Assignment #3: García et al. 2018 Frugivore biodiversity and seed dispersal
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The paper "Frugivore biodiversity and complementarity in interaction networks enhance landscape-scale dispersal function", of García, Donoso, and Rodríguez-Pérez 2018, is about the role of frugivorous passerine as seed dispersers. It relates the abundance and diversity of bird species to landscape-scale seed disposition, considering the specialization through a network approach. One of the results shows that bird abundance affects seed deposition and density of dispersed seeds. In figure 4 we can see a representation of seed density and abundance of birds. The issue with this figure is that the authors considered both sampling years but grouped their 10 bird species in one group (birds), even mentioning how important is bird diversity in seed dispersal and density.

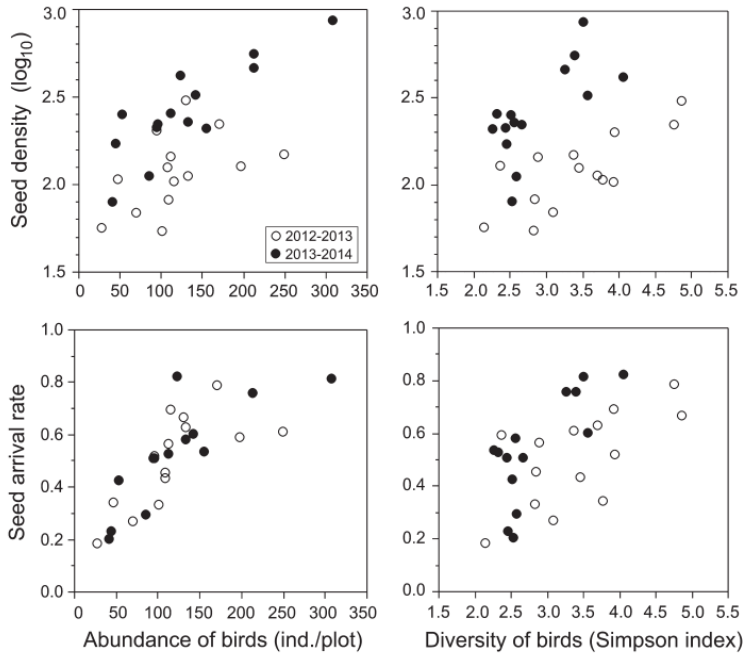

FIGURE 4 Effects of abundance (cumulative number of individuals per plot) and diversity (Simpson Index) of frugivorous birds on the density of dispersed seeds (No. of dispersed seeds per square metre) and the probability of seed arrival (proportion of sampling stations receiving dispersed seeds) for different plots and years

One alternative is to group years 2012-2013 and 2013-2014 and builds different graphs to show each bird species role in seed density. For Figure Option 1, a simple boxplot was used to show not only each bird species but also the outliers, mean and standard deviation of bird density related to seed density. For Figure Option 2, a simple boxplot was used, adding the "fill" command to species, differing from Figure Option 1 only in colors. Figure Option 3 was built as a density graph, having no success to show the data. Therefore, for Figure Option 4, a violin plot was used to show the density relationship between bird species and seeds density.

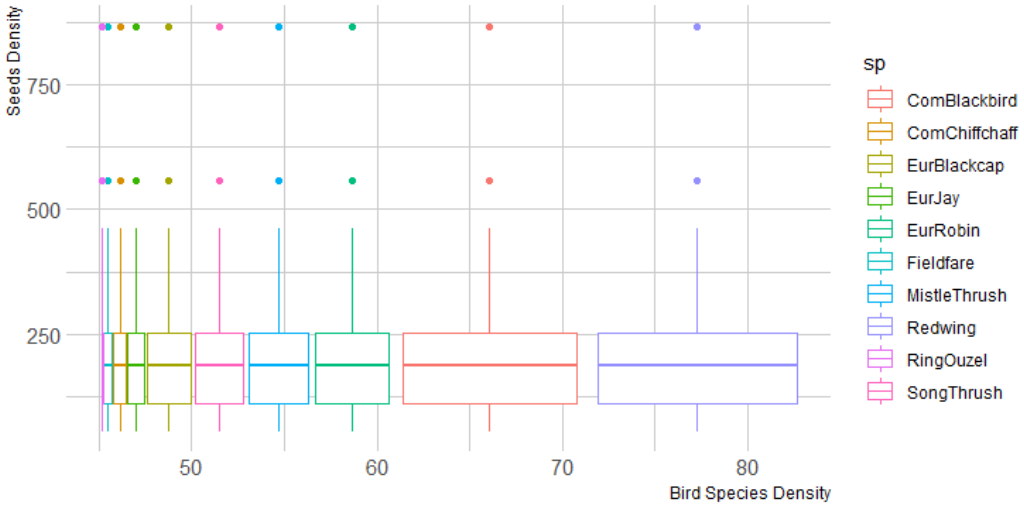

Figure Option 1. Relationship between different bird species density and seed density sampled in the Cantabrian Range, northern Spain. ComBlackbird = *Turdus merula* (Common blackbird), ComChiffchaff = *Phylloscopus collybita* (Common chiffchaff), EurBlackcap = *Sylvia atricapilla* (Eurasian blackcap), EurJay = *Garrulus glandarius* (Eurasian jay), EurRobin = *Erithacus rubecula* (European Robin), Fieldfare = *Turdus pilaris* (Fieldfare), MistleThrush = *Turdus viscivorus* (Mistle thrush), Redwing = *Turdus iliacus* (Redwing), RingOuzel = *Turdus torquatus* (Ring ouzel), SongThrush = *Turdus philomelus* (Song thrush).

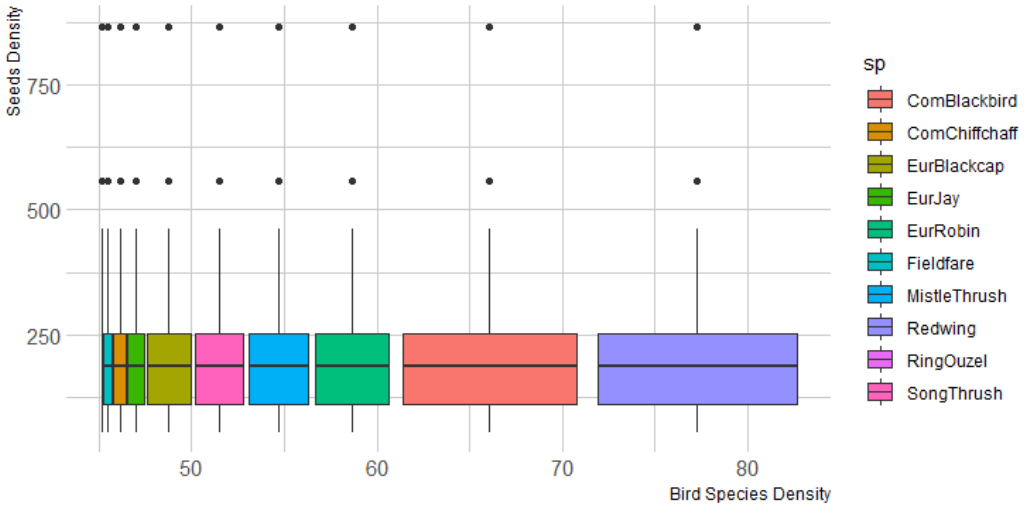

Figure Option 2. Relationship between different bird species density and seed density sampled in the Cantabrian Range, northern Spain, adding colors to plots. ComBlackbird = *Turdus merula* (Common blackbird), ComChiffchaff = *Phylloscopus collybita* (Common chiffchaff), EurBlackcap = *Sylvia atricapilla* (Eurasian blackcap), EurJay = *Garrulus glandarius* (Eurasian jay), EurRobin = *Erithacus rubecula* (European Robin), Fieldfare = *Turdus pilaris* (Fieldfare), MistleThrush = *Turdus viscivorus* (Mistle thrush), Redwing = *Turdus iliacus* (Redwing), RingOuzel = *Turdus torquatus* (Ring ouzel), SongThrush = *Turdus philomelus* (Song thrush).

Figure Option 3. The attempt fails of showing the relationship between different bird species density and seed density sampled in the Cantabrian Range, northern Spain, through density plots. ComBlackbird = *Turdus merula* (Common blackbird), ComChiffchaff = *Phylloscopus collybita* (Common chiffchaff), EurBlackcap = *Sylvia atricapilla* (Eurasian blackcap), EurJay = *Garrulus glandarius* (Eurasian jay), EurRobin = *Erithacus rubecula* (European Robin), Fieldfare = *Turdus pilaris* (Fieldfare), MistleThrush = *Turdus viscivorus* (Mistle thrush), Redwing = *Turdus iliacus* (Redwing), RingOuzel = *Turdus torquatus* (Ring ouzel), SongThrush = *Turdus philomelus* (Song thrush).

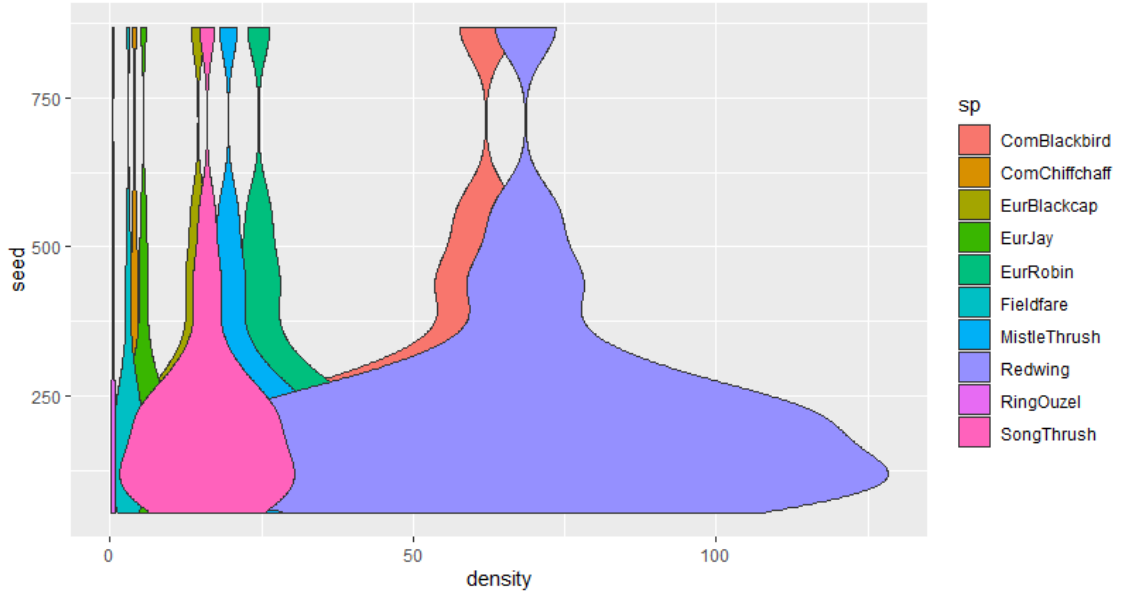

Figure Option 4. Density representation of the relationship between different bird species and seed density sampled in the Cantabrian Range, northern Spain, through violin plot. ComBlackbird = *Turdus merula* (Common blackbird), ComChiffchaff = *Phylloscopus collybita* (Common chiffchaff), EurBlackcap = *Sylvia atricapilla* (Eurasian blackcap), EurJay = *Garrulus glandarius* (Eurasian jay), EurRobin = *Erithacus rubecula* (European Robin), Fieldfare = *Turdus pilaris* (Fieldfare), MistleThrush = *Turdus viscivorus* (Mistle thrush), Redwing = *Turdus iliacus* (Redwing), RingOuzel = *Turdus torquatus* (Ring ouzel), SongThrush = *Turdus philomelus* (Song thrush).

Another alternative to show all important data, as well as mean and standard deviation, is to organize data per year and arrange the two plots obtained for bird and seeds density relationship, not missing the year factor or bird species, as shown in Figure Option 5.

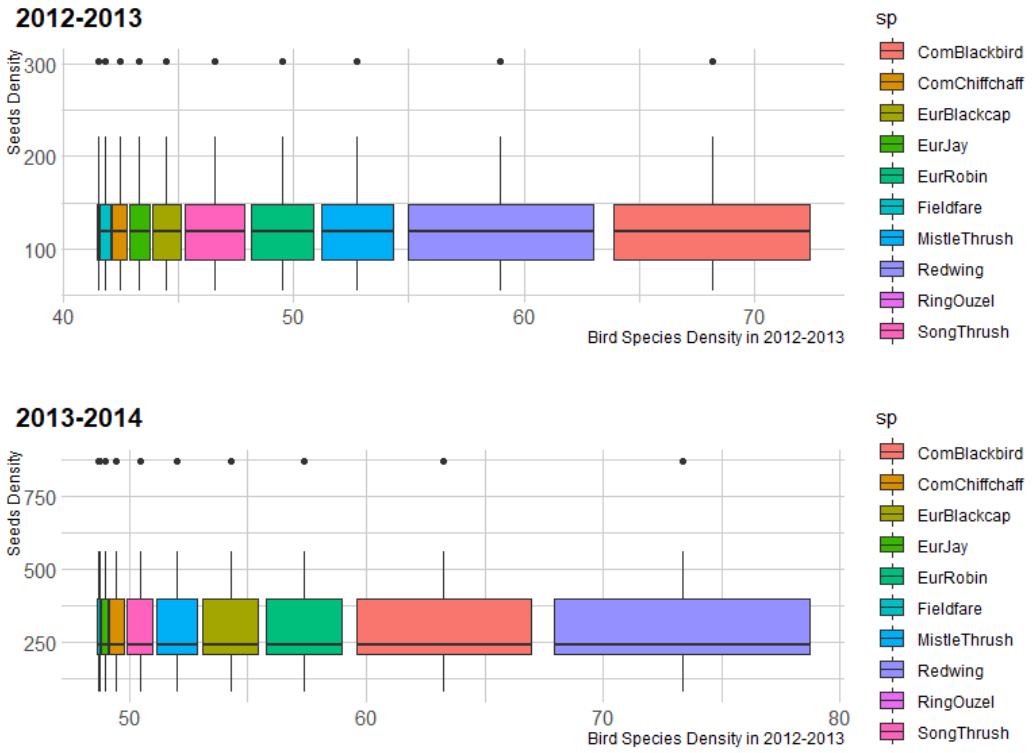

Figure Option 5. Relationship between different bird species and seed density sampled in the Cantabrian Range, northern Spain during the years of 2012-2013 and 2013-2014. ComBlackbird = *Turdus merula* (Common blackbird), ComChiffchaff = *Phylloscopus collybita* (Common chiffchaff), EurBlackcap = *Sylvia atricapilla* (Eurasian blackcap), EurJay = *Garrulus glandarius* (Eurasian jay), EurRobin = *Erithacus rubecula* (European Robin), Fieldfare = *Turdus pilaris* (Fieldfare), MistleThrush = *Turdus viscivorus* (Mistle thrush), Redwing = *Turdus iliacus* (Redwing), RingOuzel = *Turdus torquatus* (Ring ouzel), SongThrush = *Turdus philomelus* (Song thrush).

Paper cited: García D, Donoso I, Rodríguez-Pérez J (2018) Frugivore biodiversity and complementarity in interaction networks enhance landscape-scale seed dispersal function. *Functional Ecology* 32 (12): 2742–52.