Table 1. Insensitivity of Acetylcholinesterases from Colorado Potato Beetle Strains to Various Inhibitors

Inhibitor	Susceptible	Long Island	Montcalm
Carbofuran	--	--	++
Carbaryl	--	+	++
Aldicarb	--	--	--
Methomyl	--	--	--
Azinphosmethyl oxon	--	++	--
Phosmetoxon	--	++	+
Eserine	--	+	--

+indicates relative insensitivity to inhibitor

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Operational Influences on Endosulfan Resistance in Coffee Berry Borer in New Caledonia

Selection with insecticides can lead to insecticide resistance, but it is seldom possible to identify operational influences directly responsible for effects observed in the field. In the case of coffee berry borer (*Hypothenemus hampei)*, a cosmopolitan coffee pest, we have related several factors to the emerging picture of endosulfan resistance in New Caledonia (Brun *et al* 1989, 1990). Not surprisingly, resistance was higher in field with a recent history of endosulfan use. Interestingly, resistance frequency was also higher in intensive fields grown under full sun, compared to traditional fields with more widely spaced trees grown under native forest canopy. The lower resistance frequency observed in traditional fields is probably partly due to factors such as physical obstruction reducing insecticide deposition, but the cooler daytime temperatures in shady fields would also be expected to reduce the mortality resulting from endosulfan applications (Brun & Suckling in press), hence lowering selection in traditional fields.

We have also detected rapid decreases in resistance frequency away from roadsides, and can relate these clines to application methods. Coffee fields have been sprayed from roadsides, using truck-mounted sprayers. These directional sprayers deposit the majority of the insecticide within 10-20m of the point of application (Parkin *et al.* in press). Transects with bioassays of beetles in filter paper packets and in coffee berries exposed to field treatment indicate differential mortality between resistant and susceptible strains, and hence selection, which reduced with distance from the point of application. Removal of endosulfan use led to some reversion in resistance between years, while continued use increased the frequency of resistant phenotype (Brun & Suckling in press).

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The Analysis of Plasmid-Mediated Streptomycin Resistance in *Erwinia amylovora.*

Streptomycin-resistant mutants of *Erwinia amylovora* were isolated from an apple orchard in Michigan and from crabapple trees adjacent to the same orchard in 1990. Isolates that grew on King's medium B amended with 100 μg/ml of streptomycin sulfate were considered to be resistant strains, whereas isolates that failed to grow on this medium were considered to be sensitive strains. Growth of the resistant strains was not inhibited in a filter-paper disk assay (0.06-5 μg of streptomycin sulfate), but growth of sensitive strains was inhibited at concentrations as low as 0.06 μg of streptomycin sulfate.

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