

ABSTRACT

The honeybee (*Apis mellifera L.*) produces honey and cross pollinates plants for improved socioeconomic wellbeing. However its colony populations globally and locally have been declining. In Transmara West Sub-county, hive colonization and honey yields have been low, which is due to the decline in honeybee population believed to be caused by pesticides use and pests attack. Although their relative contributions are unknown, Beekeepers suspect pesticides use hold a key role in colony population decline. This scenario has impeded optimal honey production. Previous studies in the study area focused on beekeeping suitability and potential and little on effect of pesticide use. The main objective of this study was to establish the effect of pesticides use on honeybee mortality and honey production. The specific objectives were: to analyze the effect of pesticide use on honeybee mortality and honey yield, examine pesticide residue levels in honeybee, honey and pollen and determine pesticide use patterns. The study adopted experimental and descriptive survey design. Sixteen apiaries were selected and two strong colonies in Langstroth hives identified per apiary and replicated thrice totaling to 94 colonies which acted as control and treatments. Traps were fixed at hive entrances and number of dead bees recorded at weekly intervals in March-October 2015. Pollen, honeybee and honey samples from the colonies were analyzed for Amitraz, Chlorfenvinphos, Cypermethrin, Deltamethrin and Malathion residues at SGS laboratories, using Queshers method. A population of 2500 beekeeping households was targeted and a sample of 330 respondents randomly drawn and administered with a questionnaire. Honeybee mortality rate and honey yields data among experimental sets were analyzed by one way ANOVA and mean separation using Turkey HSD test. Pesticides use data was analyzed using descriptive statistics. The results indicated that mortality rate in treated colonies (229 ± 5.1) was significantly higher than in control colonies (73 ± 11); $MSD=4.6791$, $p=0.01$. Honey yield in control colonies ($16.0\pm 1.0\text{Kg}$) was significantly higher than in treated colonies ($8.7\pm 1.2\text{Kg}$); ($MSD=4.8425$, $p=0.024$). Pests were controlled using pesticides (91%) mainly; pyrethroids (50%), formamidine (25 %) and organophosphorous (25%). Most farmers applied pesticides weekly (79%) during morning hours (93%) with 66% applying pesticides cocktails for efficacy purposes. About 83% disposed pesticides inappropriately. No residues were detected in all matrices thus honeybee products are safe for consumption. Pesticides use increased honeybee mortality rate hence reduced honey yields. Pesticides were handled haphazardly in the study area. Farmers should be sensitized on safe pesticides handling. This information will guide development of proper pesticides handling strategies.