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Want to Stop Malaria? Target the Geezers

By Martin Enserink
 ScienceNOW Daily News
 7 April 2009

Kill 'em fast, kill 'em young. That's been the unofficial motto in insect control for the past 50 years. But a new paper suggests that, at least in the case of malaria, the strategy may be misguided. By choosing insecticides that act more slowly, or that specifically target older mosquitoes, researchers may be able to prevent the evolution of pesticide resistance, a problem that has long bedeviled malaria control efforts.

The new study, published on 6 April in *PLoS Biology*, offers a "completely new way of thinking" about the resistance problem, says entomologist Bart Knols of Wageningen University in the Netherlands. "You might be able to keep insecticides in business for 60, 80 years, perhaps forever," he says. Insecticides can control malaria, but only in the short run. One by one, pesticides have fallen by the wayside because mosquitoes developed resistance, often within a few years after their introduction. The reason? In areas where spraying is intense, any mutation that confers resistance, even if it's only partial, is hugely beneficial to mosquitoes, so it spreads quickly. Today, insecticide resistance is a major problem for malaria control worldwide. That might have been prevented, medical entomologist Andrew Read of Pennsylvania State University, University Park, and his colleagues say.

Here's their idea. Insecticides that kill mosquitoes early in their life cycle keep them from reproducing, thus creating a huge selective pressure to become resistant. But if you want to control malaria, it's fine to let mosquitoes reproduce; the trick is to prevent them from transmitting malaria--which they only do at the ripe old age of 10 to 14 days.

In their paper, the team presents models that show that targeting these older

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Killing them slowly. A pesticide that acts late in mosquitoes' lives might combat resistance.

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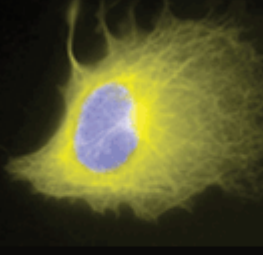
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mosquitoes could delay the emergence of resistance by decades--and still reduce the number of infectious bites by 95%. Some of the same authors co-authored a paper about one late killer, a slow-acting fungus, in *Science* in 2005. But other candidates exist, and spraying existing insecticides in lower doses, perhaps in clever combinations, might also be a way to target older mosquitoes, they write.



Knols applauds the idea but says there would be downsides as well. People who have their house sprayed, for instance, would no longer have the immediate benefit of being rid of their mosquito problem. "You'd have to explain that they're still going to have mosquitoes, and they will still be bitten, but malaria will go down," says Knols. "That might be a hard sell."

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