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# Incorporating intraspecific trait variation into functional diversity: Impacts of selective logging on birds in Borneo

## *Supporting Information*

*Functional trait data*

Selected traits reflected species' diets, foraging substrates and resource requirements, each of which are considered functionally important (Sekercioglu 2006; Edwards *et al*. 2013b; Calba *et al.* 2014; Hamer *et al*. 2015; see Table S1 for data sources for all selected traits). Dietary composition was recorded in terms of the proportion of diet derived from each of six different feeding guilds (Wilman *et al*. 2014; Table S1). We also included trophic position, estimated using stable isotope analysis, as an integrated fine-scale measure of the proportion of the diet derived from different trophic levels (Edwards *et al*. 2013a). Foraging substrate was also recorded, in terms of the proportion of the diet obtained from each of five different substrates or vegetation strata (adapted from Wilman *et al*. 2014 to fit the substrate categories used by Edwards *et al*. 2013b; Table S1).

Body mass and clutch size were included in the analysis as indicators of each species' resource requirements (LaBarbera 1989; Clarke & Johnston, 1999; Williams 2005) and because body mass is also frequently used as a proxy for a range of other functional traits (Edwards *et al*. 2013a,b; Mori *et al*. 2013). Clutch size was included in addition to body mass because population persistence in each habitat is likely to require successful reproduction in addition to survival (none of the recorded species in either habitat were non-breeding migrants).

**Table S1. Functional trait data used in analysis.**

| *Functional category* | *Functional Trait* | *Scale* | *Data Source* |
|---|---|---|---|
| *Dietary Composition* | Insectivory | Percentage | Wilman *et al*. (2014) |
| | Frugivory | Percentage | Wilman *et al*. (2014) |
| | Granivory | Percentage | Wilman *et al*. (2014) |
| | Nectarivory | Percentage | Wilman *et al*. (2014) |
| | Piscivory | Percentage | Wilman *et al*. (2014) |
| | Carnivory/Predator | Percentage | Wilman *et al*. (2014) |
| | Trophic Position | Continuous | Edwards *et al*. (2013a) |
| *Foraging Substrate* | Water | Percentage | Wilman *et al*. (2014) |
| | Air | Percentage | Wilman *et al*. (2014) |
| | Vegetation | Percentage | Wilman *et al*. (2014) |
| | Arboreal | Percentage | Wilman *et al*. (2014) |
| | Ground | Percentage | Wilman *et al*. (2014) |
| *Resource Requirements* | Clutch Size | Continuous | del Hoyo *et al*. (1992-2002), (2003-2010); Myers (2009); Myhrvold *et al*. (2015) |
| | Body Mass (g) | Continuous | Wilman *et al*. (2014); Myhrvold *et al*. (2015) |

*Comparison between established indices and individual-level baseline indices*

We compared our individual-based models of identical individuals within species (individual-level baseline indices) to established methods of calculating FD, based on species' mean trait values with species weighted by abundance where appropriate. Figure S1 shows that although our modified individual-level baselines produced numerically different values to established methods for some indices, the differences between primary and logged forest remained the same, and the differences between methods were the same in each type of forest. Hence simply calculating indices at an individual-level rather than species-level, without accounting for ITV, had negligible effect on the comparison between habitats.

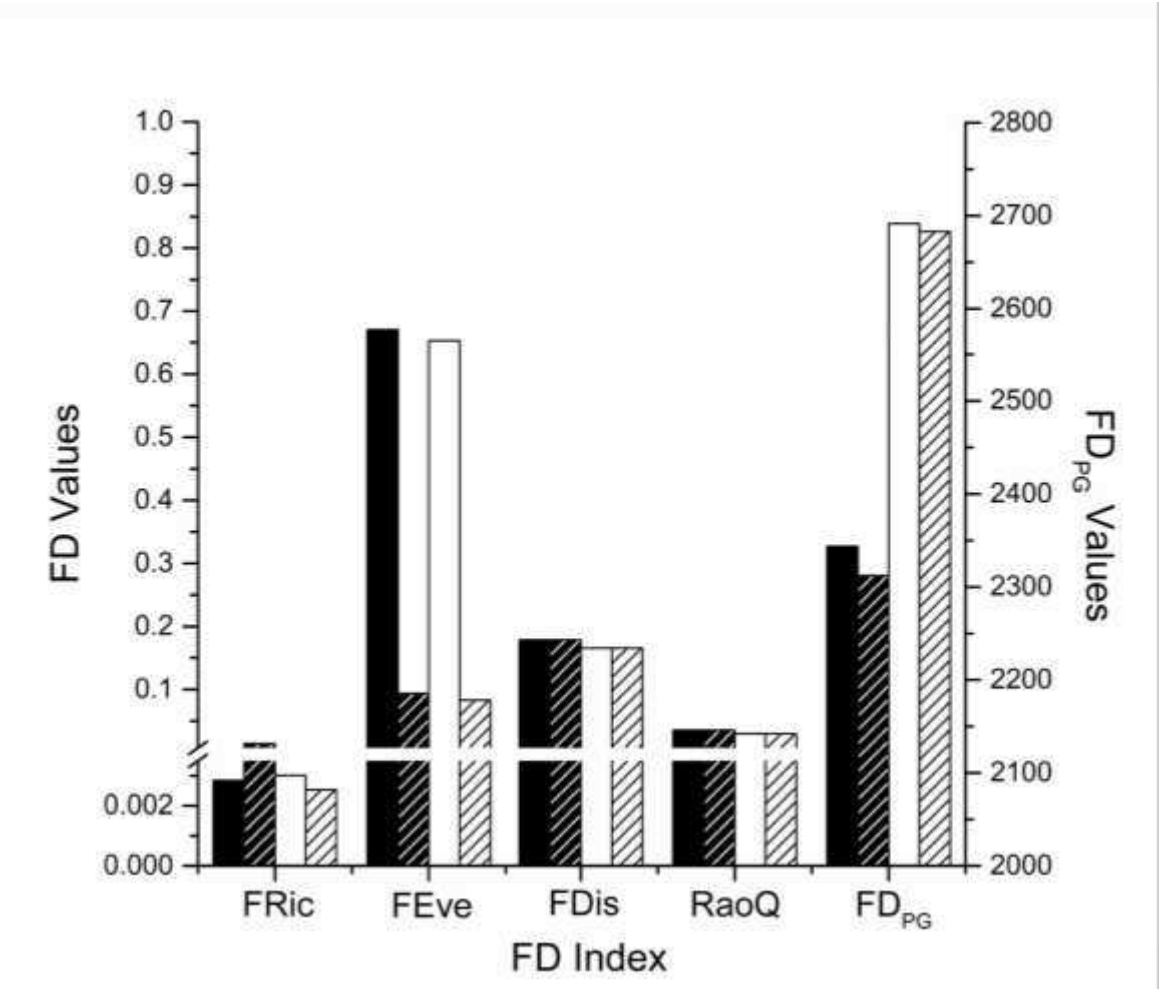


**Fig. S1** Comparison between FD indices calculated using established methods (plain bars) and individual-level baseline FD indices (striped bars) for five commonly-used FD indices in primary forest (black) and logged forest (white). Note break in left-hand y-axis and different scale for $FD_{PG}$.

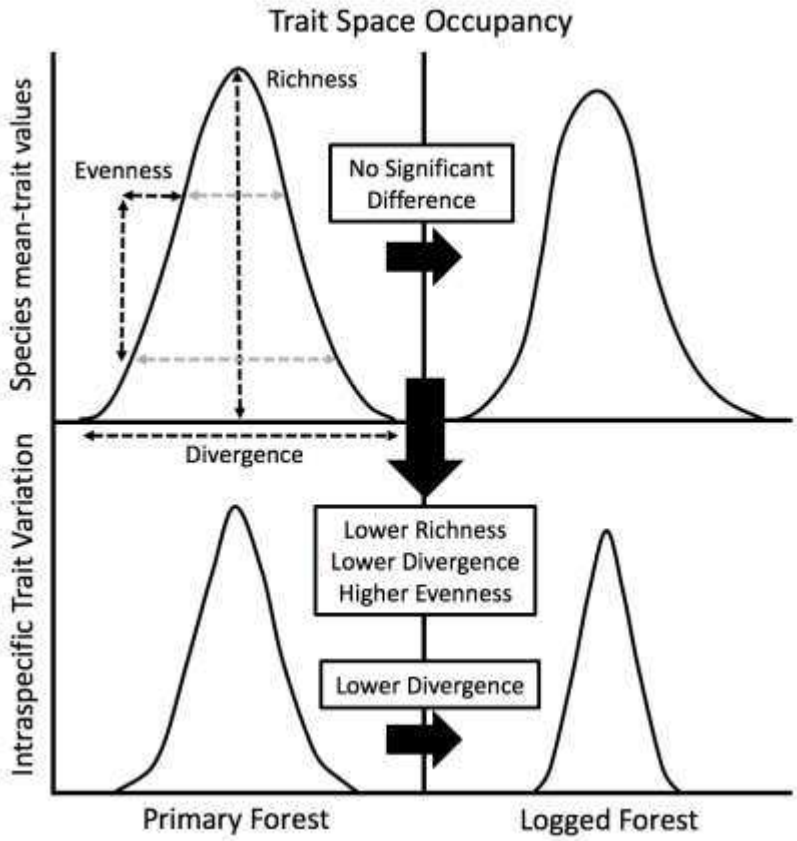


**Fig. S2** Conceptual figure illustrating our main findings. The three components of trait space we tested (dashed arrows for divergence – width of trait space; richness – height of trait space; evenness – distribution of width across trait space) are represented graphically in 2 dimensions for each community (left panels = primary forest, right panels = logged forest) under each of our two methods (top panels = individual baseline mean trait FD, bottom panels = FD when incorporating ITV). Solid black arrows with labels represent our main findings between conditions (no difference between communities when considering mean trait values; lower richness and divergence and higher evenness when incorporating ITV; lower divergence in logged forest when considering ITV).

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