# Main text figures
# (as mock-ups for now)

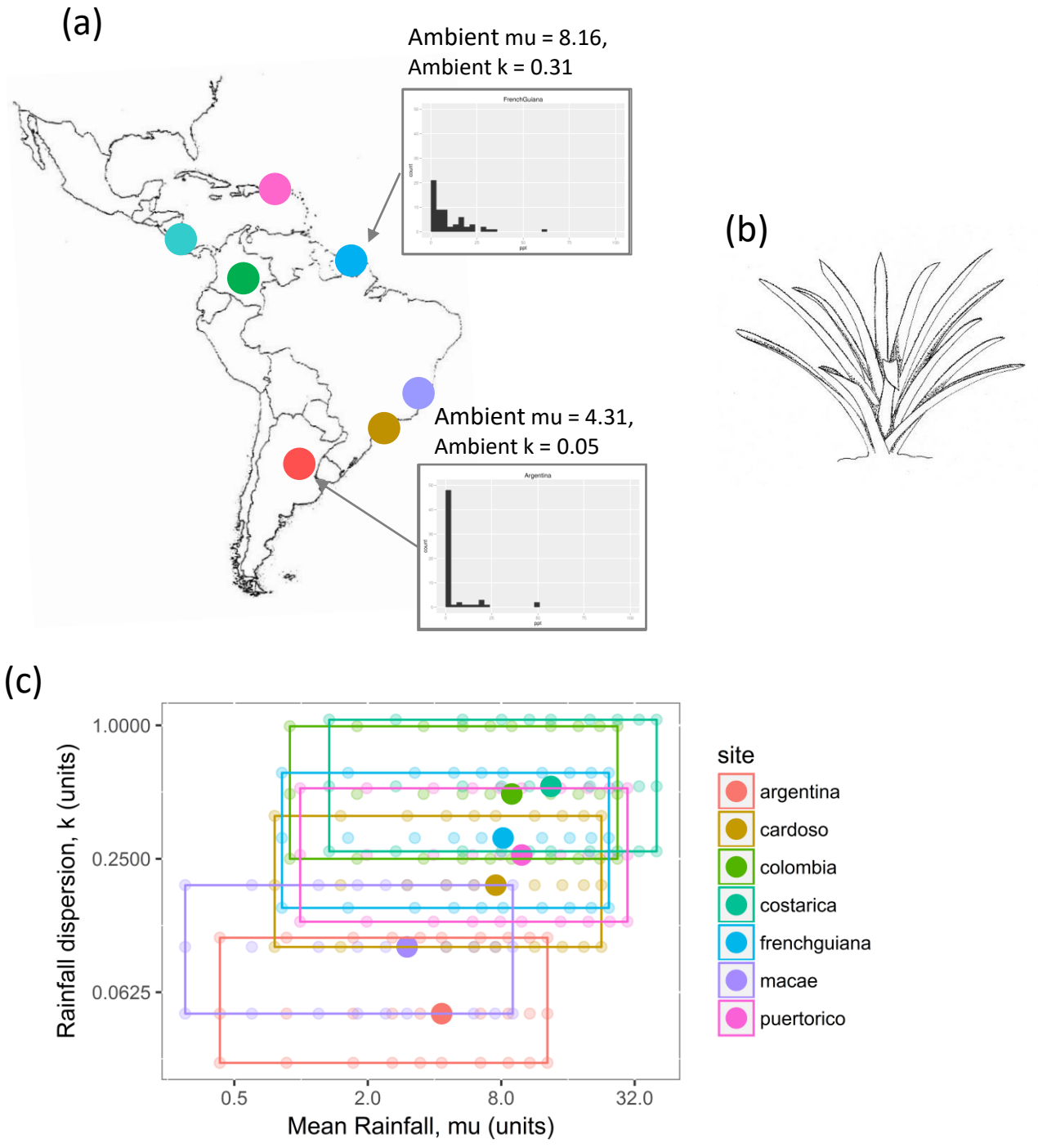



**Figure 1**. (a) Rainfall manipulations were replicated at seven sites that encompassed the natural range of tank bromeliads. Insets show the frequency distribution of daily rainfall under ambient conditions at two sites (top: French Guiana, bottom: Argentina). (b) A tank-forming bromeliad. (c) We manipulated two parameters of the rainfall frequency distribution: the mean amount of rainfall (mu) and the dispersion of rainfall across rainfall amounts (k). At each site, thirty rainfall manipulations (faded dots, range denoted by rectangle) systematically covered the parameter space around each site-specific ambient condition (solid dot). [note: have note georeferenced points on map, need units for mu and k, need high res frequency distribution for two sites in (a)]

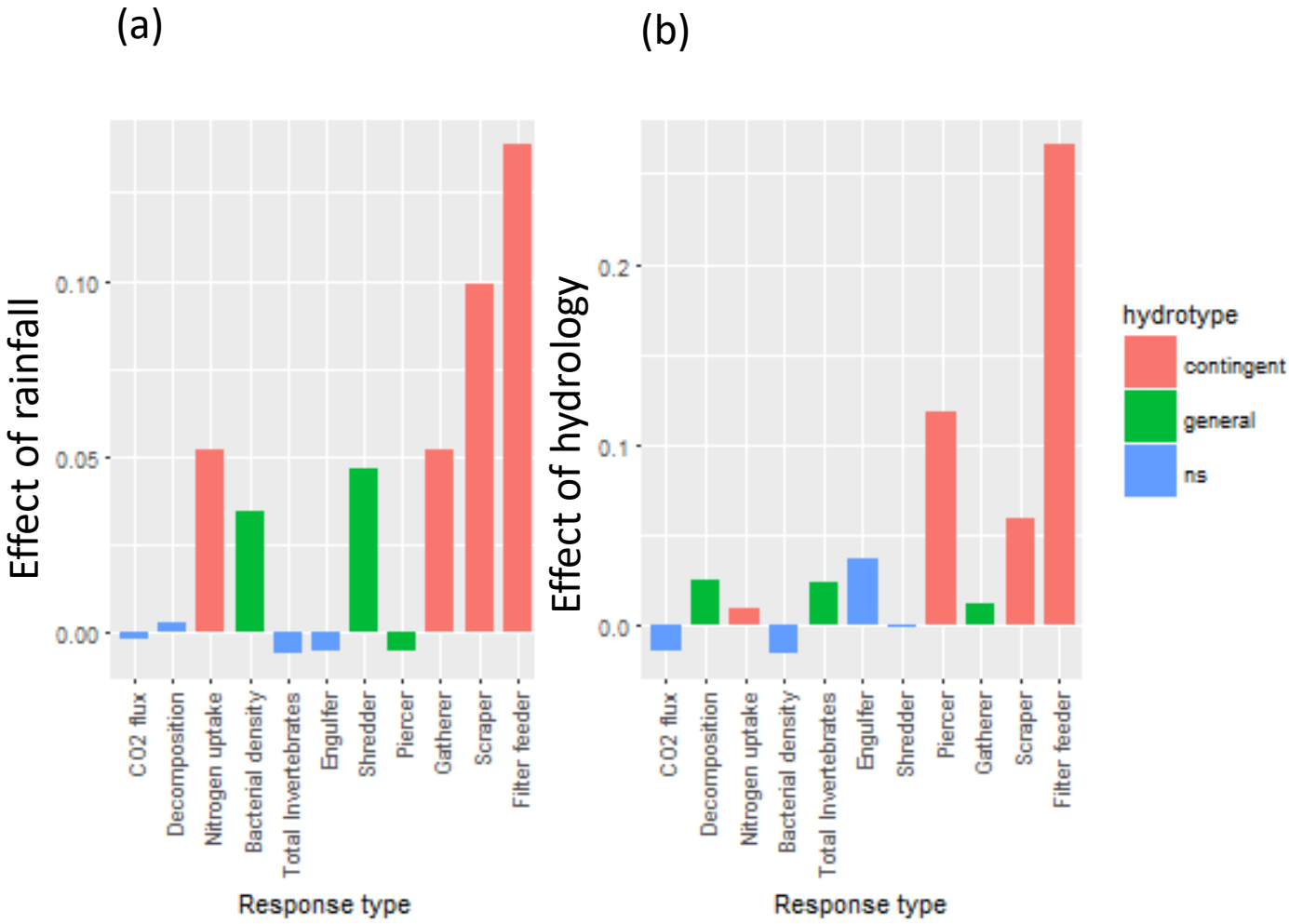
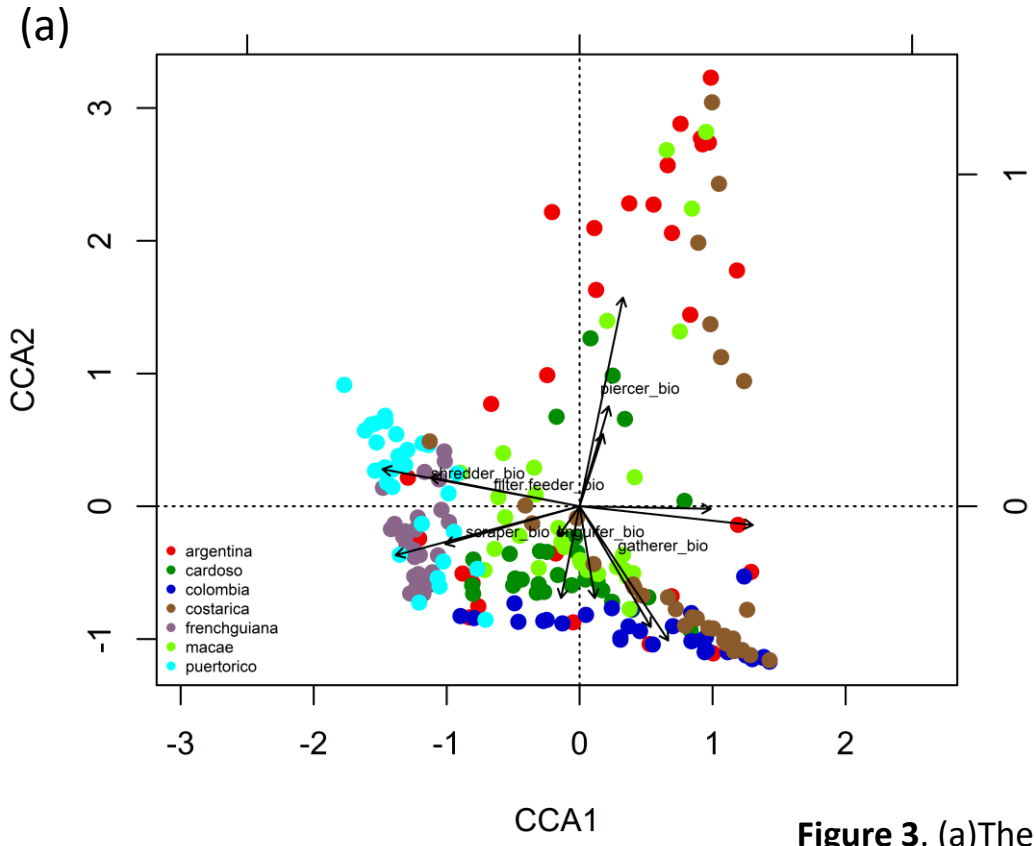



**Figure 2**. The effect of (a) rainfall and (b) hydrology on ecosystem variables, including elemental fluxes (CO2 flux, decomposition and nitrogen uptake by the plant), organism stocks (bacterial density, total invertebrate biomass) and the biomass of different invertebrate functional groups (engulfers, shredders, piercers, gatherers, scrapers and filter feeders). The height of bars represents the amount of residual deviance explained by either rainfall or hydrology terms, after accounting for main effects of site and bromeliad volume. Models that are "contingent" have significant interactions with site, whereas "general" models do not. In all cases, a model selection procedure was employed to prevent overfitting. The amount of deviance has been adjusted for the number of terms in the model, to allow comparison between models; therefore nonsignificant ("ns") or marginal models sometimes have negative deviance explained.



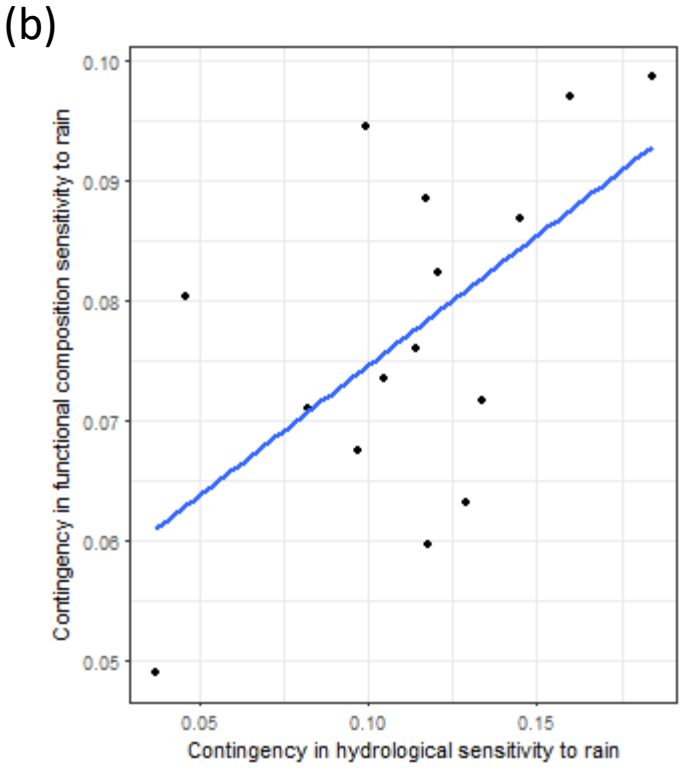




**Figure 3**. (a)The relative biomass of invertebrate functional groups (text labels) differs between sites (colours), and is affected by site-specific changes in rainfall k from ambient conditions (vectors). (b) Site contingency in the effect of rainfall on functional composition is best explained by site contingency in the hydrological sensitivity of bromeliads to altered rainfall (dots: pairwise comparisons of sites; Mantel test results). [Note: need to remove some of the vectors in (a) with shown main effects of sites, not just site-specific effects of change in k)

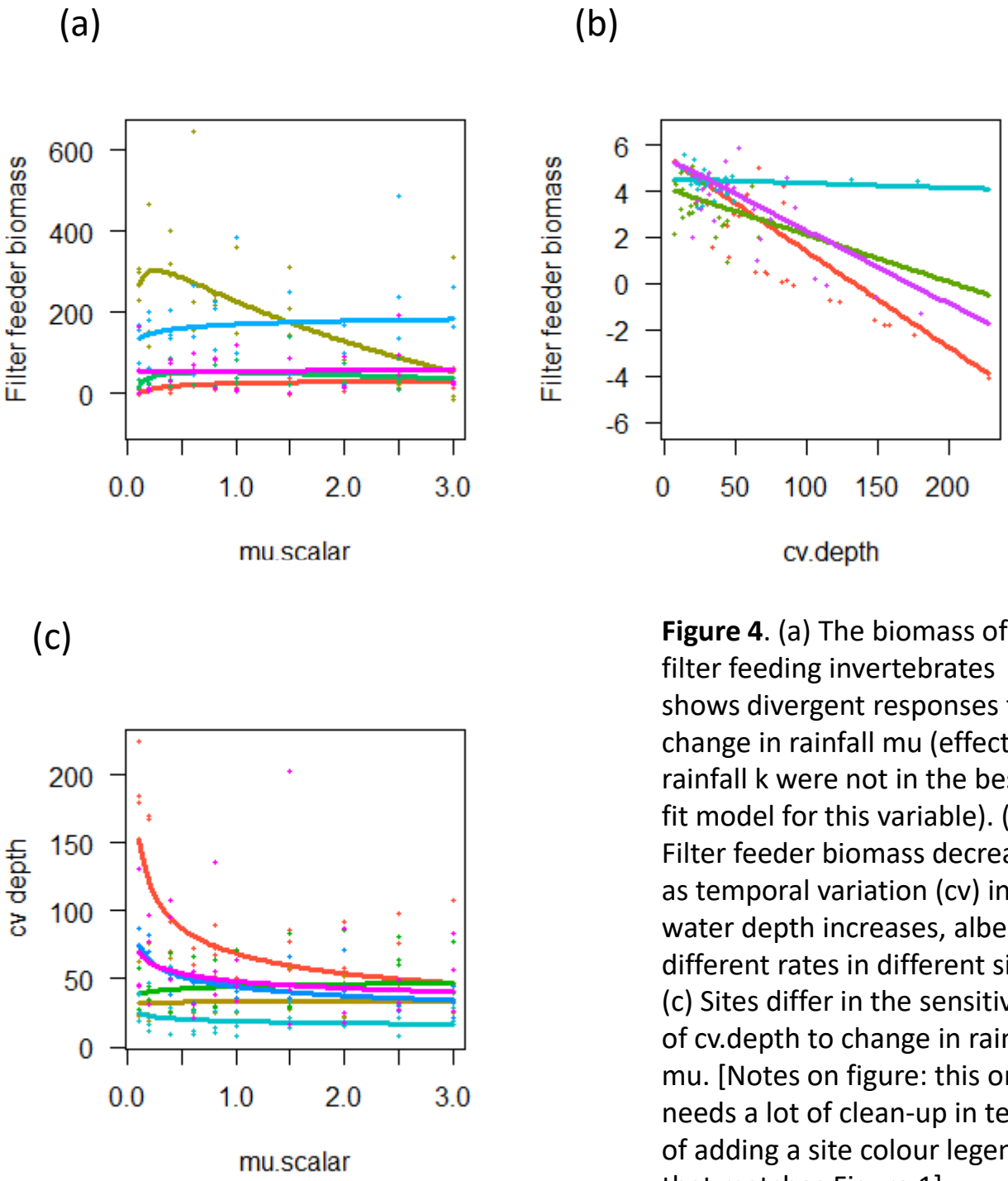



**Figure 4**. (a) The biomass of filter feeding invertebrates shows divergent responses to change in rainfall mu (effects of rainfall k were not in the best-fit model for this variable). (b) Filter feeder biomass decreases as temporal variation (cv) in water depth increases, albeit at different rates in different sites. (c) Sites differ in the sensitivity of cv.depth to change in rainfall mu. [Notes on figure: this one needs a lot of clean-up in terms of adding a site colour legend that matches Figure 1]

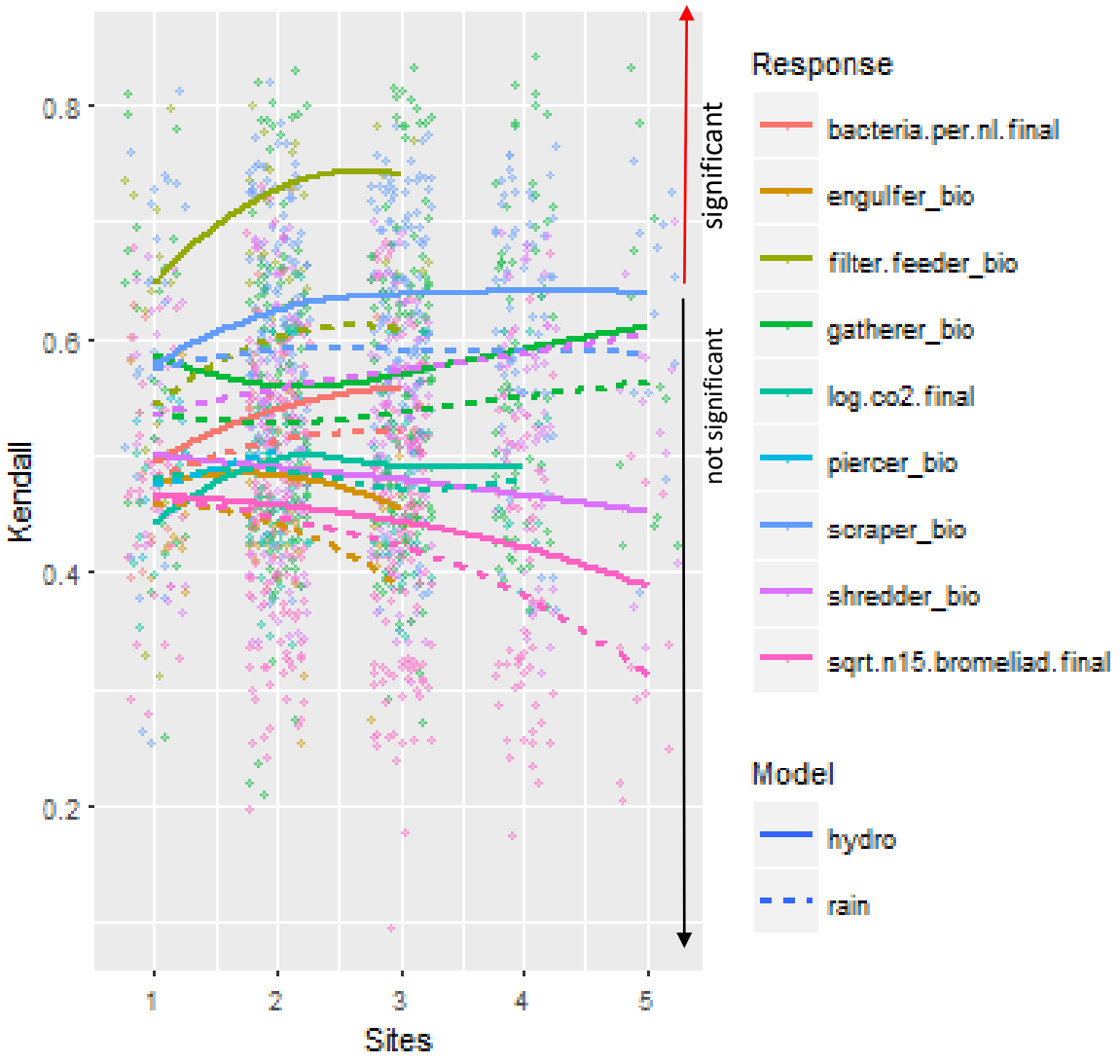
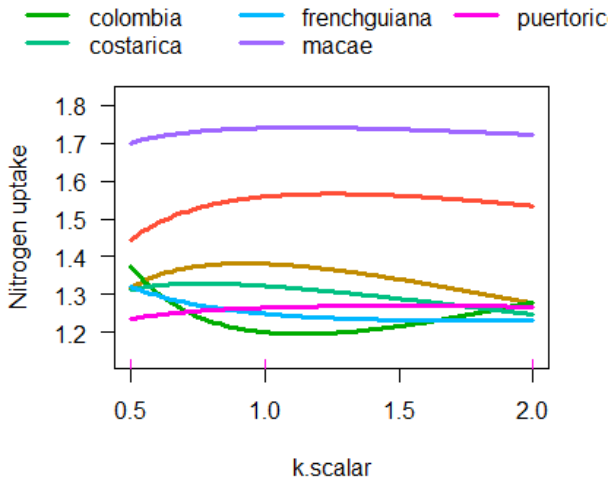
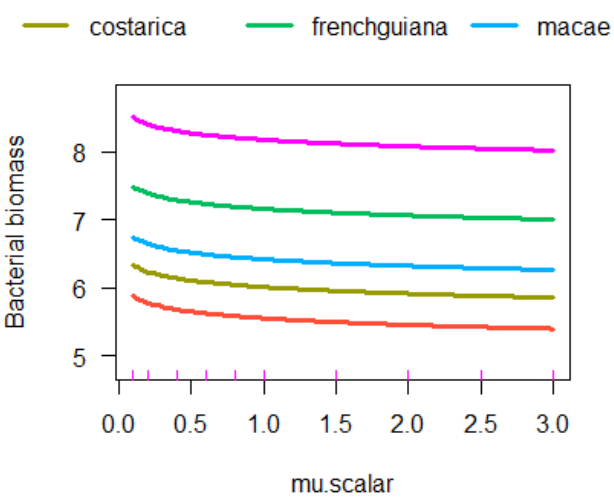
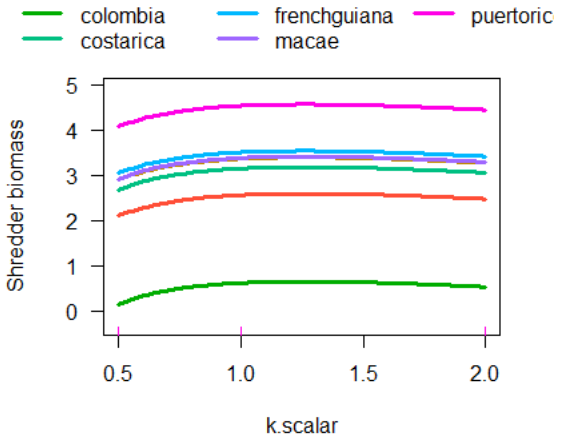


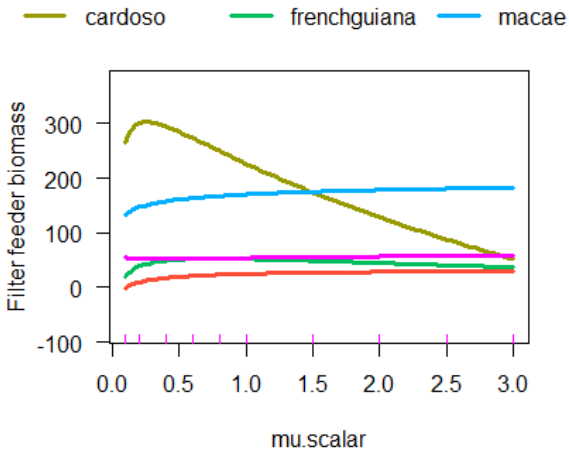

**Figure 5**. Concordance, as measured by Kendall's W, between predicted and observed values of ecosystem variables. For each ecosystem variable, we automated a model selection procedure to obtain the best model based on either rainfall (dashed lines) or hydrology (solid lines) as well as main effects of site and bromeliad volume. We then used this model to predict the variable for a new site, not included in the training dataset, for which the ambient level of the response plus distribution in bromeliad sizes was known. All possible subsets of sites were used as the training dataset ("Sites"), and all possible sites were used as the test dataset. For some variables, not all sites had adequate coverage so were not included in this analysis, thus the maximum number of sites varies between response variables. Cardoso, Brazil, lacked hydrological data and so was not included in this analysis.

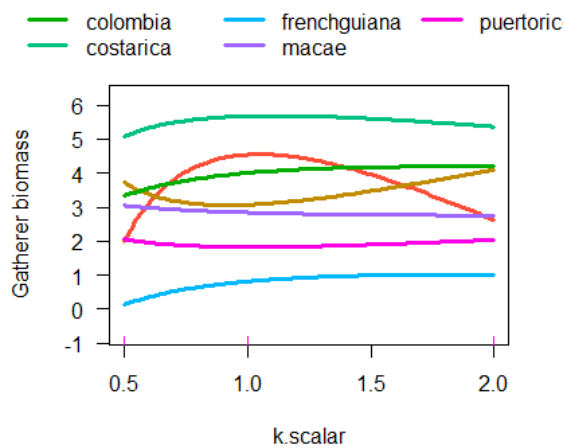
# Appendix figures

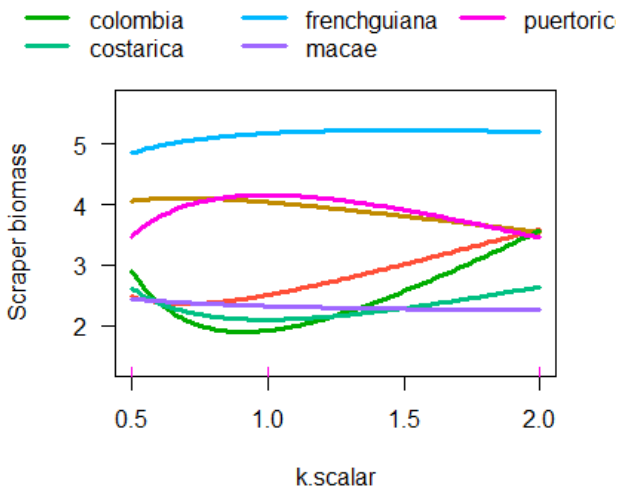


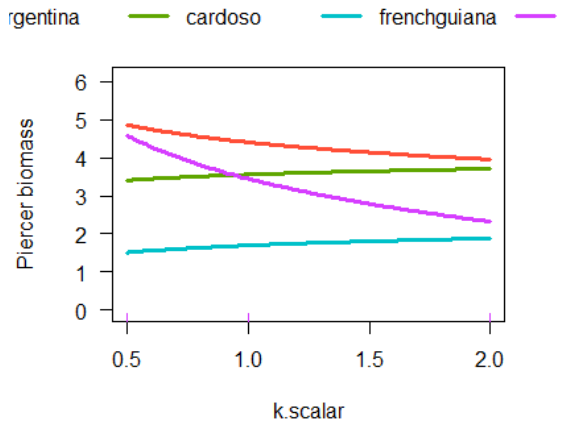




**Figure.** This is a rough mock-up of what the individual response variable graphs will look like. Responses without sig rainfall effects not shown. One set like this for rainfall models, another for hydrology?

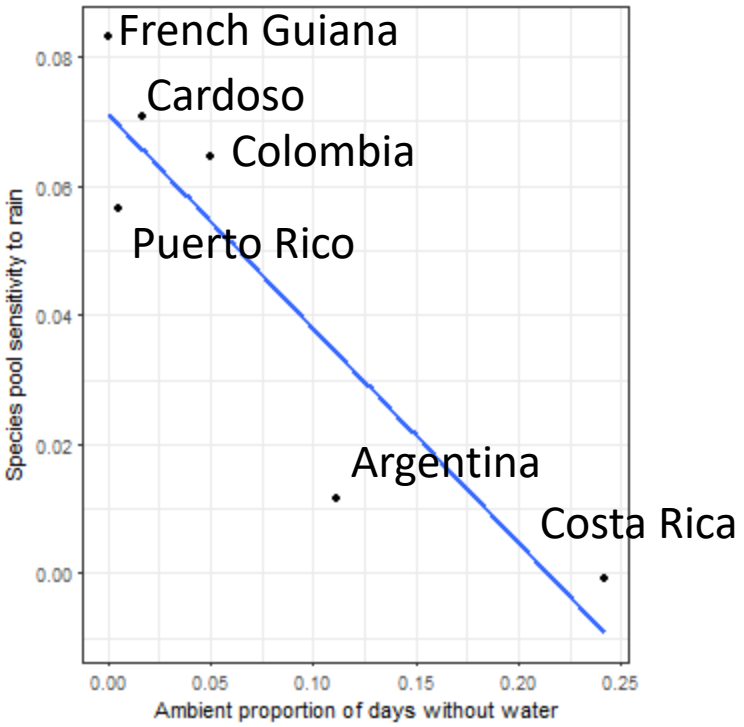



**Figure.** Sites with bromeliads that frequently are without water under ambient conditions tend to already have species pools dominated by invertebrate families that are insensitive to rainfall. The sensitivity of each family was determined by a global analysis of response to rainfall manipulations, data that is independent of calculations of ambient conditions.

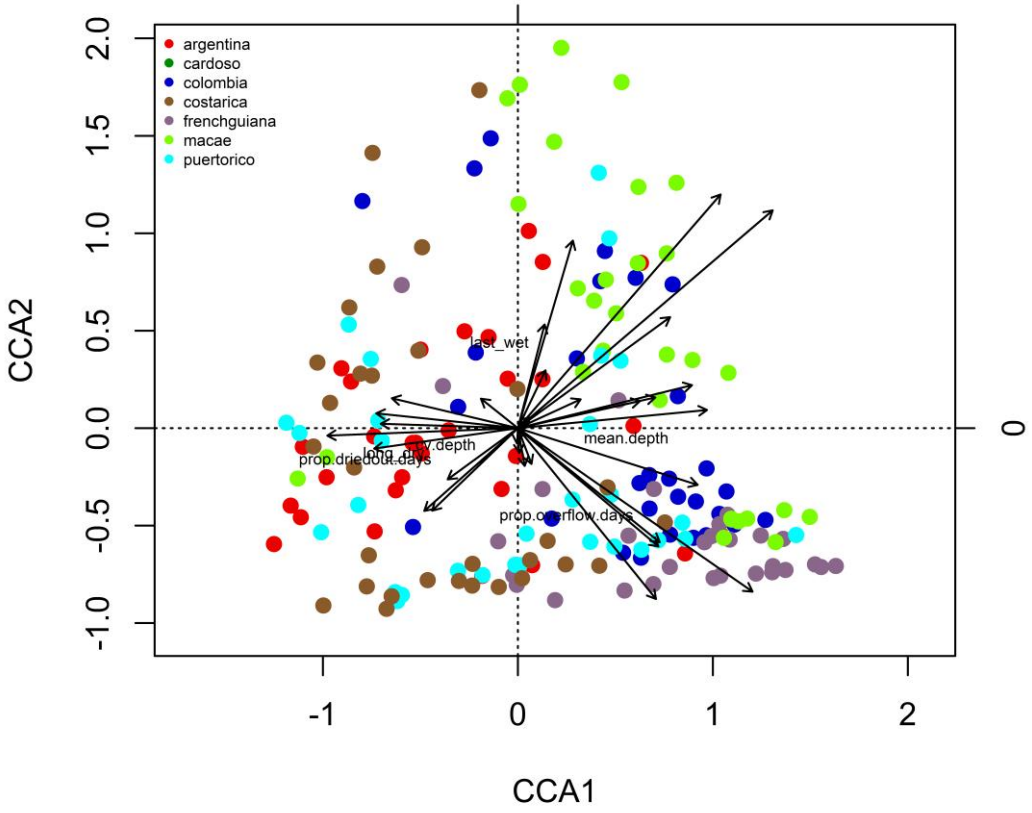



**Figure**. Hydrological variables differ between sites, and are responsive to site-specific rainfall change (vectors, once I tidy these up)