Appendix S1.

Methodology of bird censuses

We performed bird censuses in the study plot to quantify the abundance of frugivorous birds (thrushes) during the fruiting season. Direct observations of thrushes in different sampling cells were made from five different vantage positions in elevated outcrops, located along the central axis of the plot. Observations were made from October to February of each year, with a cumulative observation time of 105 and 156 h for 2009 and 2010, respectively. Observation time was allocated in a balanced number of 1-h observation periods between stations throughout each season. In each observation period, the observer, with the help of 8 x 30 binoculars, counted and identified at the species level all thrushes seen (or heard) in different sectors of the area surveyed. Bird sightings were assigned to the different geo-referenced sampling cells covered from each vantage position, with the help of printed maps. In some cases, the consecutive sightings of a given species could have corresponded to the same individuals remaining within, or successively entering a given cell. In these doubtful cases, we considered as independent those sightings separated by at least five minutes. Also, the sightings potentially corresponding to a given individual bird in different cells – or in the same cell on different days – were considered to be as valid as those from different individuals. For each bird observation we detailed the microhabitat where the bird was resting. We distinguished between three different microhabitats depending on the structure of the forest cover: forest (in the main forest cover), remnant tree (in isolated trees within the pastures) and open ground (with no tree cover at all). We considered as an isolated tree each tree-like plant, showing a minimum trunk diameter of 10 cm and taller than 1.5 m, standing alone or together with a maximum of two other individuals (evidenced by direct observation on the field), and showing a minimum distance of 5 m to the main forest cover (estimated by using the GIS).

Due to the elevated location of vantage positions (ca 70 m of elevation gradient) and the patchy and sparse structure of forest cover, a high visual and/or acoustic detectability of thrushes was achieved across almost the entire plot, even in those cells at a considerable distance away. However, due to the denser forest canopy and topographical features, bird detectability was lower in some of the easternmost cells of the plot and therefore, complementary bird observation was accomplished from positions within the forest in these areas (see García and Martínez, 2012 and García et al., 2013 for similar procedure). Twelve forest point-count positions were established,

each one corresponding to the center of a group of four cells. Observations were made in 10 min periods, recording any thrush heard or seen within the four surrounding cells. Total observation time from each point count was 110 and 195 min for 2009 and 2010, respectively. Rather than assessing the actual size of bird populations, our goal was to provide a measure of bird abundance in functional terms, i.e. an estimation of the total activity of frugivorous thrushes throughout the season in the study plot. For this, we calculated the abundance of birds per cell as the cumulative number of birds heard or seen in each cell through the season. We divided the cumulative number of birds by the total observation time for each cell, thereby calculating the number of birds per 10-h of observation. Weighting by total observation time per cell enabled the comparison of abundance between cells, correcting for overestimation in those cells observed from different positions and thus accounting for longer observation times, and also between years with different observation efforts.

References

García, D. and Martínez, D., 2012. Species richness matters for the quality of ecosystem services: a test using seed dispersal by frugivorous birds. P. R. Soc. B 279: 3106-3113.

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Appendix S2

Distributions of frequencies of sampling stations with respect to forest cover descriptors

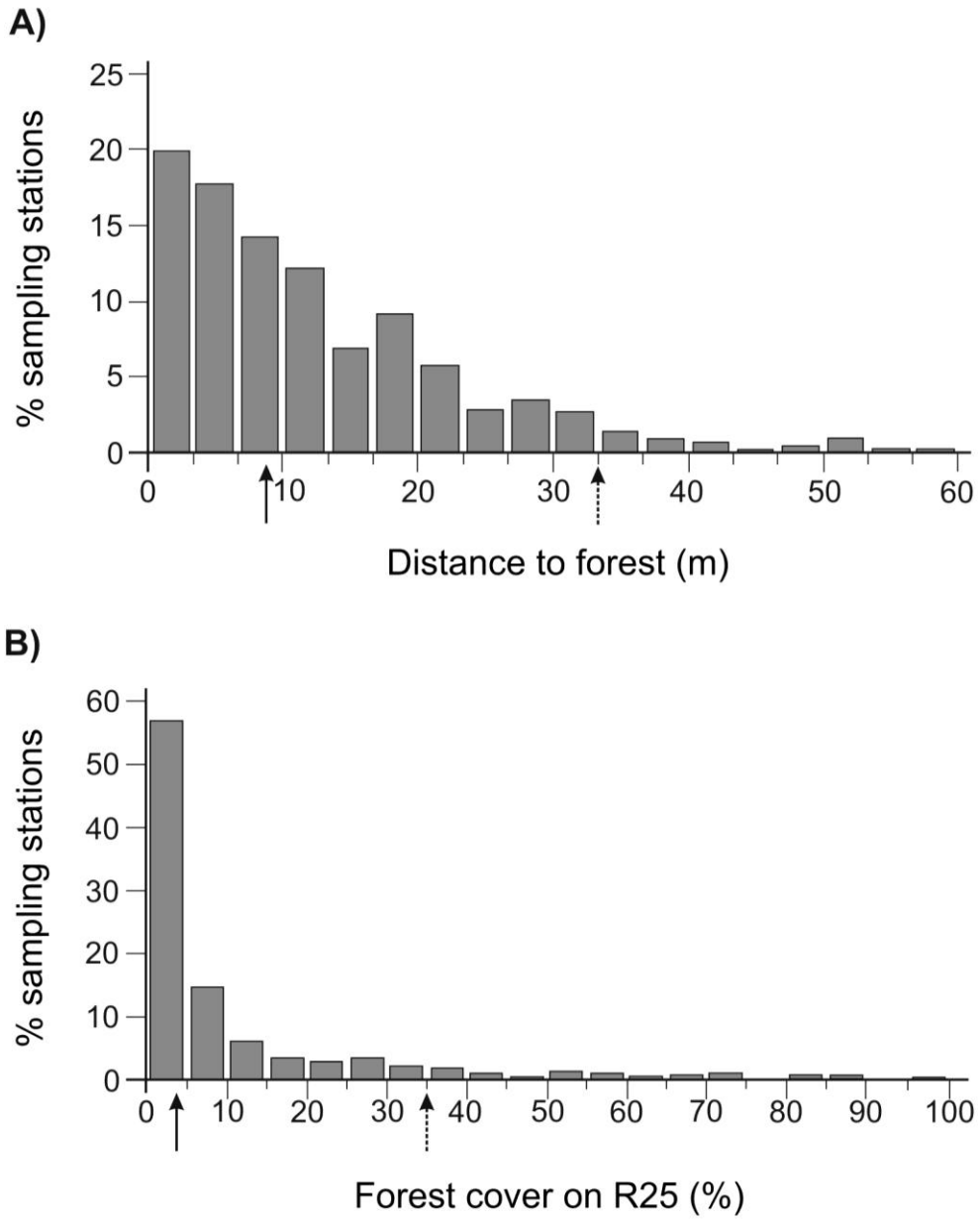

Fig. S2.1 Distribution of sampling stations located in pastures along the gradient of forest cover on the study plot. A) Percent of sampling stations in different categories considering their distance to the forest edge. B) Percent of sampling stations in different categories considering the percent of forest cover in a 25 m radius (R25) surrounding each station. Values of the median and the 90th percentile of each distribution have been highlighted on the x axis with solid- and dashed arrows respectively.