

Supplementary figures for “Ongoing changes in the avifauna of La Selva Biological Station, Costa Rica: twenty-three years of Christmas bird counts”

W. Alice Boyle ^{a, b} and Bryan J. Sigel ^c

a. Division of Biology, 116 Ackert Hall, Kansas State University, Manhattan, Kansas, USA 66506-4901

b. Corresponding author. Email: aboyle@ksu.edu, Phone: (785) 532-1701

c. Department of Biology, Nevada State College, 1121 Nevada State Drive, Henderson, NV, USA 89002

Figures S1-S6: Univariate associations between population trends of 202 resident landbirds inhabiting La Selva Biological Station and each of the following variables potentially related to trends: diet, habitat, flocking, body mass, and an index of rarity.

Figures S7-S16: Pairwise associations between independent variables potentially associated with population change in the birds of La Selva Biological Station.

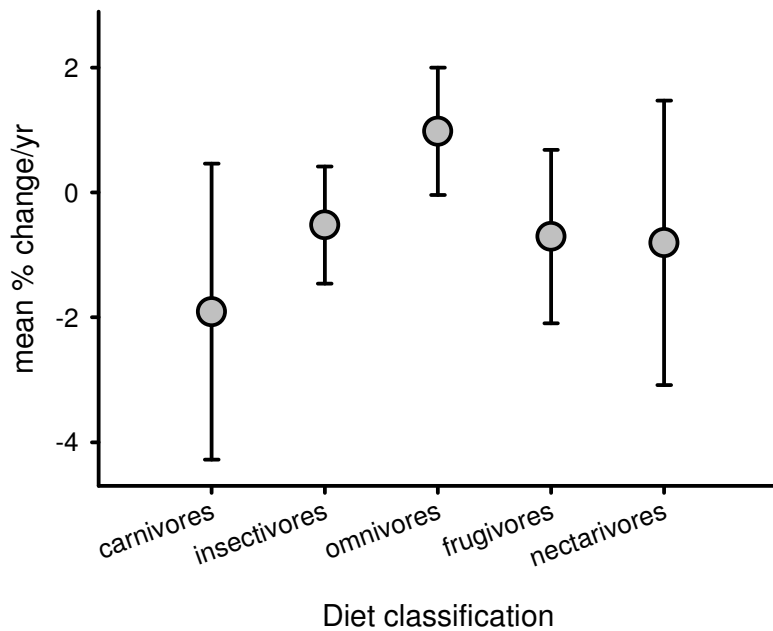


Figure S1

Univariate relationship between diet as classified in Boyle (2011) and the mean population trends (\pm SE) of resident landbirds inhabiting La Selva Biological Station. Categorical responses (i.e., species grouped based on whether they exhibited significant population increases, decreases, or no significant directional change) are depicted in Figure 2A.

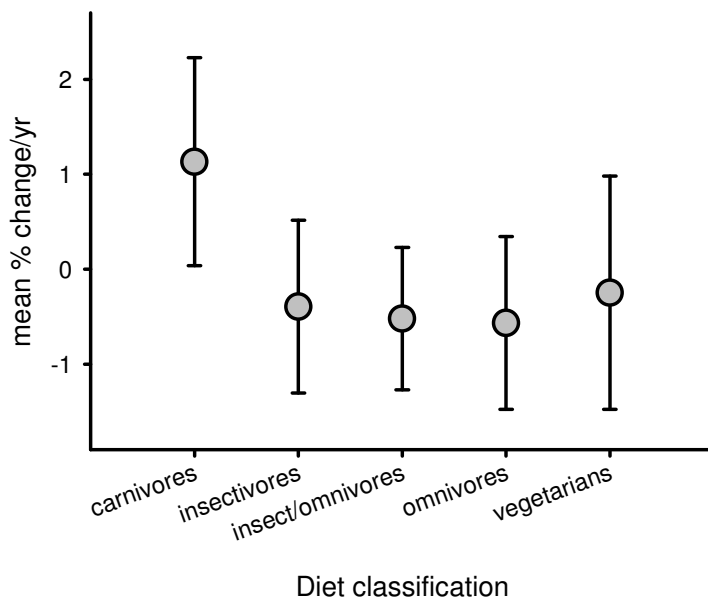


Figure S2

Univariate relationship between diet as classified in Sigel et al. (2006) and the mean population trends (\pm SE) of resident landbirds inhabiting La Selva Biological Station. Categorical responses (i.e., species grouped based on whether they exhibited significant population increases, decreases, or no significant directional change) are depicted in Figure 2B.

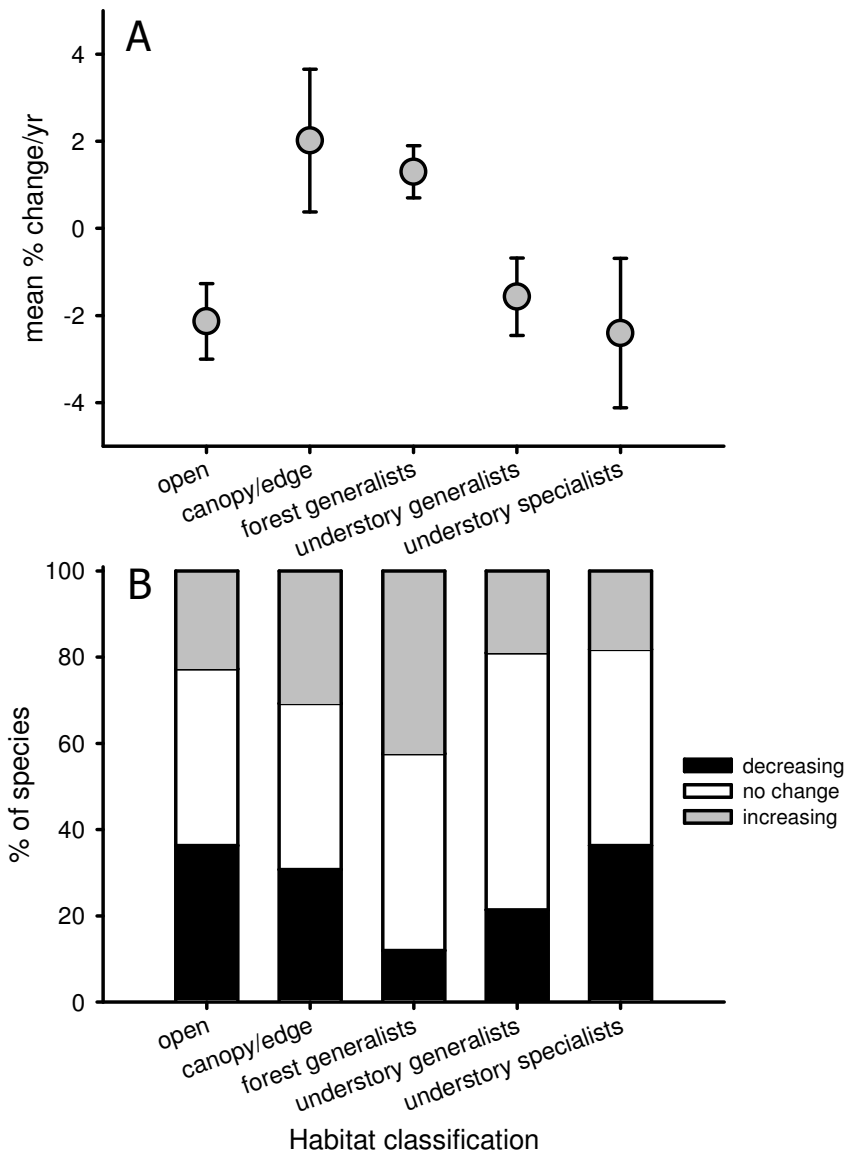


Figure S3

Univariate relationship between habitat as classified in Sigel et al. (2006) and population trends of resident landbirds inhabiting La Selva Biological Station. Panel A plots the mean trend estimate (\pm SE) for each species as the response variable, and panel B groups species by those exhibiting significant positive or negative population trends, or no significant directional change over the 23 yr of this study.

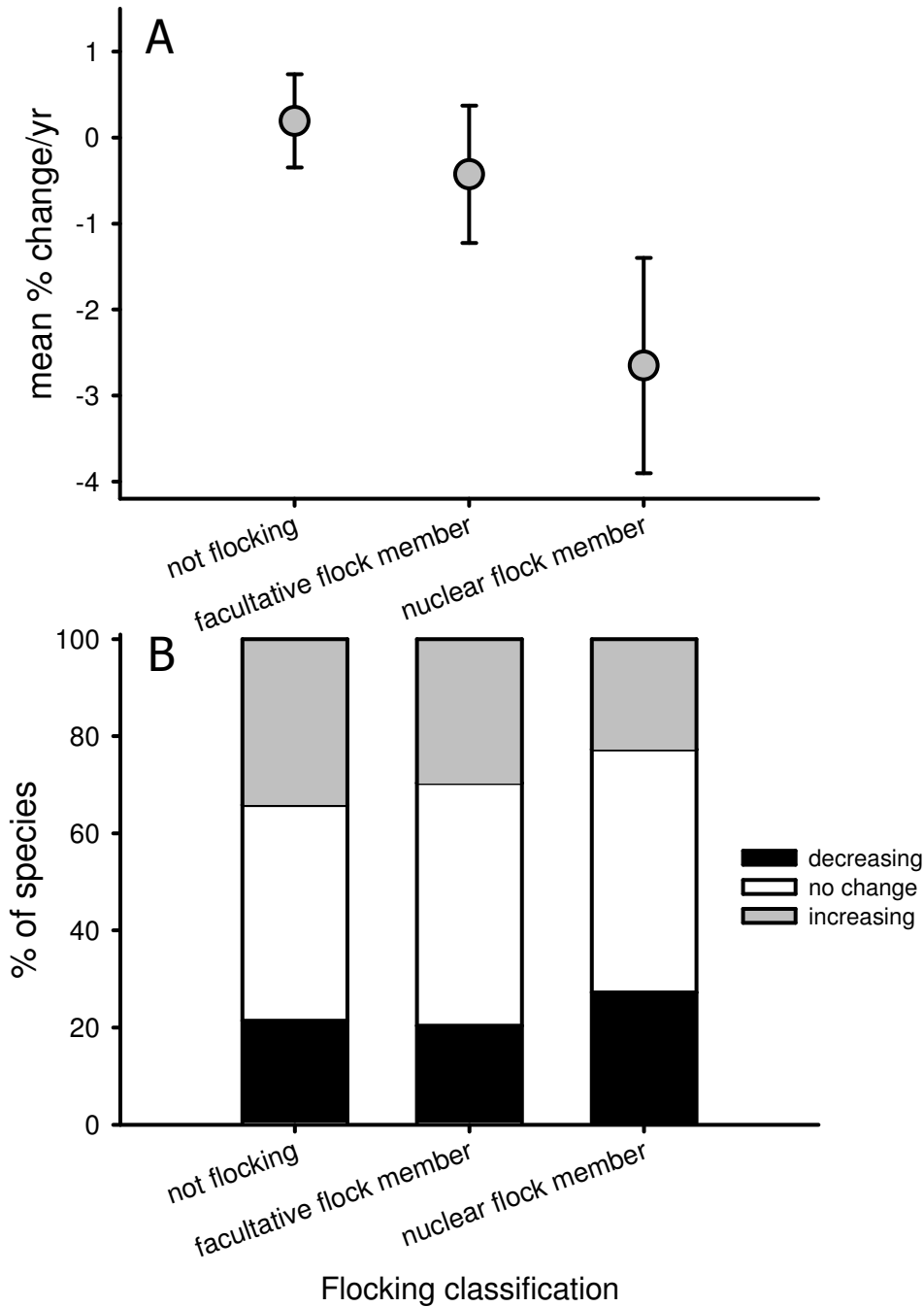


Figure S4

Univariate relationship between flocking as classified in Sigel et al. (2006) and population trends of resident landbirds inhabiting La Selva Biological Station. Panel A plots the continuous trend estimate for each species as the response variable, and panel B groups species by those exhibiting significant positive or negative population trends, or no significant directional change over the 23 yr of this study.

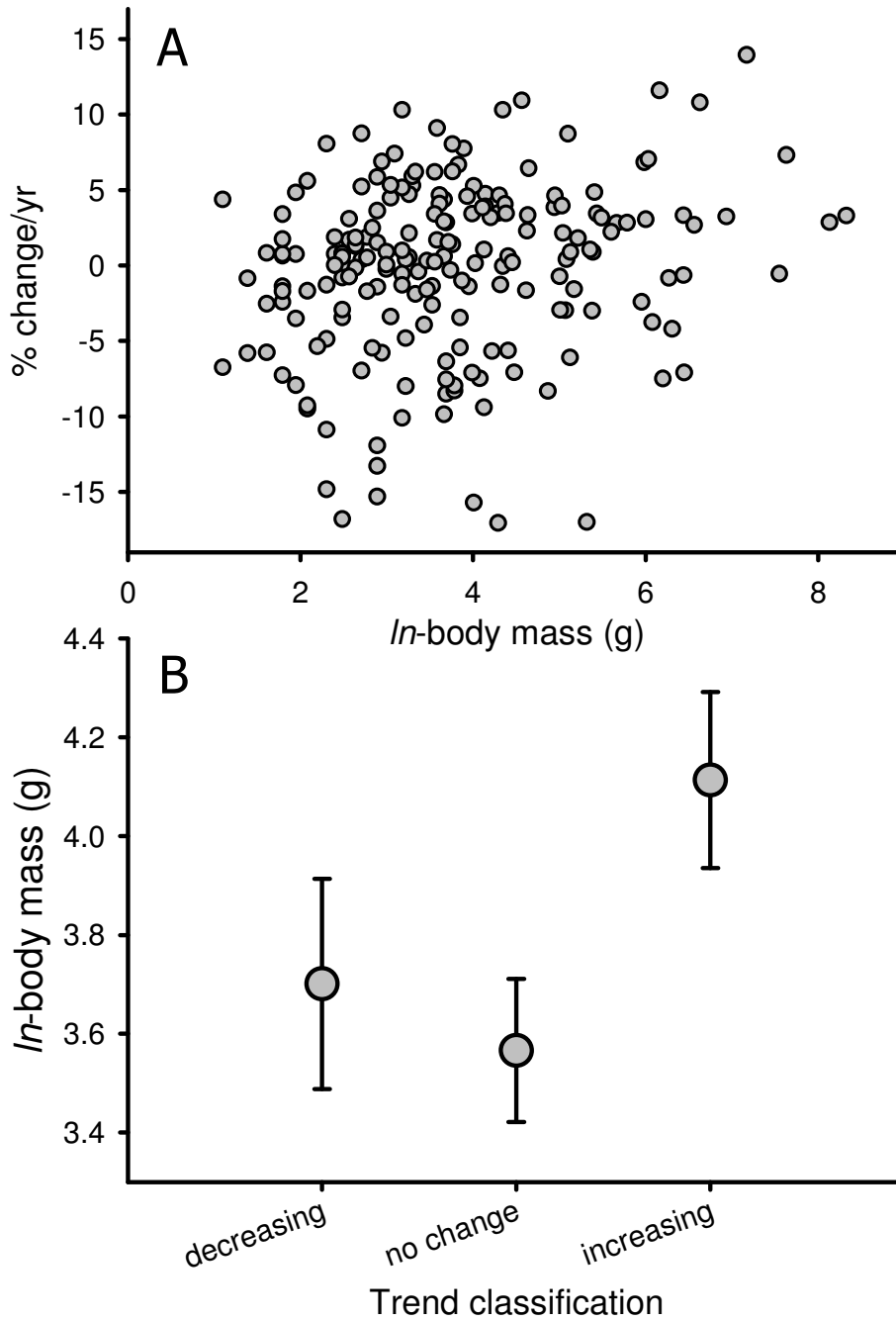


Figure S5

Univariate relationship between \ln -transformed body mass and population trends of resident landbirds inhabiting La Selva Biological Station. Panel A plots the continuous trend estimate for each species as the response variable, and panel B groups species by those exhibiting significant positive or negative population trends, or no significant directional change over the 23 yr of this study.

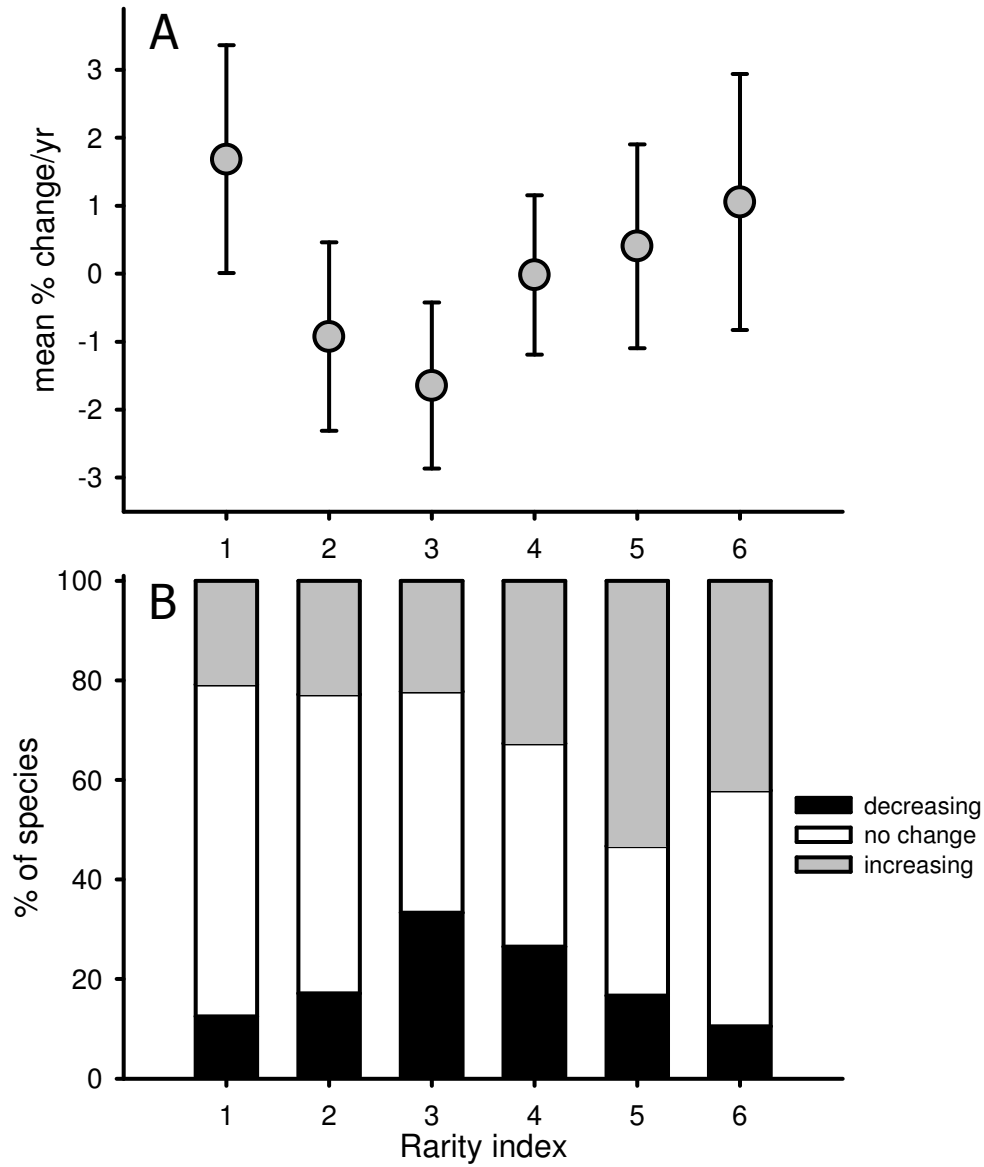


Figure S6

Univariate relationship between rarity index (see text) and population trends of resident landbirds inhabiting La Selva Biological Station. Panel A plots the continuous trend estimate for each species as the response variable, and panel B groups species by those exhibiting significant positive or negative population trends, or no significant directional change over the 23 yr of this study.

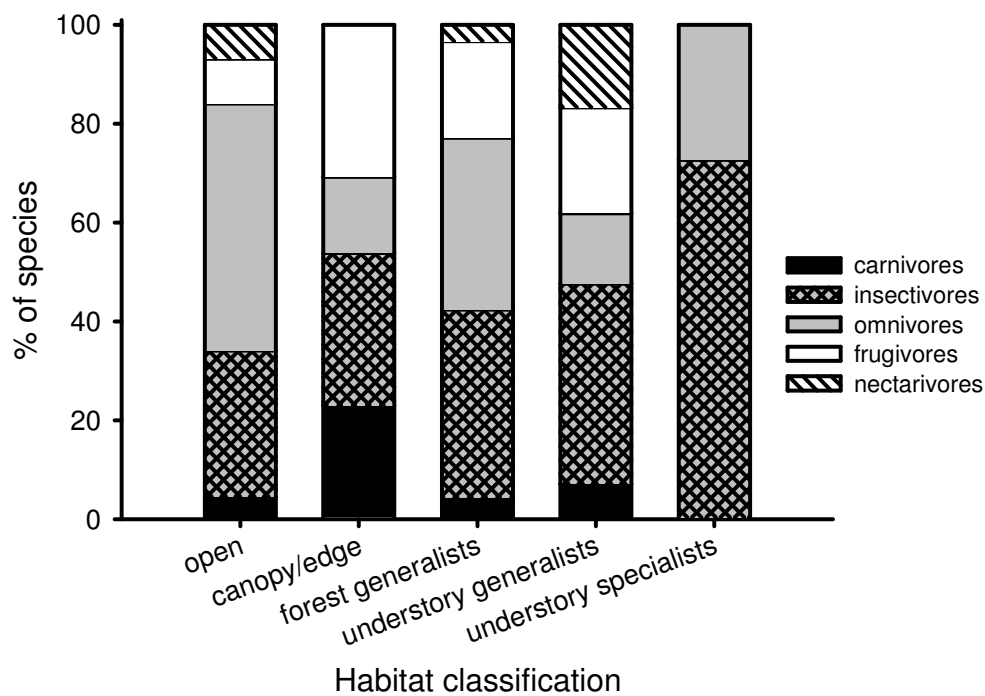


Figure S7
 Association between diet and habitat classifications of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 37.5$, $df = 16$, $P = 0.002$).

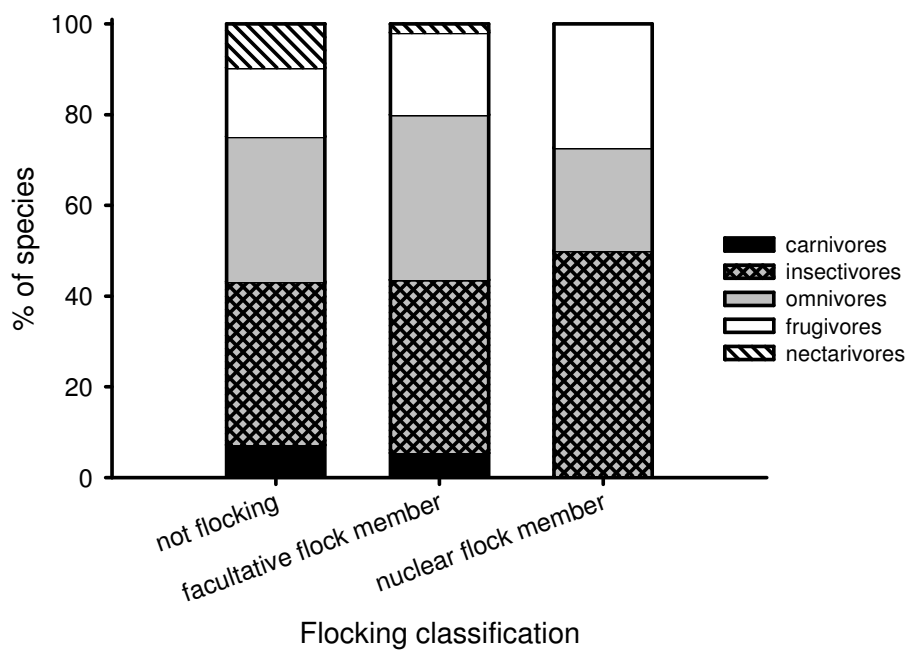


Figure S8
 Association between diet and flocking classifications of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 13.3$, $df = 8$, $P = 0.101$).

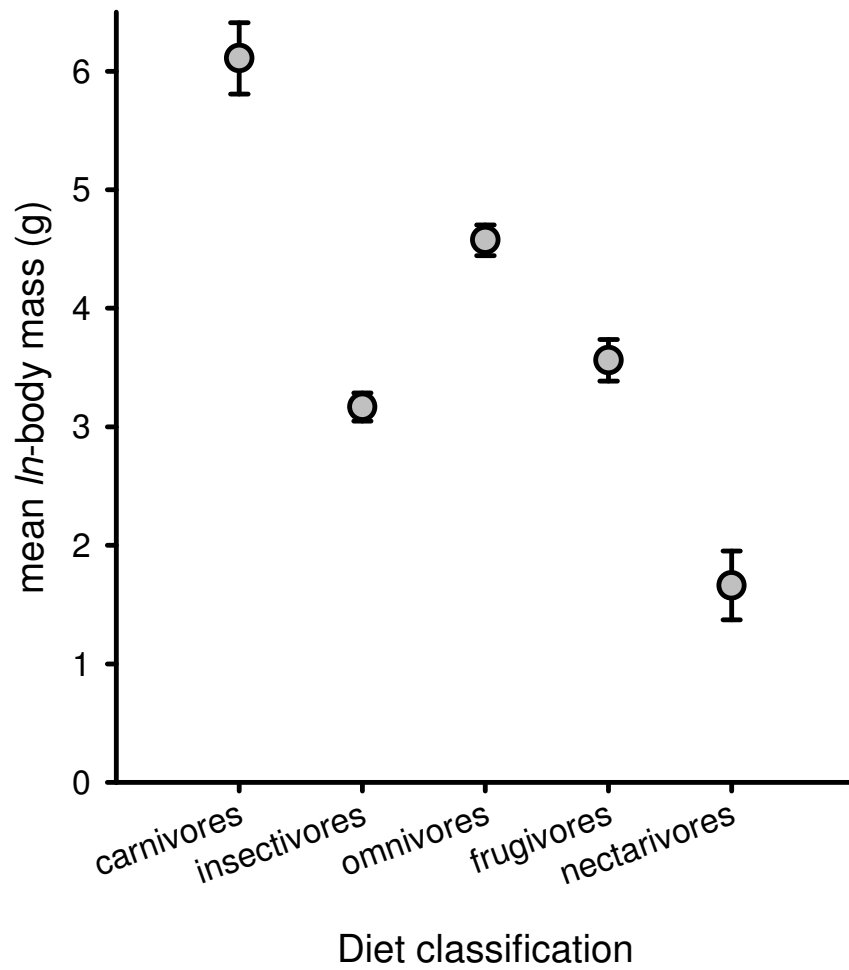


Figure S9

Association between diet classification and \ln -body mass of resident landbirds inhabiting La Selva Biological Station ($F_{4,197} = 44.8$, $P < 0.0001$).

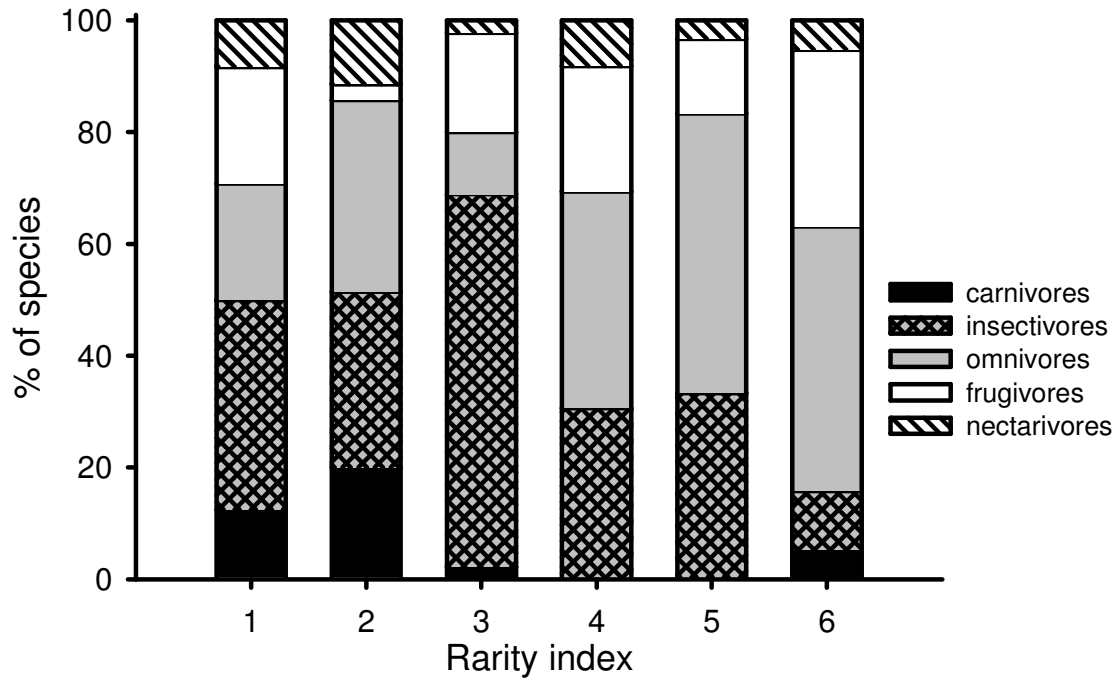


Figure S10

Association between diet classification and rarity index of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 60.8$, $df = 20$, $P < 0.0001$).

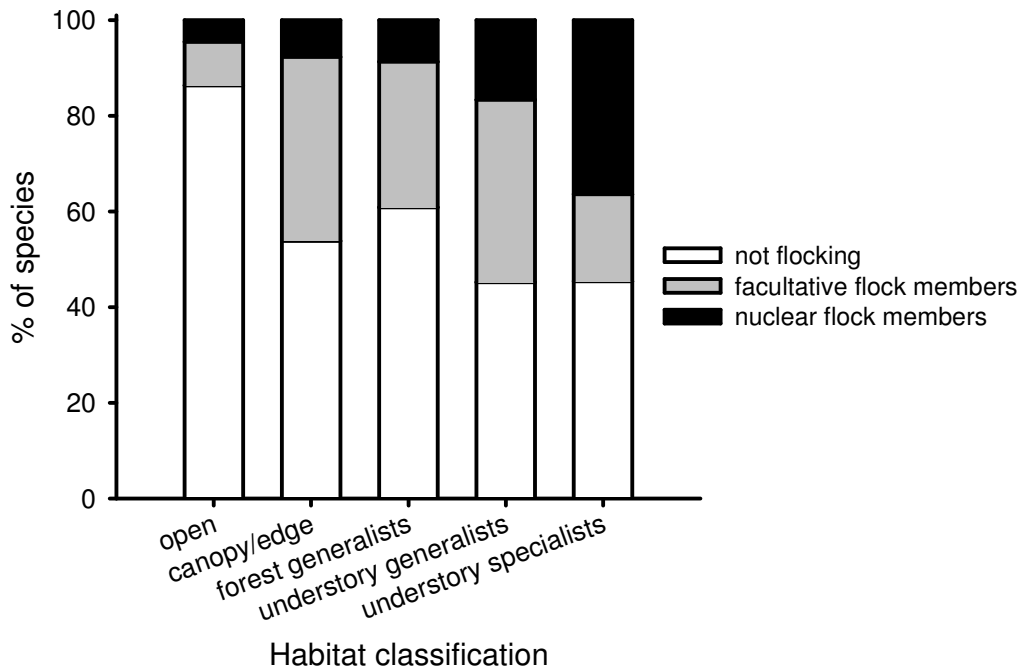


Figure S11

Association between habitat and flocking classification of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 24.4$, $df = 8$, $P = 0.002$).

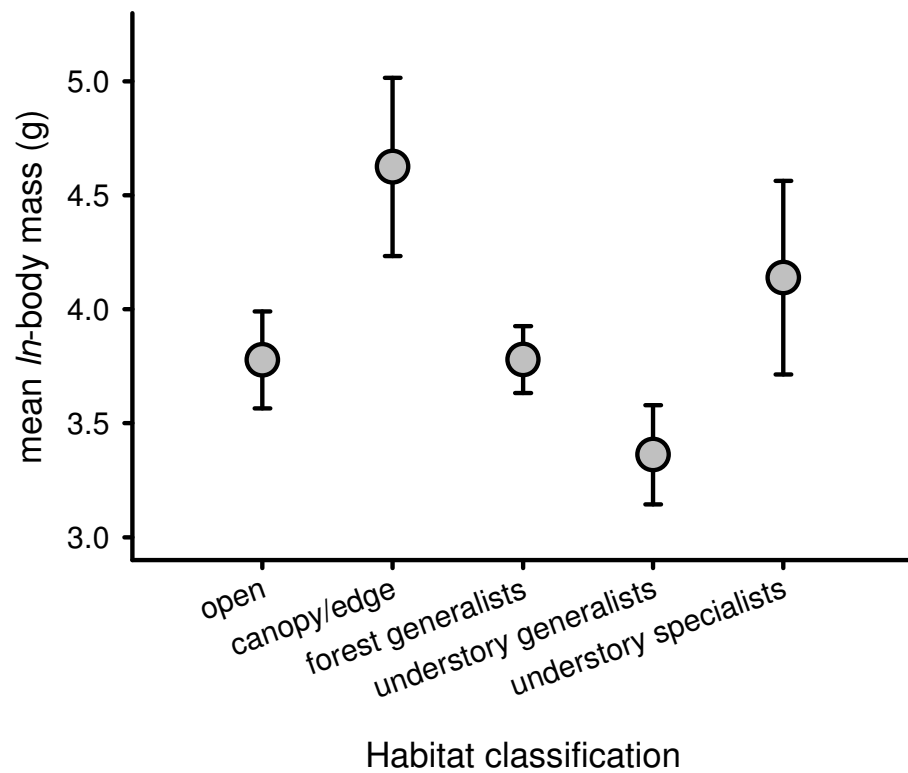


Figure S12

Association between habitat classification and body mass of resident landbirds inhabiting La Selva Biological Station ($F_{4,197} = 2.3$, $P = 0.063$).

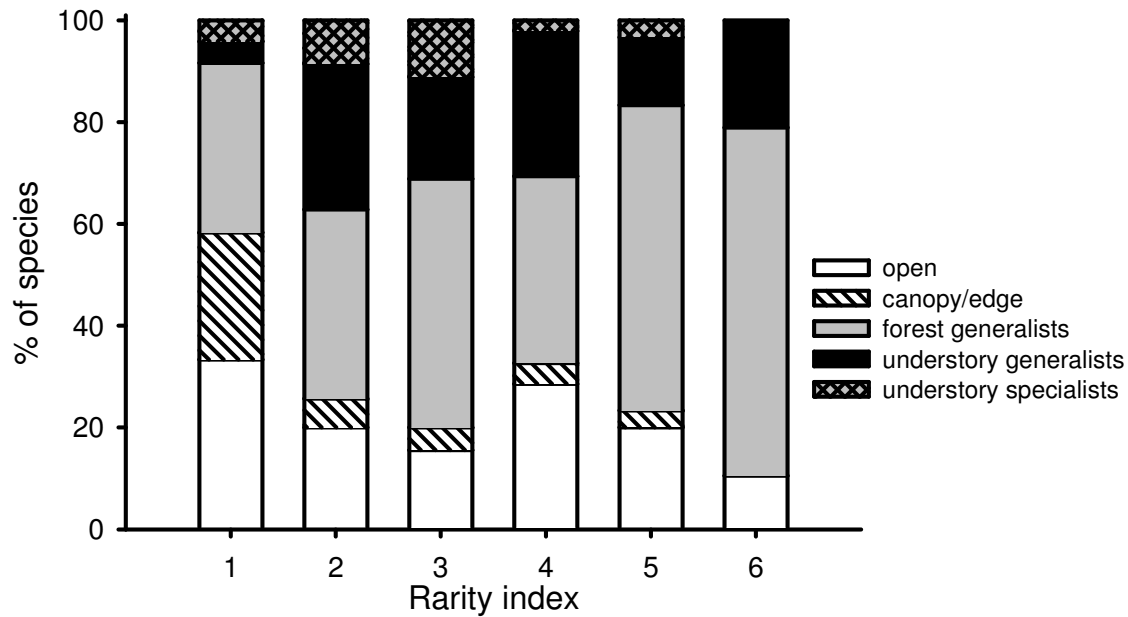


Figure S13

Association between habitat classification and rarity index of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 35.6$, $df = 20$, $P = 0.017$).

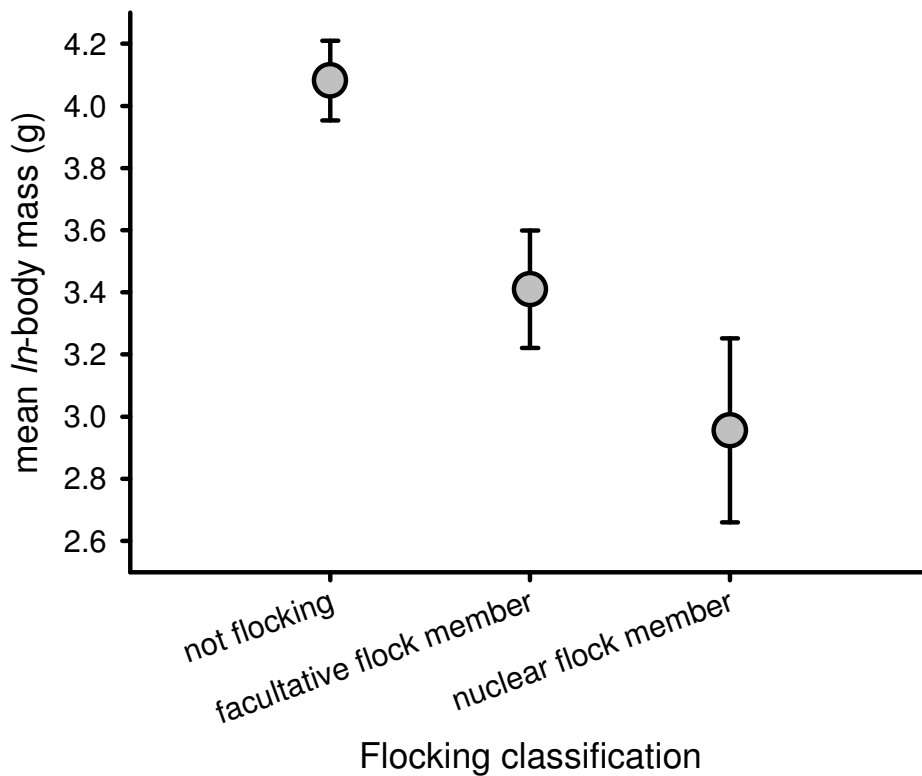


Figure S14

Association between flocking classification and body mass of 202 resident landbirds inhabiting La Selva Biological Station ($F_{2,190} = 8.6$, $P < 0.001$).

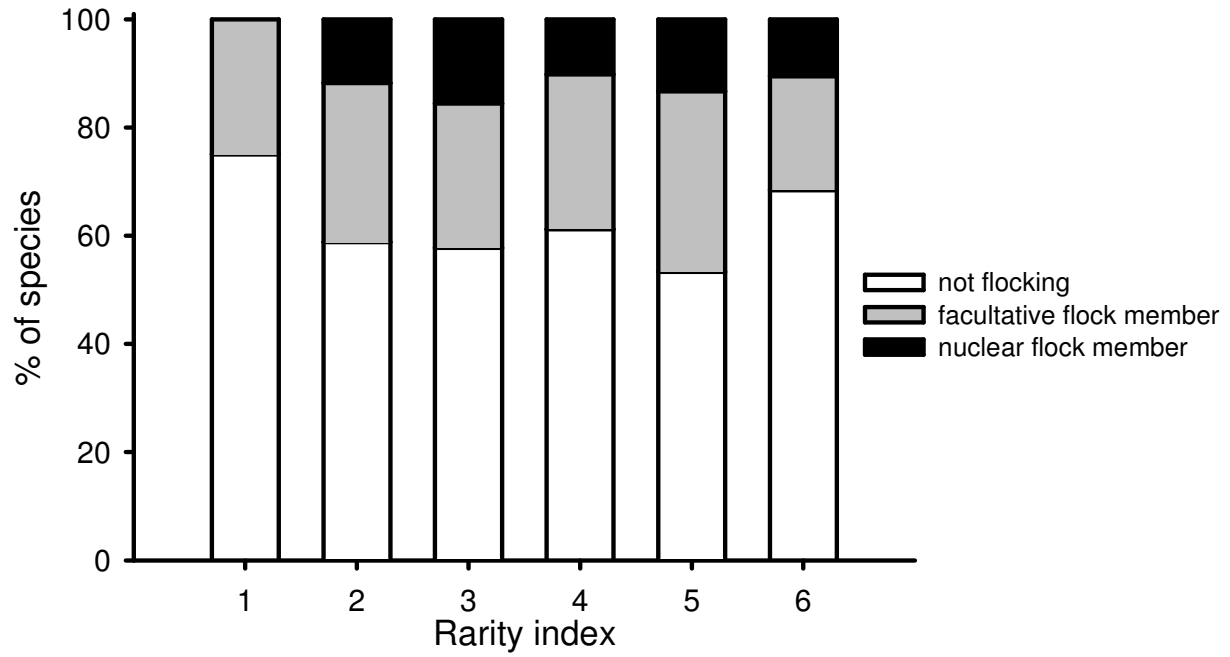


Figure S15

Association between flocking classification and rarity index of resident landbirds inhabiting La Selva Biological Station ($\chi^2 = 6.2$, $df = 10$, $P = 0.795$).

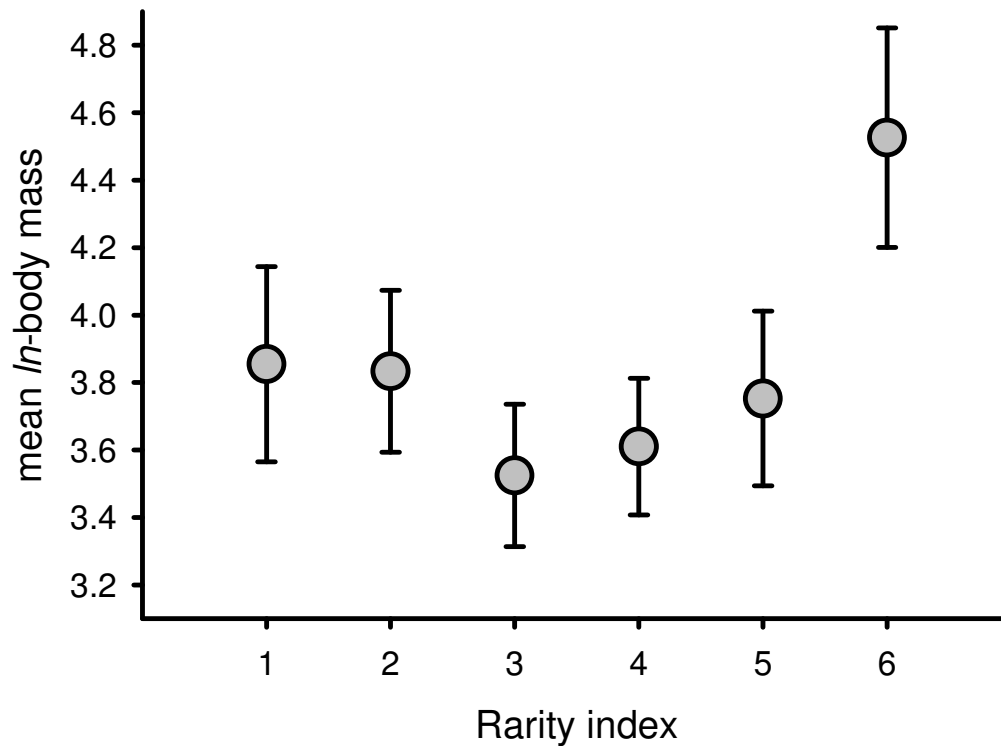


Figure S16

Association between rarity index and body mass of resident landbirds inhabiting La Selva Biological Station ($F_{5,196} = 1.5$, $P = 0.189$).

Boyle, W.A., 2011. Short-distance partial migration of Neotropical birds: a community-level test of the foraging limitation hypothesis. *Oikos* 120, 1803-1816.

Sigel, B.J., Sherry, T.W., Young, B.E., 2006. Avian community response to lowland tropical rainforest isolation: 40 years of change at La Selva Biological Station, Costa Rica. *Conservation Biology* 20, 111-121.