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ASSESSING SUBLETHAL EFFECTS OF FENITROTHION ON BIRDS MEASURING AEROBIC METABOLISM DURING FLIGHT AND COLD EXPOSURE

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ABSTRACT
An organophosphate pesticide, fenitrothion is used by the Australian Plague Locust Commission (APLC) to limit locust outbreaks. Birds captured at locust-control sites typically show evidence of pesticide exposure. We have accordingly examined the sublethal effects of fenitrothion on birds by measuring aerobic metabolism (oxygen consumption) during exercise (flying) and during a 1-h cold exposure (equivalent to –10 to -20 °C) in house sparrows (Passer domesticus), zebra finches (Taeniopygia guttata) and king quail (Coturnix chinensis). Measurements were made before and 1, 2, 6 or 14 days after receiving 30 mg/kg (house sparrows and king quail), 3 mg/kg (zebra finches), or corn oil alone (control birds, all species). Fenitrothion had no effect on the metabolic response to cold exposure in any of these species.

House sparrows were also dosed with fenitrothion at 100 mg/kg (high dose), 60 mg/kg (medium dose) or 30 mg/kg (low dose). The high dose group experienced a 68% reduction in exercise-induced peak metabolic rate (PMR) two days post-dose, and was still 30% lower than pre-dose rates 14 days later. The extent and duration of this effect was dose dependent, with birds showing a 16% and 10% reduction in mean PMR two days after dosing in the medium and low-dosed groups, respectively. Zebra finches given 3-mg fenitrothion/kg had a 25% reduction in PMR three days after dosing, and king quail dosed with 30mg fenitrothion/kg showed a 23% reduction two days post-dose. PMR was invariant in control birds throughout all measurements. We conclude that birds exposed to sublethal levels of fenitrothion can experience reduced flight capacity, despite otherwise appearing asymptomatic. Exercise-induced PMR thus serves as a useful biomarker for sublethal exposure to fenitrothion in birds.