ABSTRACT

This study investigated the development of resistance by selected populations of *Hypothenemus hampei* Ferrari in Jamaica to endosulfan and cross resistance to actellic, decis, diazinon and karate. The mechanism of resistance, persistence and effects on soil fauna were also assessed. The data indicated that resistance had developed in the coffee berry borer due to continued exposure to insecticides, particularly endosulfan. The 24 hr. LC_{50} data after exposure revealed that resistance to endosulfan ranged from 26-fold to over 700-fold; the order of resistance of different populations to endosulfan was Mountain Hill = Bermuda Mtn., Irish Town, (733-fold; LC_{50} 0.22%) > Stony Hill, (533-fold ; LC_{50} 0.16%) > Winefield, (266-fold; LC_{50} 0.08%) > Bolo, (233-fold; LC_{50} 0.07%) > Sligoville - Silver Hill Gap = Oxford, (100-fold; LC_{50} 0.03%) > Creighton Hall, Irish Town, (50-fold; LC_{50} 0.015) > Clarendon = Flamstead, (47 and 43-fold; LC_{50} 0.014 and 0.013%) > St. Thomas, (26-fold; LC_{50} 0.008%)

These populations had also developed cross-resistance to other insecticides, the values ranged from 16-fold for diazinon to 130-fold for actellic, their relative toxicity being generally lower than that of endosulfan, except for actellic (2.00) in Bolo and diazinon (1.11) in Silver Hill Gap.

Susceptible strains possessed fewer metabolites than resistant strains of

populations of coffee berry borer. Metabolites of susceptible strains showed peaks corresponding to retention times of 0.295 for endosulfan lactone and 0.651 for endosulfan ether, while resistant populations showed peaks of 0.359, 0.765 and 1.027 which corresponded to endosulfan ether, endosulfan lactone and β- endosulfan, respectively.

The persistence ($t_{1/2}$ in days) of endosulfan, diazinon and dimethoate in Marvelly Sandy Loam (MSL) soil (Mona) was 5.57, 2.87 and 9.82, respectively. In St. Ann Clay Loam (SACL) soil (Sligoville), the persistence of high and low concentrations of endosulfan was 3.17 and 1.87 respectively. The insecticides, however, had no prolonged, adverse effects on soil fauna which was comprised predominantly of mites and ants.