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“Filling gaps and removing traps
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Local Crop Diversity, Soil Properties and Altitude as Indicators of Carabidae Distribution in the Highland Coffee Farms

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Abstract

Carabids are sensitive to environmental changes, quantity of plant life and soil parameters, which can be influenced by biophysical conditions. In this study we carried out a two year research on the abundance and distribution of ground beetles (Carabidae) in coffee farmlands of Mt Elgon region of Uganda. The predictors under this study were altitude and cropping system and the response variables were abundance and distribution of Carabidae, abundance of semi-natural vegetation and selected soil parameters. Altitude was categorised as: low (1400–1499 m a.s.l), mid (1500–1679 m a.s.l) and high (1680–2100 m a.s.l); and cropping system as: Coffee monocrop; coffee+annual; coffee+banana; and coffee+banana+shade trees. For each altitudinal range, each cropping system was represented three times. The study was in two districts of the Mt. Elgon region making it a total of 72 study sites. The results from the generalised linear mixed models showed highly significant effects of altitude, cropping system, and the altitude*cropping system interaction on the abundance and distribution of the three Carabidae: *Anisodactylus* spp., *Chlanius* spp. and *Harpalus* spp. *Harpalus* spp. was significantly more abundant in coffee monocrop fields at lower altitude while *Chlanius* spp. was found more in coffee+banana+shade tree at mid altitude. Occurrence of *Anisodactylus* spp. was higher in the coffee+annual system at high altitude. Bivariate correlations revealed a significant positive correlation between *Chlanius* spp. abundance and the abundance of semi-natural vegetation; and a negative correlation of *Chlanius* spp. and *Harpalus* spp. with the soil pH. These results showed differential preference of biophysical conditions of different Carabidae species indicating complexity in generating ecological management recommendations.

Keywords: Coffee farmlands, generalist predators, Mt. Elgon, semi natural vegetation, Uganda