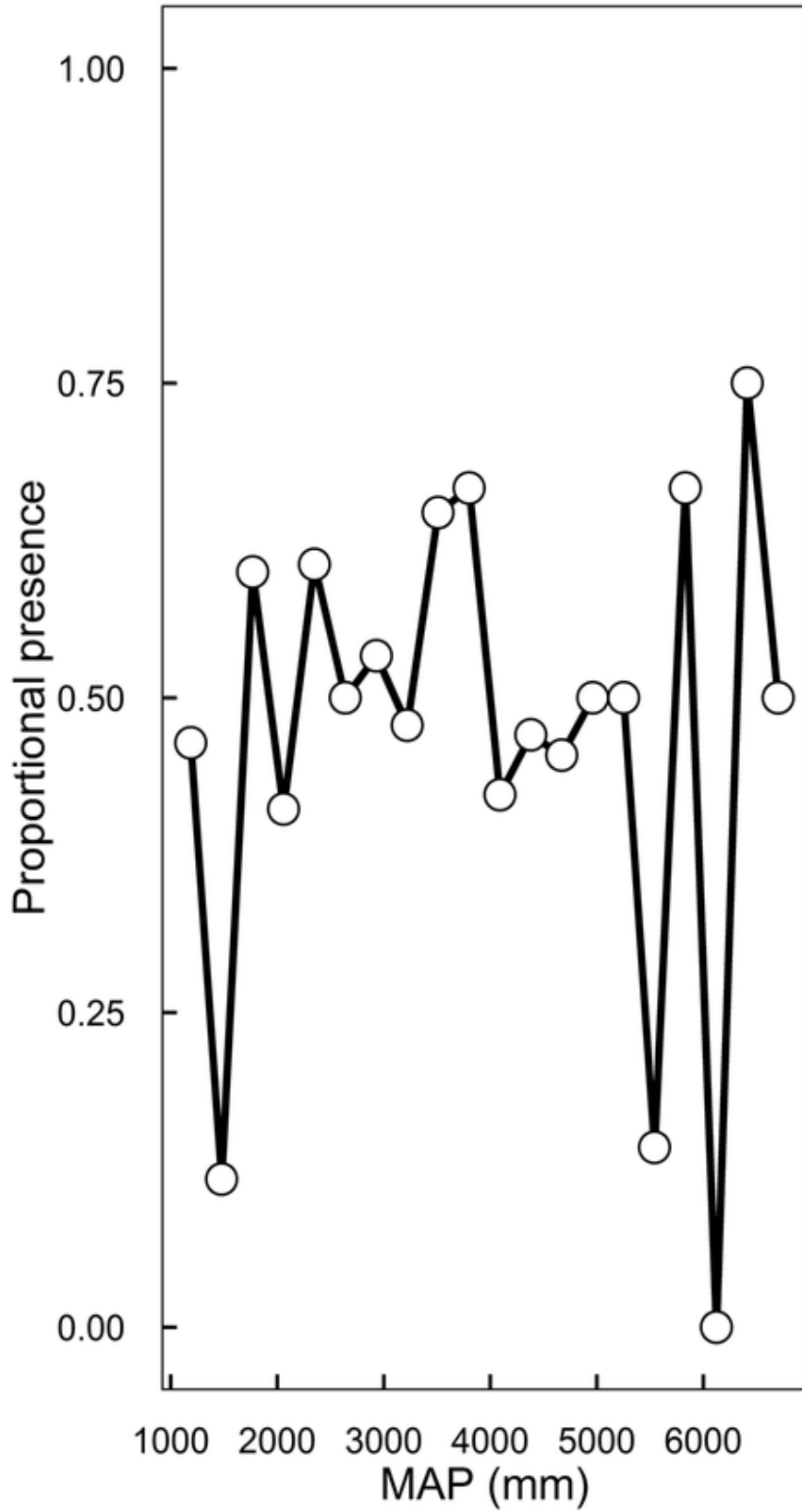
Proportional presence Maui Parrotbill bio12

S5

Proportional presence of species along climate gradients

Proportional presence Maui Parrotbill bio15

S5
Proportional presence of species along climate gradients

Proportional presence Maui Parrotbill bio7

S5

Proportional presence of species along climate gradients

Proportional presence Oahu Amakihi bio1

S5
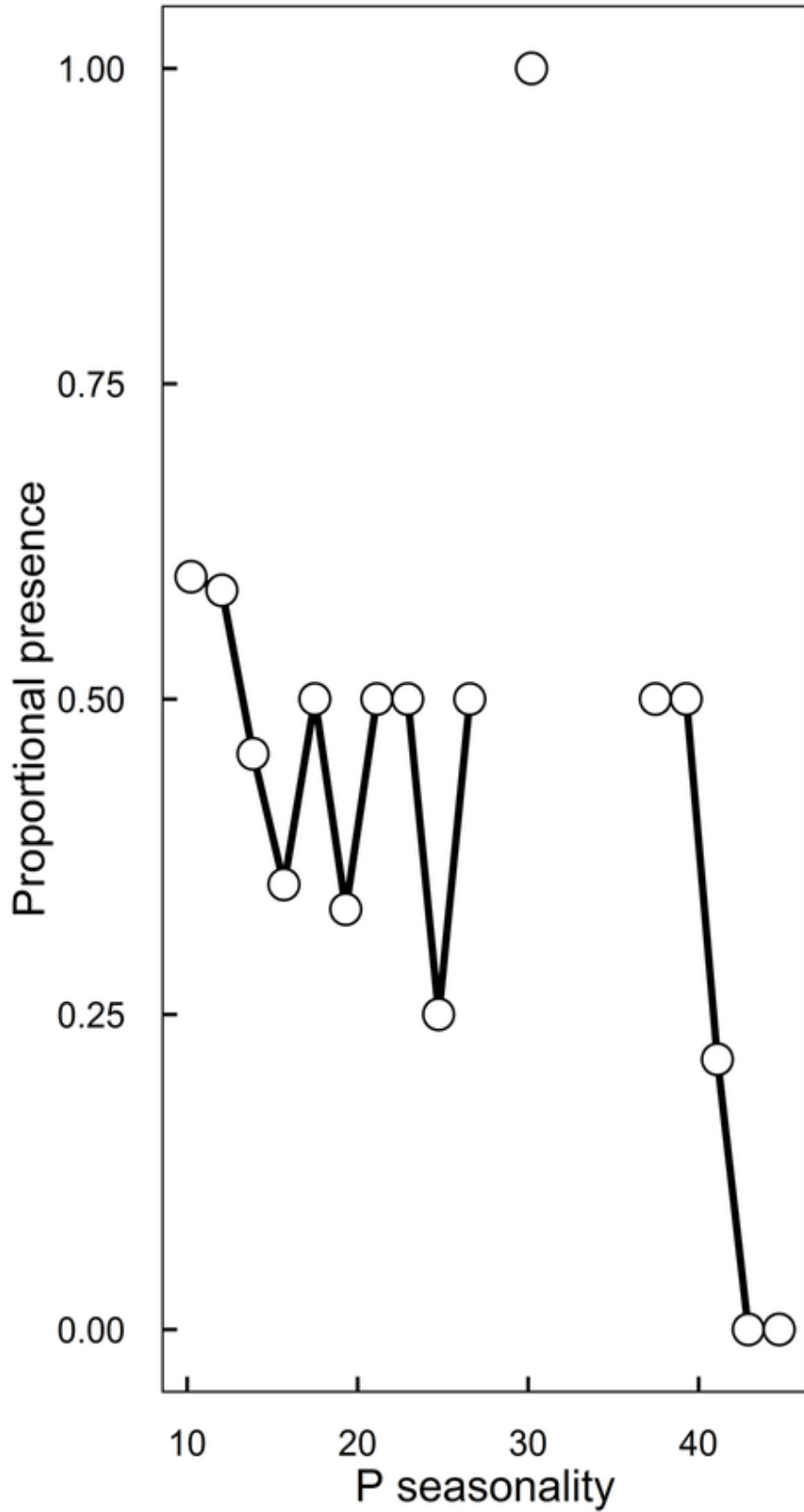Proportional presence of species along climate gradients
Proportional presence Oahu Amakihi bio12

S5

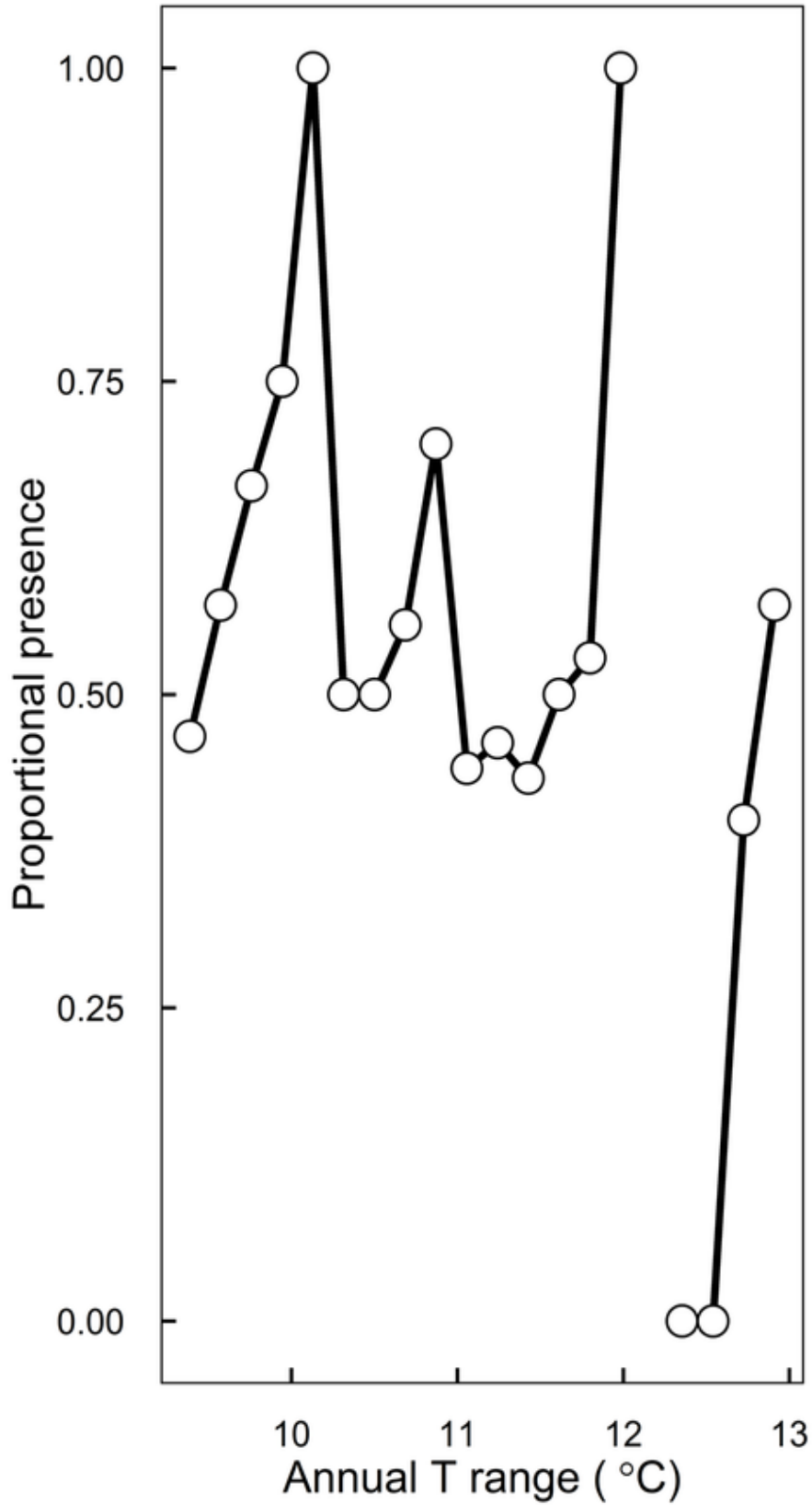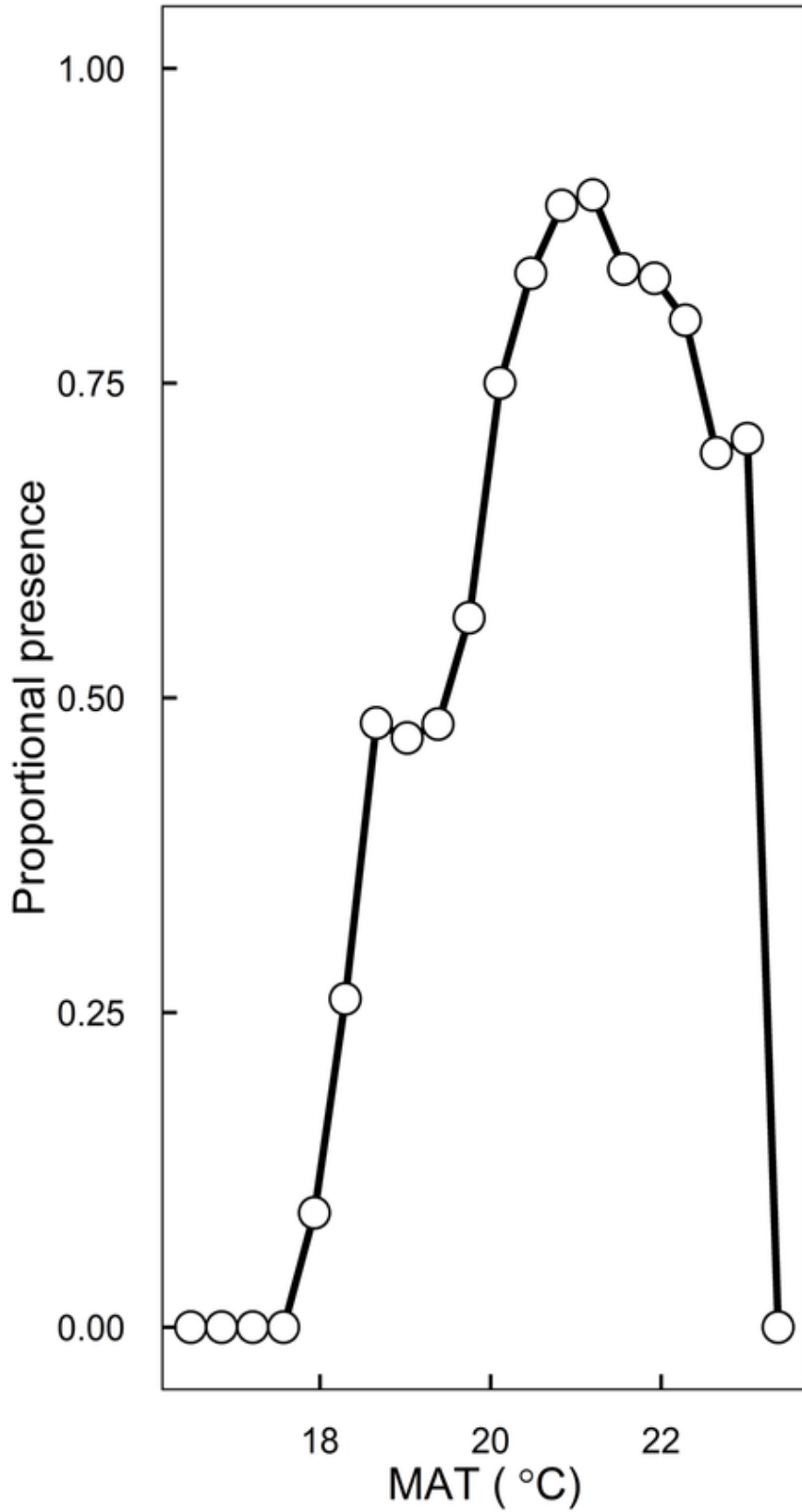Proportional presence of species along climate gradients

Proportional presence Oahu Amakihi bio15

S5
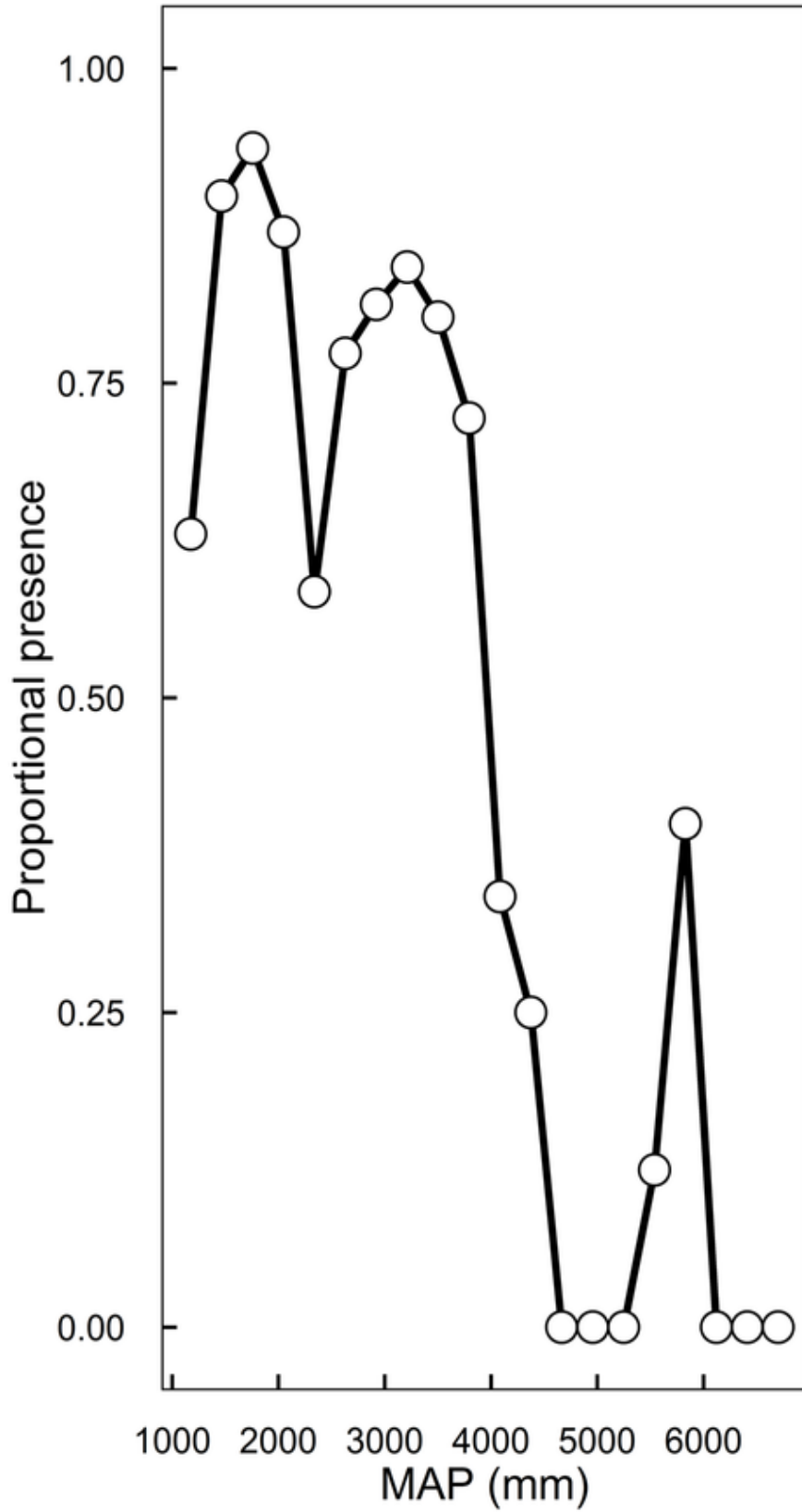Proportional presence of species along climate gradients
Proportional presence Oahu Amakihi bio7

Proportional presence of species along climate gradients

Proportional presence Oahu Elepaio bio1

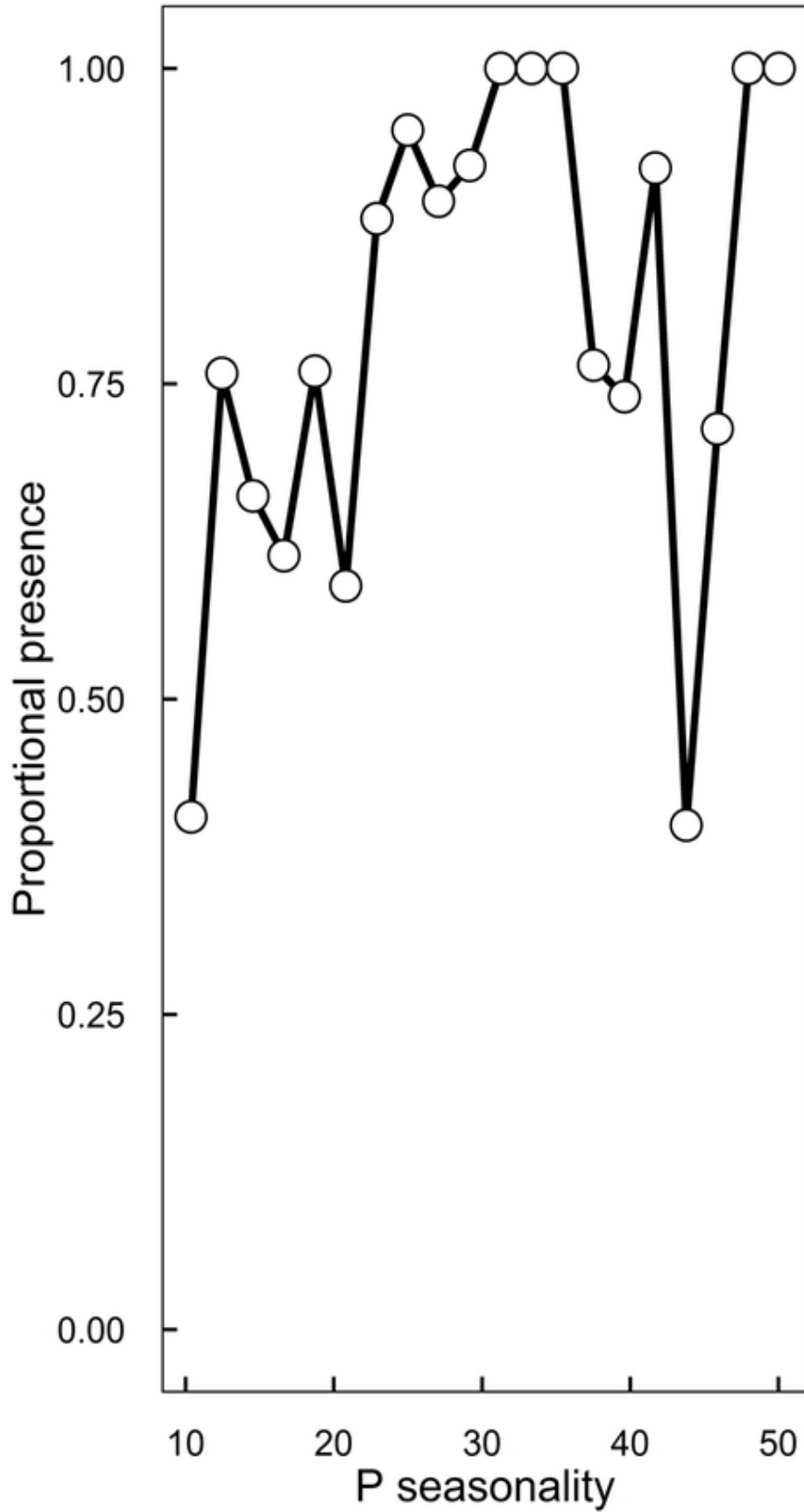S5
Proportional presence of species along climate gradients
Proportional presence Oahu Elepaio bio12

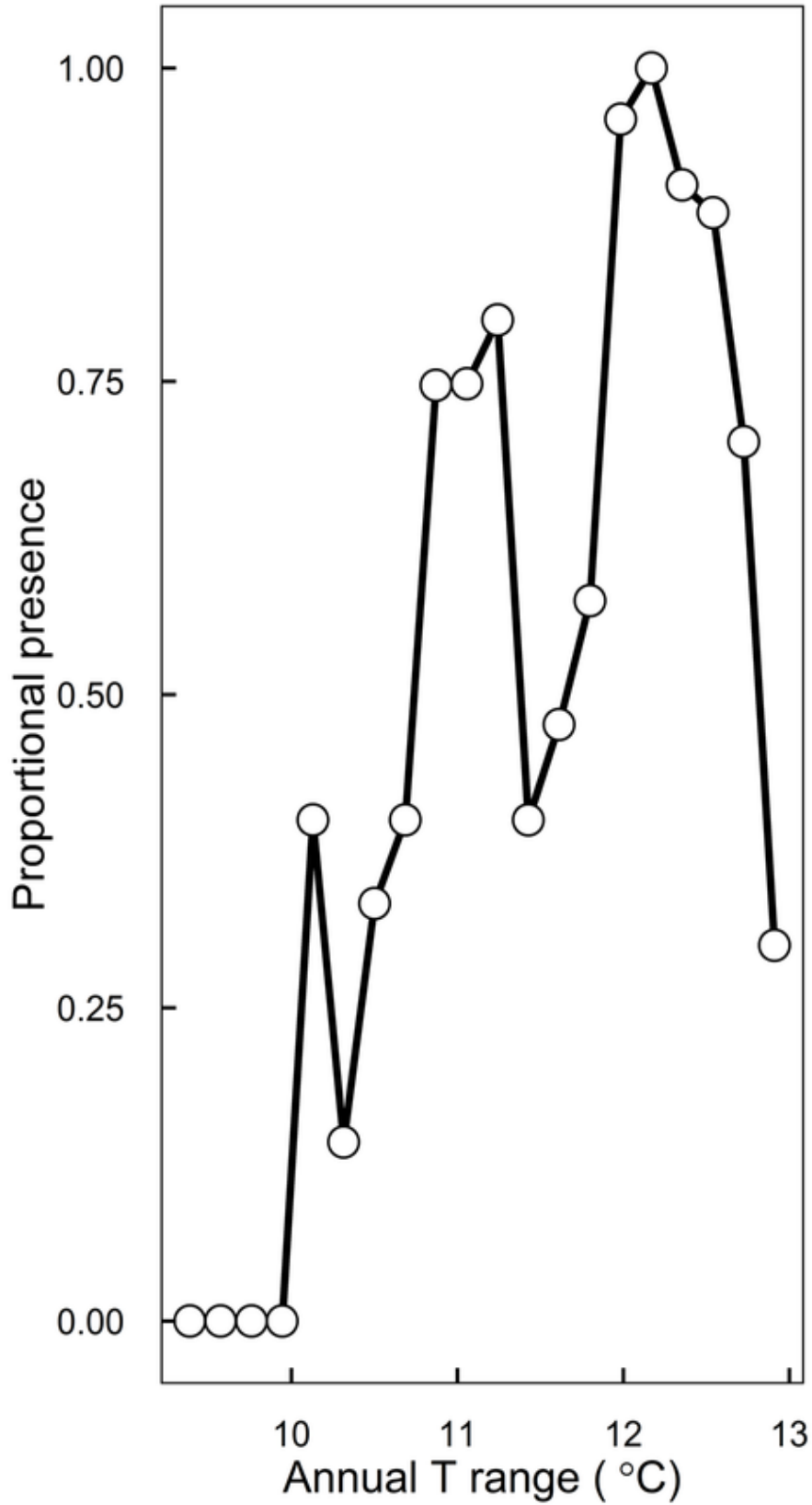Proportional presence of species along climate gradients

Proportional presence Oahu Elepaio bio15

S5
Proportional presence of species along climate gradients
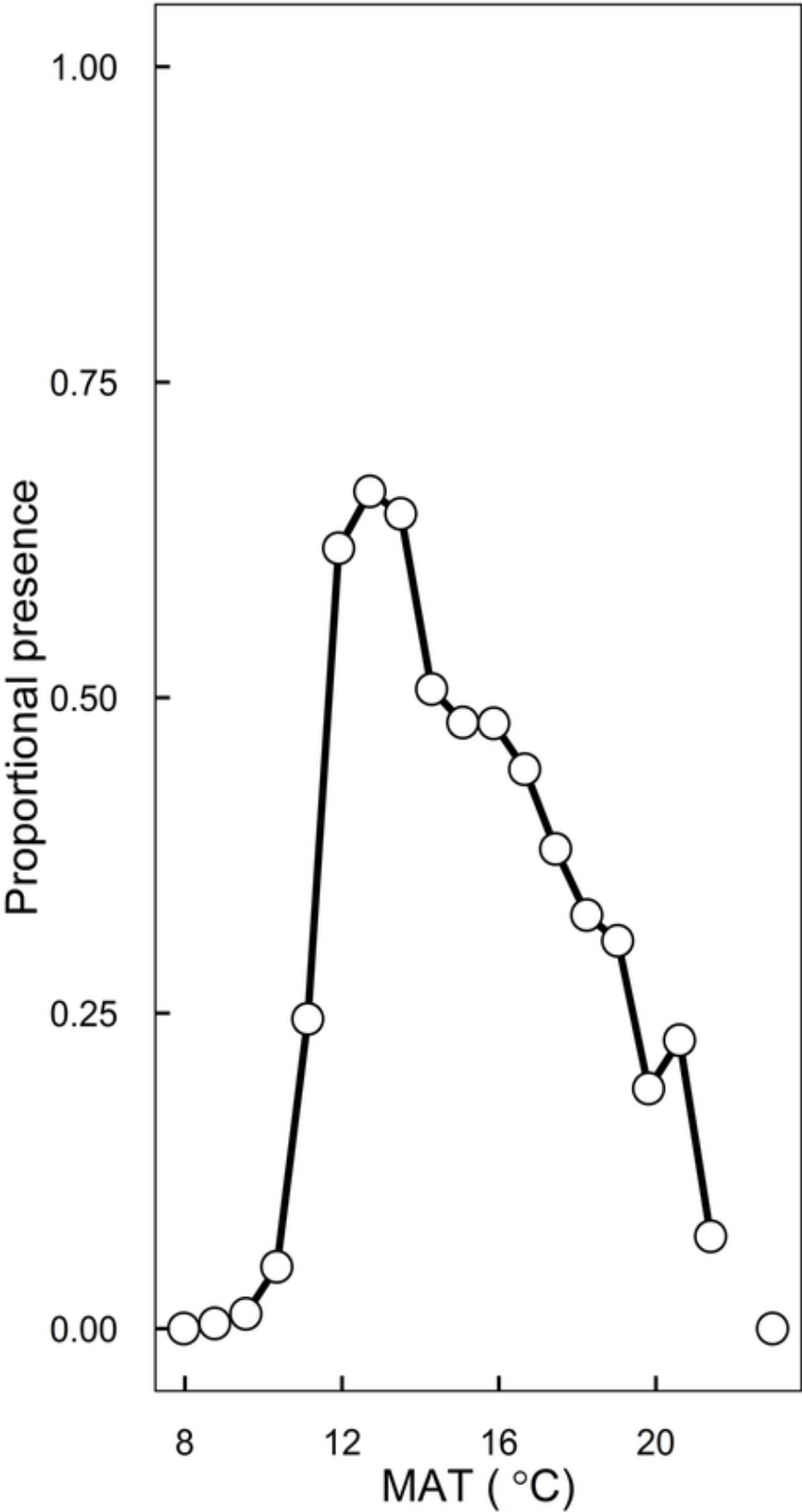Proportional presence Oahu Elepaio bio7

S5

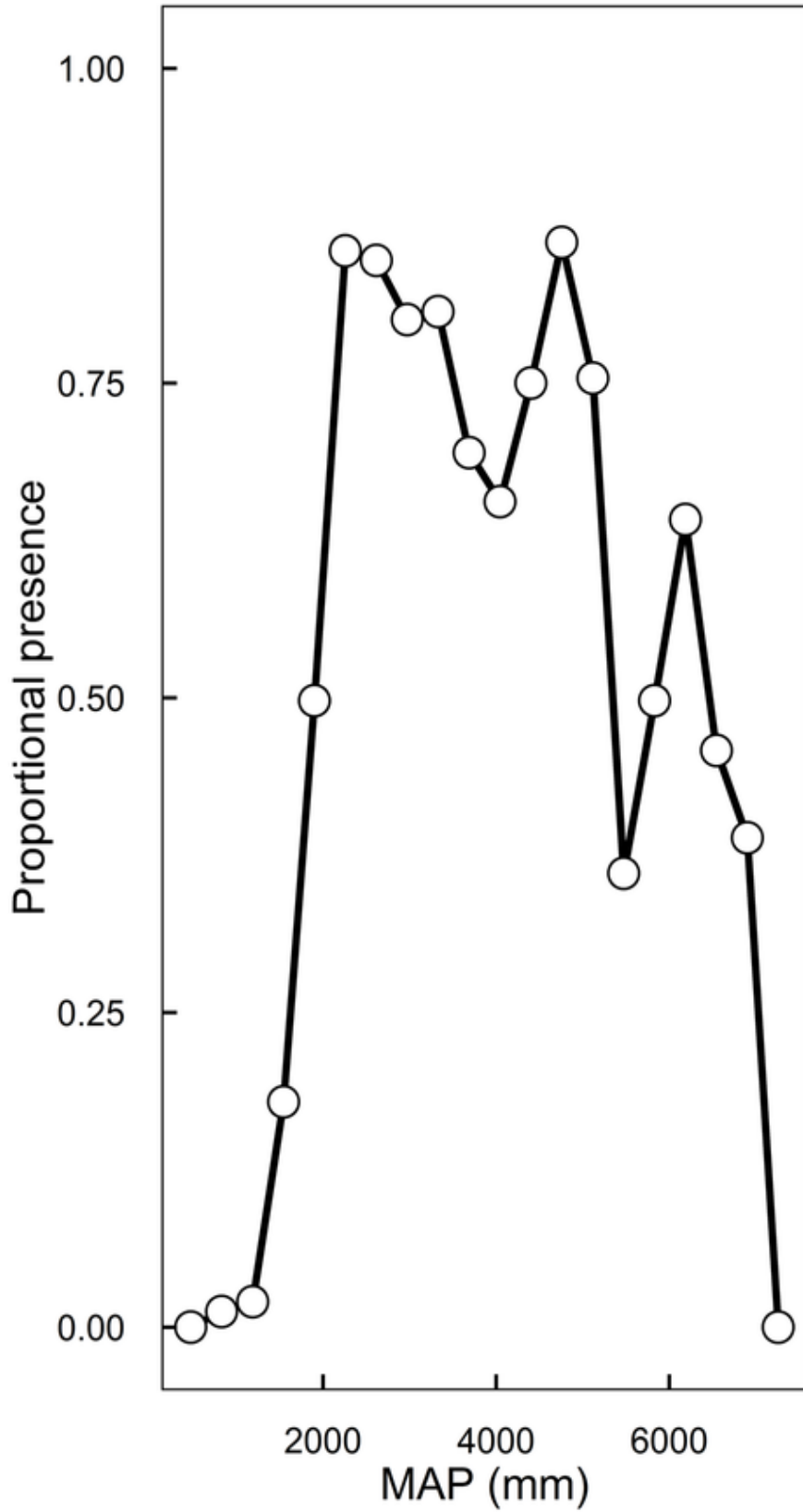Proportional presence of species along climate gradients

Proportional presence Omao bio1

Proportional presence of species along climate gradients

Proportional presence Omao bio12

S5
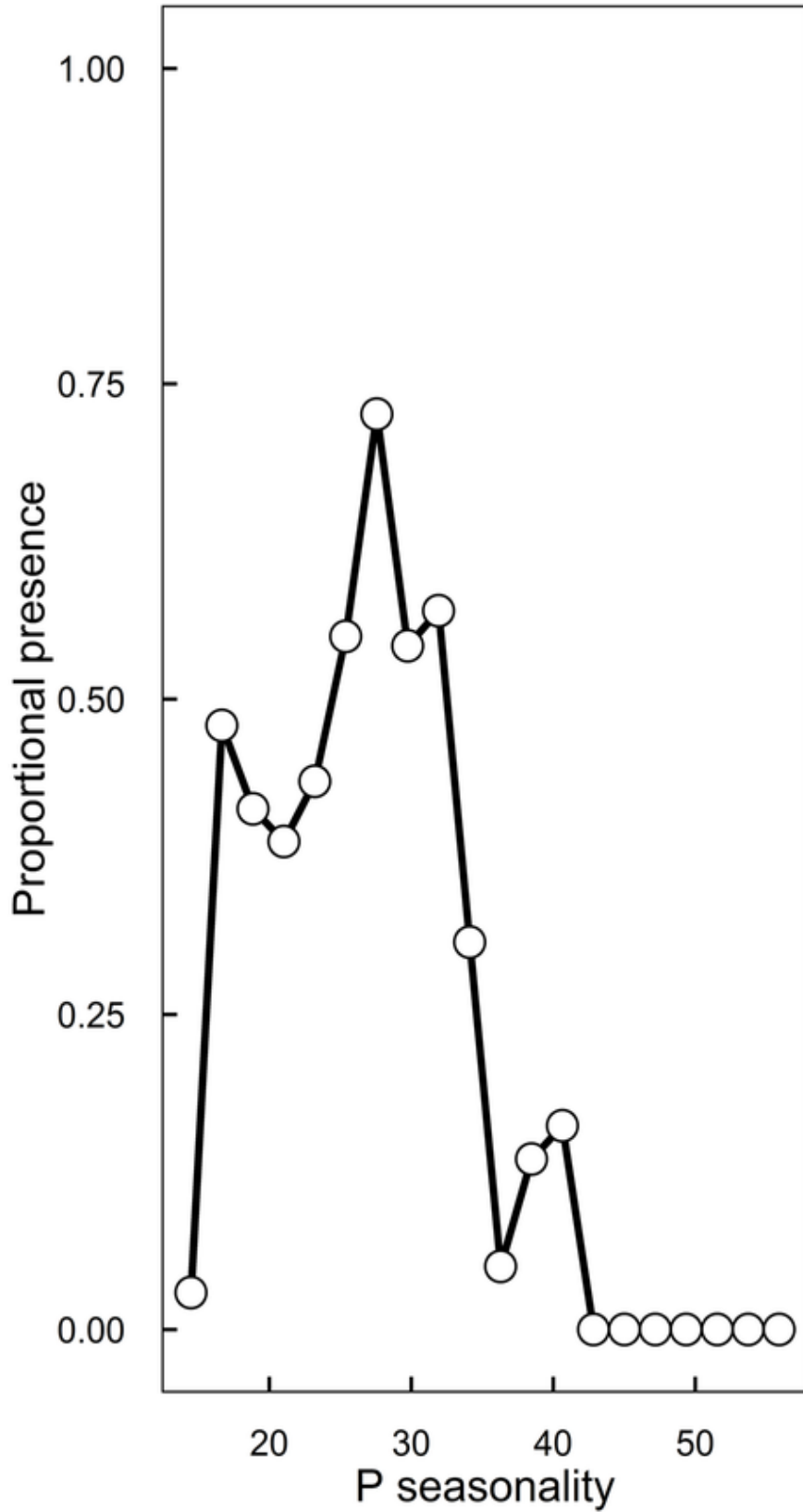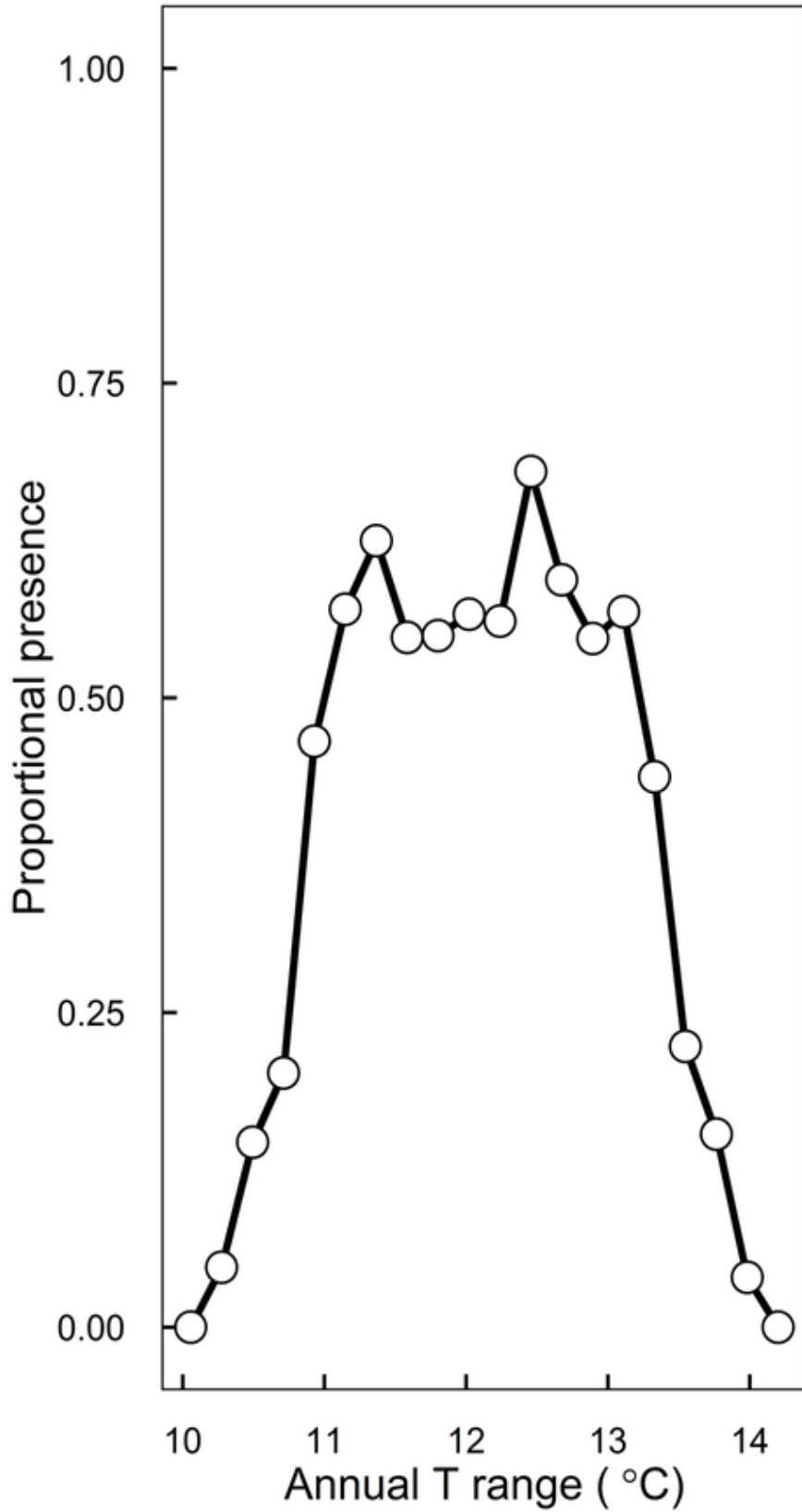
Proportional presence of species along climate gradients

Proportional presence Omao bio15

S5

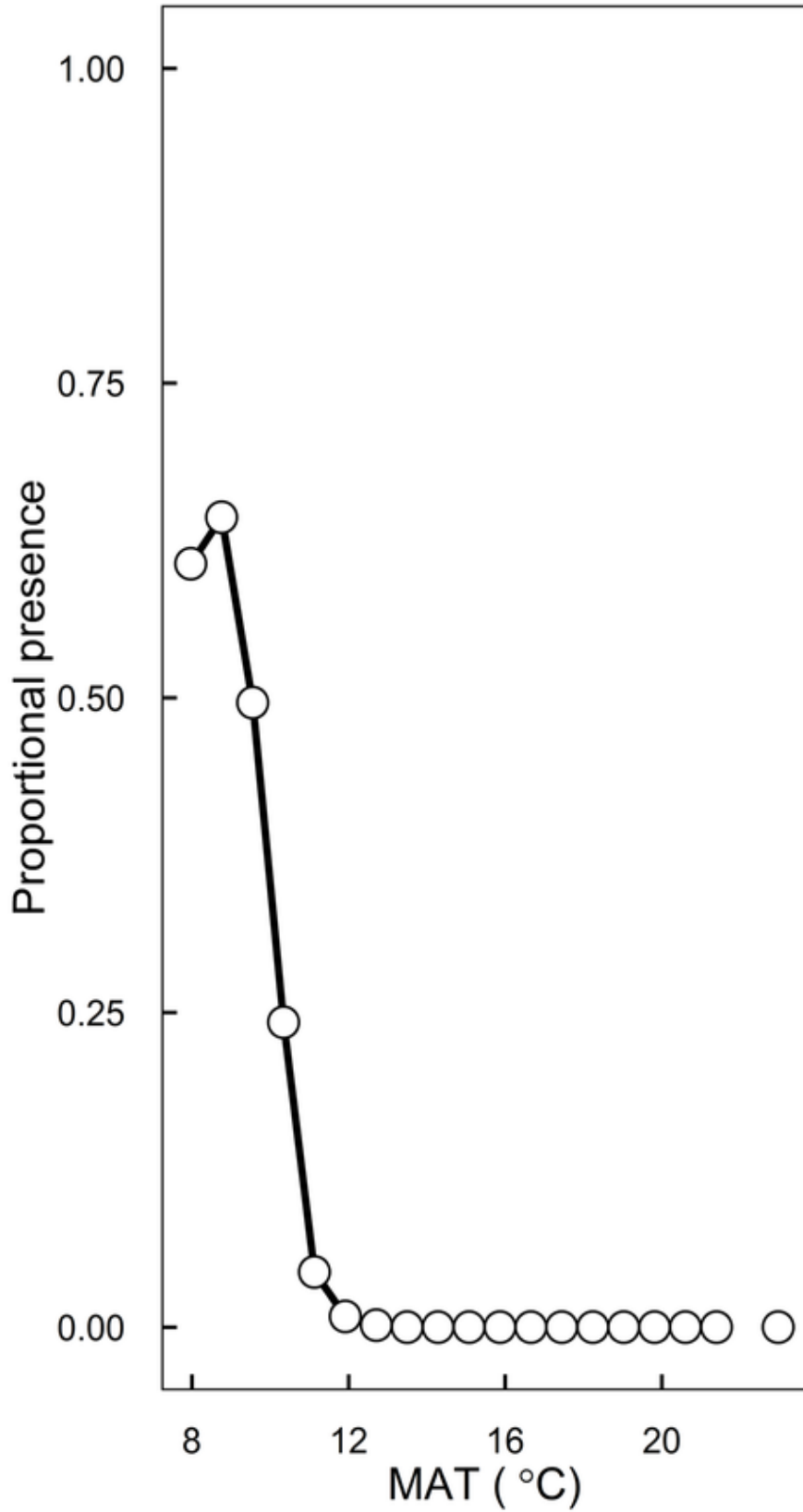Proportional presence of species along climate gradients

Proportional presence Omao bio7

S5

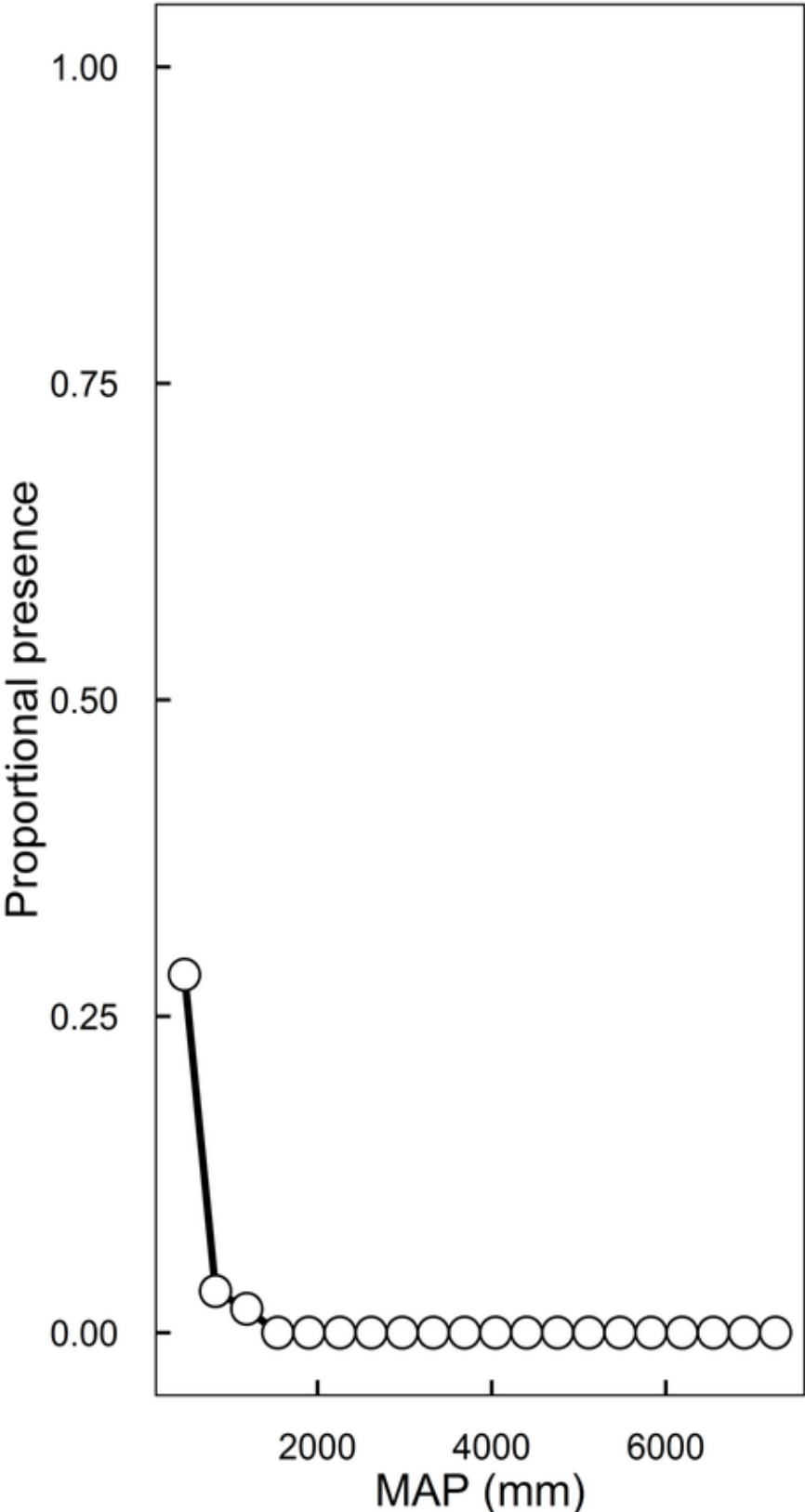Proportional presence of species along climate gradients

Proportional presence Palila bio1

S5
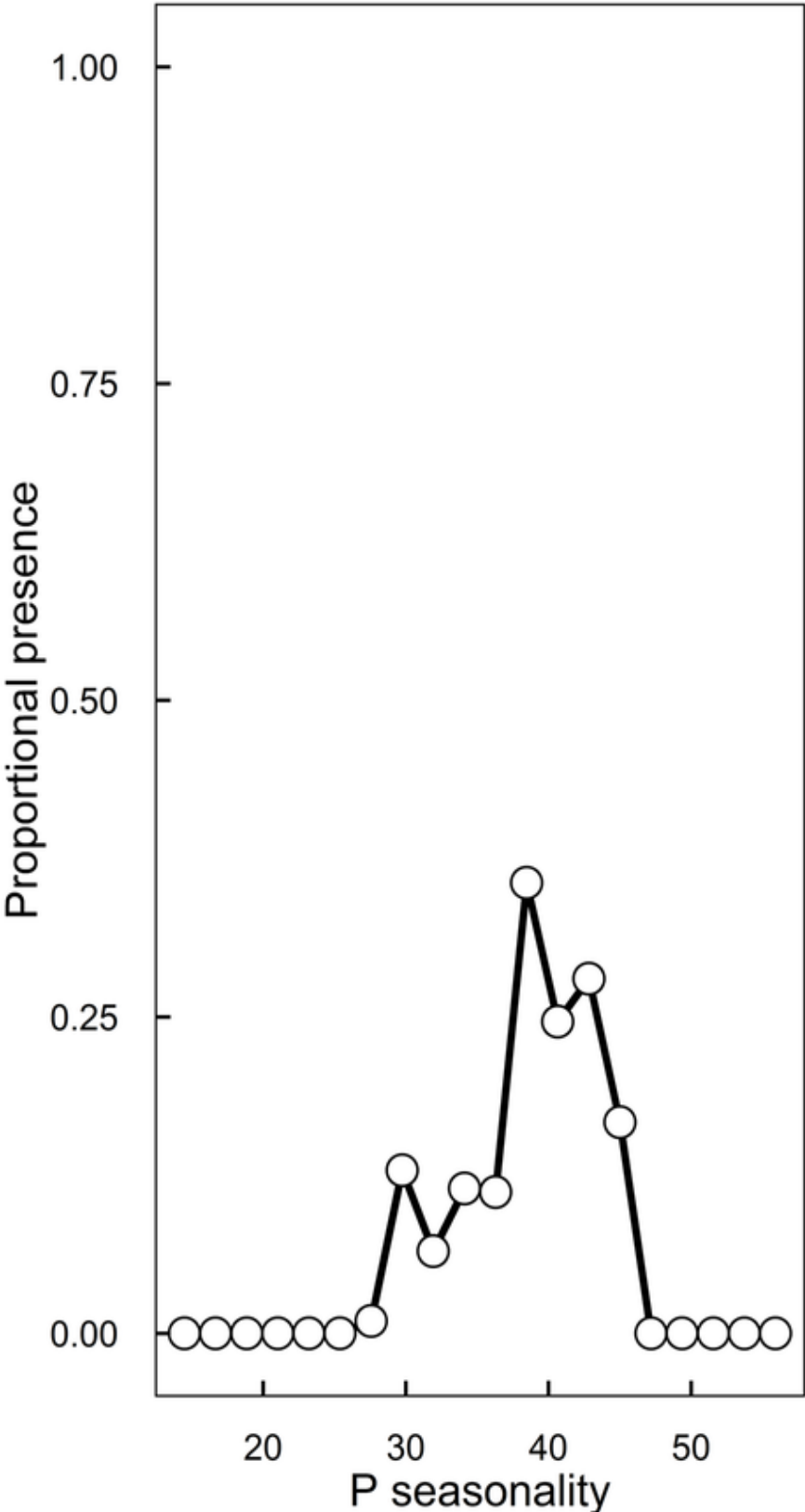Proportional presence of species along climate gradients

Proportional presence Palila bio12

S5
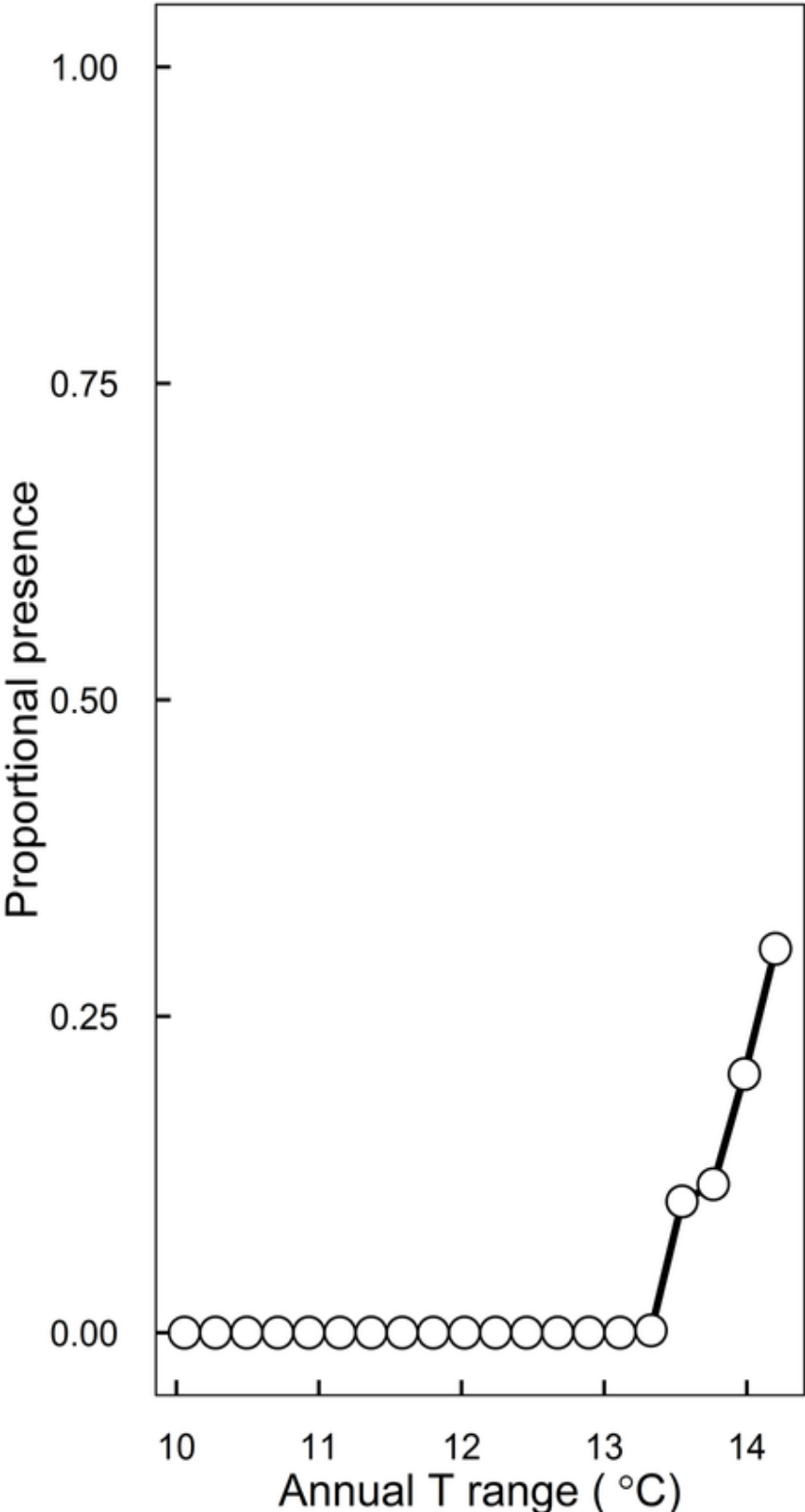Proportional presence of species along climate gradients
Proportional presence Palila bio15

S5

Proportional presence of species along climate gradients
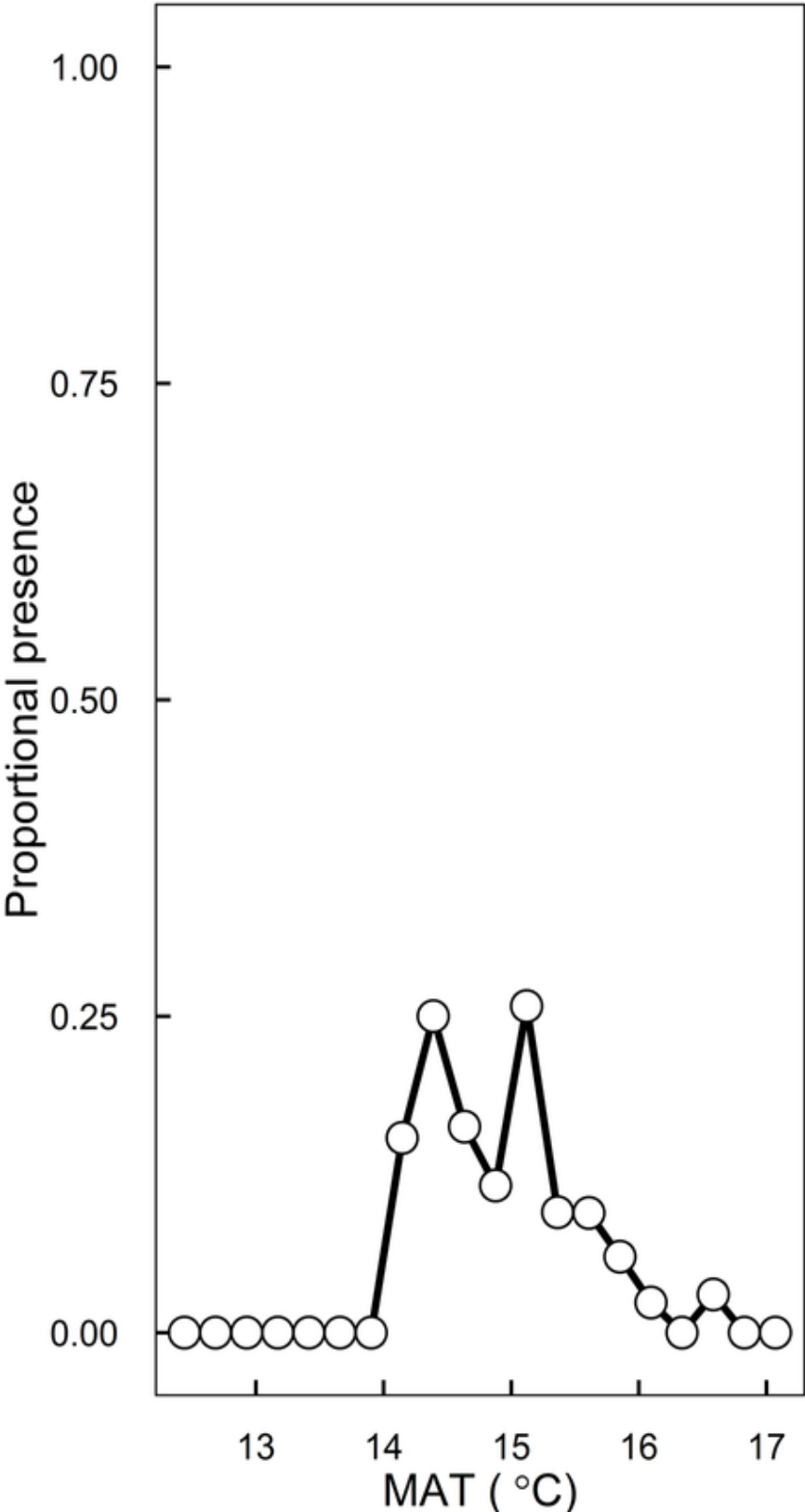
Proportional presence Palila bio7

S5

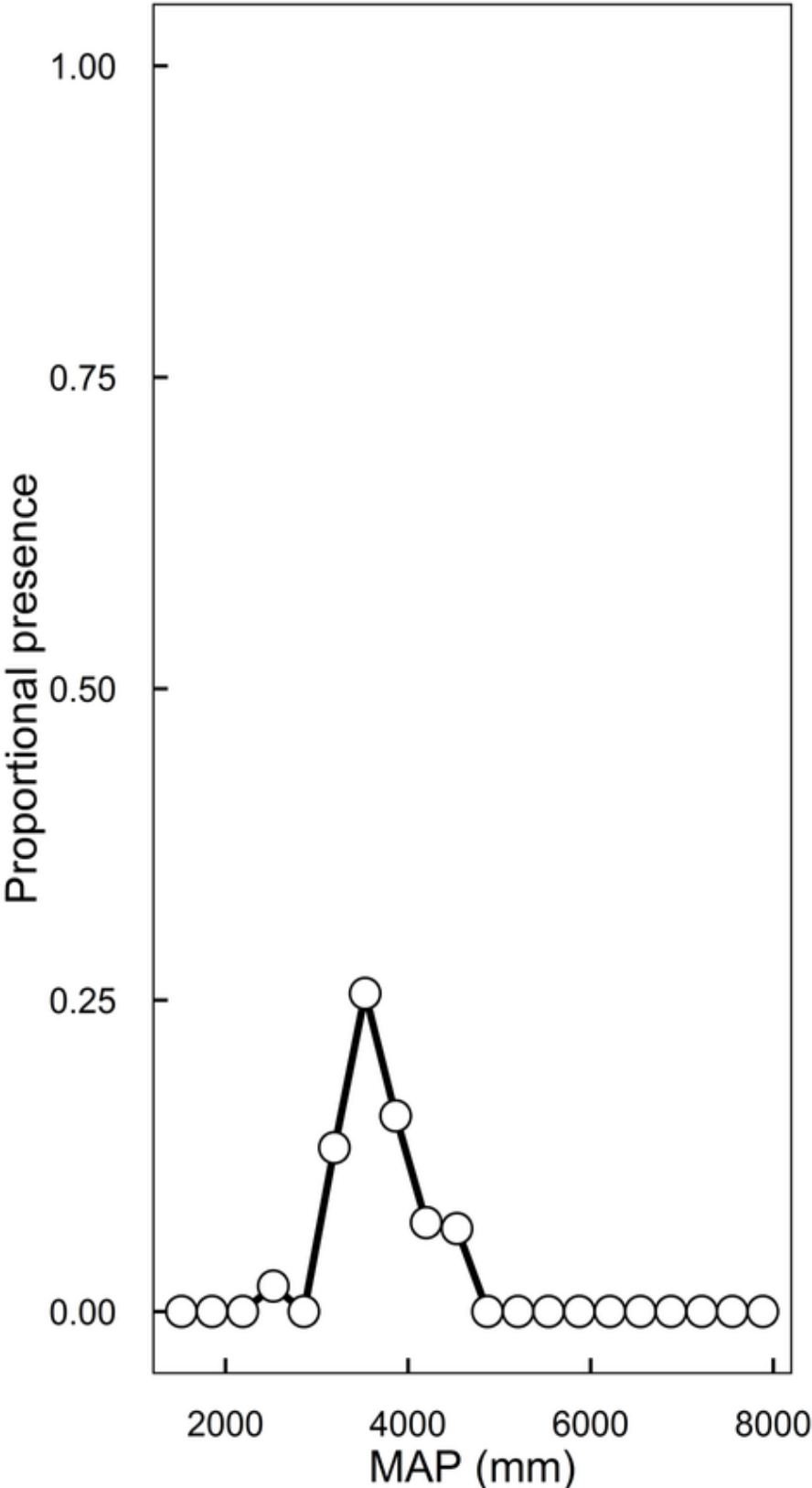Proportional presence of species along climate gradients

Proportional presence Puaiohi bio1

S5
Proportional presence of species along climate gradients
Proportional presence Puaiohi bio12

S5
Proportional presence of species along climate gradients

Proportional presence Puaiohi bio15

Proportional presence of species along climate gradients
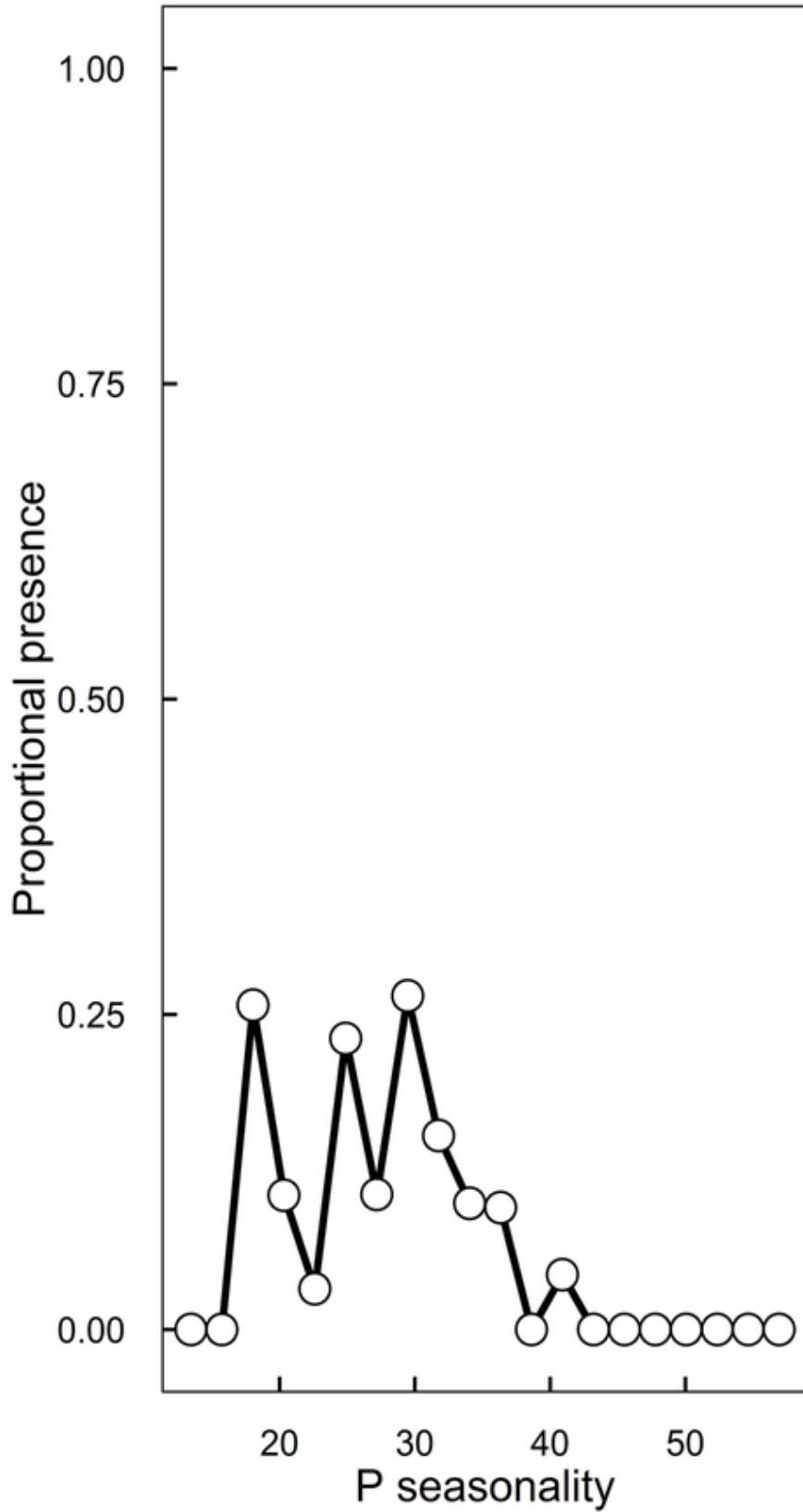
Proportional presence Puaiohi bio7

Proportional presence (y-axis) vs Annual T range (°C) (x-axis)