

Ivermectin for the Control of West Nile Virus Transmission

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Abstract

Presently there are limited options for controlling the transmission of West Nile virus (WNV), including the use of larvicides and adulticides to target the mosquito vector. However, these methods are poorly-targeted, restricted to wealthy semi-urban and urban areas that are able to fund the efforts, and opposed in some communities due to toxicity concerns. This study evaluated the use of endectocide-treated bird feed to control WNV transmission by targeting the primary vector in Colorado, *Culex tarsalis*. Ivermectin susceptibility in *C. tarsalis* was first measured through ivermectin-spiked bloodmeals fed using membrane feeders, and the LC50 was determined to be 49.94 ng/ml (39.71-59.93 95% CI, n=988). Chickens were then fed ivermectin-treated feed to examine its safety and palatability, and mosquitoes were blood fed directly on the chickens to assess *in vivo* effects. Finally, ivermectin pharmacokinetics were analyzed using vein blood from chickens as well the *C. tarsalis* that bloodfed on the chickens. A mixture of 200 mg ivermectin/kg of bird feed was determined to be a palatable and safe dose on which chickens would feed while also being effective in killing *C. tarsalis* in bioassays. Pharmacokinetic data from the *in vivo* tests produced conflicting results compared to *in vitro* blood feeds but drug was detected in chicken blood at concentrations that may be expected to affect *C. tarsalis*.

Keywords:

Dosing safety infected mosquitoes treated bird feed could be a novel method of controlling WNV transmission