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Non-destructive estimation of Oecophylla smaragdina colony biomass

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In most ecosystems, ants are a dominant part of the arthropod community. However, understanding of their ecological importance has been hampered by limited availability of data on ant abundance. We developed a model to estimate the size (biomass and number of workers) of *O. smaragdina* colonies in mango plantations in Darwin, Australia. The total nest volume of *O. smaragdina* colonies in a tree was related to the activity of the ants ($R^2=0.85$), estimated as the density of ant trails in the tree. Subsequently, the relation between nest volume and ant biomass ($R^2=0.70$) was added to enable a prediction of ant biomass directly from ant activity. With this combined regression the ant biomass in a tree equaled 244.5 g fresh mass*ant activity. Similarly, the number of workers in trees was estimated using the relationship between nest volume and worker numbers ($R^2=0.84$). Based on the model, five *O. smaragdina* colonies assessed in a plantation in the dry season, ranged in size from 131,000-562,388 workers and from 0.8-3.3 kg total ant wet biomass for the smallest and largest colony, respectively. Correspondingly, the areal abundance of ants in the plantation was 353 workers/m² and 2.1 g ant mass/m². With this model, estimates on *O. smaragdina* abundance can be obtained with a minimum of workload and it provides a possibility to scale physiological experiments on per capita rates (e.g. food consumption) to an ecological context. Thus, colonies of *O. smaragdina* can serve as model organism providing valuable information on the impact of ants in ecosystems.