Damage potential of Tribolium castaneum (Herbst) (Coleoptera: Tenebrionidae) on cocoa beans: effect of initial adult population density and post infestation storage time

ABSTRACT

The effect of different initial adult population densities of Tribolium castaneum (Herbst) at several post infestation storage times on the final adult population density, the percentage of damaged beans, the percentage of weight loss, and the weight of insect feeding residues on cocoa beans was investigated in laboratory experiments. Both factors interactively had highly significant ($P < 0.01$) effects on variables assessed. The highest mean final adult population density of 129.7 ± 4.6 was recorded in samples infested with the highest initial adult population density and stored for 150 d, while the least mean adult population density of 10.8 ± 0.54 was recorded on samples infested with the lowest initial adult population density in samples stored for 30 d. The highest percentage damaged cocoa beans $51.0 \pm 1.21\%$ was recorded in samples infested with the highest initial adult population density, while the least mean percentage damaged beans of $16.9 \pm 1.26\%$ was also recorded on samples infested with the lowest initial adult population density. Similar trends of means were recorded for all the remaining variables. Correlation between factors was significant and positive. Multiple and simple linear regressions analyses were also significant ($P < 0.01$) and all equations fitted the regression models and perfectly described the relationship between the independent and the dependent variables. Our results show that *T. castaneum* can impact negatively on both the quantity and quality of stored cocoa within just 30 days of infestation, with the impact increasing with increasing population density and post infestation storage time.

Keyword: Cocoa beans; Insect infestation; Tribolium castaneum; Population density; Damage; Storage time