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### Commentary

## Some trees do not necessarily mean a forest: a criticism to Ramos and Anjos (2014)



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#### ABSTRACT

Ramos and Anjos (2014) worked with birds in two riparian “forests” from the northwest of the state of Paraná, southern Brazil, to evaluate how the width and biotic integrity of the “forests” affected the communities. One of their conclusions was that riparian forest should be expanded to a minimum of 50 m of width on each side of a stream. I believe that Ramos and Anjos (2014) compared different environments with different sampling areas: one sampled area was covered by secondary vegetation, which has so far not reached the forest stage, and showed approximately 40% less arboreal vegetation than the second sampled area. This undermines some of the claims made by Ramos and Anjos (2014), for example that the riparian vegetation should be expanded to a minimum of 50 m. The minimum width of the riparian forests must be better evaluated comparing samples of vegetation at similar regeneration stages.

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Brazilian environmental laws are intended to protect forests more than other environments (Bornschein et al., 1998), and they likely intended to protect forests to a greater extent than do the laws of any other country. The most well-known of all these laws is the Forest Code (“Código Florestal”; Law 4.771, of 15 September 1965), which requires the maintenance of forests along water bodies in a width that is dependent on the width of the water body. In 2011, this law was the center of much discussion. Despite efforts to the contrary, this law was repealed and a new Forest Code (Law 12.651, of 25 May 2012) was created, reducing the needed width of forests surrounding water bodies.

Some studies have focused on the potential damage of the new Forest Code to biodiversity conservation (e.g. a special issue of *Biota Neotropica*, from 2010 [vol. 10, no. 4]), while others have focused on forest widths and their effectiveness in conservation, whether riparian forests or forest corridors. Ramos and Anjos (2014) worked with birds in riparian “forests” of northwestern state of Paraná, southern Brazil, to evaluate how the width and biotic integrity of the “forests” affects those communities. One of their conclusions was that “The data... suggest that in the case of streams (where the requirement, according to the Forest Code... is 30 m on each side), the PPAs [permanent preservation areas] should be expanded to a

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**Fig. 1 – Areas sampled by Ramos and Anjos (2014): A = Caracu Stream and B = São Pedro River. In each area, the authors sampled four points, which I tentatively positioned, accordingly their statements: the first point was at a distance of 100 m from the confluence of each stream in the Paraná River, and the other three were 200 m distant from one another, along a transect through the riparian vegetation. However, following these criteria, point #4 from “A” would fall in the upstream limit of the arboreal vegetation, close to a road. Therefore, I believe that in “A” the authors marked each point after 200 m counted in trails inside the vegetation. At each point, authors counted forest birds in a fixed radius of 50 m (circumferences). Note that the arboreal vegetation inside the circumferences is not homogeneous between areas. The background is based on a satellite image from Google Earth Pro 7.1.2.2041 (dated 14 December 2005). The north is directed toward the right of the images.**

minimum of 50 m on each side of a stream, to aid in conserving species with stricter ecological requirements.” This is in accordance with the general view that wider forest areas are better than those that are narrower, but concerns were expressed about the possibility that the decision-makers may interpret 50 m as the greatest needed width of forest for regional conservation purposes. After evaluating Ramos and Anjos (2014), I disagree with some of the points they made, which led me to undertake this response with the sole purpose of showing a different view of their conclusion regarding regional bird communities as indicators of quality of riparian vegetation.

In 2008, Ramos and Anjos (2014) quantitatively sampled birds in two riparian “forests”, along small rivers (Caracu Stream and São Pedro River), which “were intensively exploited and degraded by farming and urbanization, but in the last decade were fenced and allowed to regenerate naturally”. The sampling method used was the point count method (Ramos and Anjos, 2014) – more specifically four point for each river – in which a person remains fixed at one point, counting the individuals seen or heard in a fixed radius, during a given period of time. The authors did not report the length of this radius, but reported that the methods had been adapted

according to Anjos (2007), from which I deduce that the radius was 50 m.

I have already been in the area of Caracu Stream. It is an area of secondary vegetation, which has so far not reached the forest stage, according to the criteria for the classification of Brazilian vegetation proposed by the RADAMBRASIL Project (*sensu* Veloso et al., 1991; IBGE, 1992). The vegetation has not yet (2014) developed to the point of presenting two arboreal strata (superior and intermediate), and is partly composed of trees whose canopies do not touch one another. Exotic grasses from open areas are plentiful. Using Google Earth, it is possible to access some satellite images of both areas studied by Ramos and Anjos (2014) from 2003 to the present day, and thereby confirm the process of regeneration of the vegetation.

I plotted an area with a 50 m radius for each counting point for both areas sampled by Ramos and Anjos, via Google Earth, using the image dated from 14 December 2005, being the closest available image from the date of the sampling (September to November 2008), and verified that the arboreal vegetation did not reach this radius in the Caracu Stream (Fig. 1). Ramos and Anjos (2014) drew attention to the fact that they included “records of the species present within a radius limit, taking care not to record species outside the forest”. This suggests that they sampled individuals until the tree line, fixing only a maximum radius of 50 m. If so, the sampled area was not homogeneous, showed approximately 40% more arboreal vegetation in the São Pedro River (2.95 ha) than the Caracu Stream during the same period (2.10 ha; measures made using GEPATH 1.4.5). I believe that the only way to standardize the sampling area would be to shrink the radius until the resulting circumference encompassed only the arboreal vegetation and to standardize this radius measure for the other points. According to my evaluation, this results in a minimum radius of around 10–15 m (in the upper Caracu Stream, at point #4; see Fig. 1A). However, this adjustment of the sampling radius was not described in the methods of Ramos and Anjos (2014).

The procedure used by Ramos and Anjos (2014), whereby every point was sampled twice in the morning of two consecutive days, can be characterized as pseudoreplicates. In fact, the authors have only sampled four points in two areas of riparian vegetation. Regarding the analysis of bird communities, to combine the records of endemic birds of the Atlantic Forest and those of the center of South America in a single set of endemic birds to compare sampled areas (Ramos and Anjos, 2014) can overlook different patterns of responses to local conditions by the endemic birds of each region.

I believe that Ramos and Anjos (2014) compared different environments with different sampling areas. This undermines some of the claims made by Ramos and Anjos (2014): (1) That “Forest bird species diversity increased 30%, with increase in total width [of riparian vegetation] from 40 m to 100 m on average”; (2) That the composition of the Caracu Stream community is dominated by edge species, mainly due to the influence of the narrow width of the “forest”; (3) and that the riparian vegetation should be expanded to a minimum of 50 m. The difference of 30% in the species diversity between both sampled rivers could be a consequence of the difference in 40% in the sampled area, and the dominance of edge species in the Caracu Stream could be a consequence of the relatively young stage of regeneration of its vegetation. The effect of the width of the riparian forests for the bird species diversity must be better evaluated by comparing samples of vegetation at similar regeneration stages. Perhaps the width of riparian forests in the region should be much higher than 50 m, for bird conservation purposes.

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### Conflicts of interest

The author declares no conflicts of interest.

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