Flowering margins support natural enemies between cropping seasons

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Introduction: Populations of natural enemies of insect pests are declining owing to agricultural intensification and indiscriminate use of pesticides, and this may be exacerbated in agricultural systems that clear all margin plants after the cropping season for other uses such as fodder. Retaining a diversity of non-crop flowering vegetation outside the cropping season may support more resilient and effective natural pest regulation.

Methods: We tested the potential for non-crop vegetation to support natural enemies in fields across two locations after harvesting the primary crops of lablab and maize.

Results: A total of 54 plant species were recorded across the sites in Kenya with 59% of them being annuals and 41% perennials. There was a significant seasonal variation in plant species richness (ANOVA: $F_{1, 16}$ = 33. 45; P< 0.0001) and diversity (ANOVA: $F_{1, 16}$ = 7.20; P = 0.0511). While time since harvesting was a significant factor influencing the overall abundance of natural enemies (ANOVA: $F_{2, 1133}$ = 8.11; P< 0.0001), they were generally higher in abundance in locations with margin plants or where a diversity of margin plants was observed.

Discussion: These findings demonstrate that flowering plants in agricultural systems offer refuge and alternative food for natural enemies and potentially other beneficial insects between cropping seasons. The conservation of natural enemies between crops may lead to more effective natural pest regulation early in the following crop, thus reducing reliance on insecticides application.