Abstract

Weekly sampling of the Indian meal moth, *Plodia interpunctella*, was conducted over 15 consecutive weeks at 19 locations within a maize storage facility. Direct sampling consisted of maize samples from two depths from the maize surface, and was compared with three indirect sampling techniques: (1) cardboard traps intended for trapping of late instar larvae and pupae; (2) unbaited sticky traps at two heights above the maize intended for trapping adults; and (3) probe traps inserted into the maize intended for trapping both larvae and adults. Temperature was recorded weekly and maize moisture content every 2 weeks at each sampled location. Total catches for the entire sampling period were highest with cardboard traps followed by maize samples, sticky traps, and probe traps. Spatial statistics were used to examine the distribution pattern of weekly catches for each sampling technique: (1) larvae in both top and bottom maize samples indicated similar aggregated distribution patterns; (2) catches with cardboard traps and sticky traps at both heights suggested a random distribution pattern; and (3) catches with probe traps were considered too low for analysis. For each weekly sampling event, the level of spatial association between sampling techniques was investigated in which the spatial distribution of larvae in top samples was compared with: (1) larvae in bottom maize samples; (2) cardboard trap catches; and (3) adults sticky traps. Catches of adults in low sticky traps were compared with: (4) adults in high sticky traps; (5) cardboard trap catches; and (6) larvae in bottom maize samples. Of the six spatial associations, only larvae in the top and bottom maize samples were significantly associated, while there was no significant spatial association involving catches with indirect sampling techniques. We used response surface regression analysis to evaluate the relative contribution of six explanatory variables in a model fitted to the abundance of larvae in maize samples (order of importance): y-coordinate of sampling locations, vertical position of samples, temperature, number of weekly sampling event, moisture content, and x-coordinate of sampling locations. Using additional response surface regression analyses with the same explanatory variables, we showed that abundance of larvae in maize samples was a poor predictor for the occurrence of *P. interpunctella* individuals in indirect samples. The implications of different spatial distribution patterns for different sampling techniques of *P. interpunctella* are discussed.