Key messages

- All field populations showed phenotypic resistance to temephos compared with the sensitive strain.
- *Ae Aegypti* adult populations were all highly resistant to permethrin and seven out of eight populations showed resistance to deltamethrin.
- Innovative vector control tools are needed to replace ineffective pesticides in Cambodia.

Introduction

Knowledge on the extent, distribution and mechanisms of insecticide resistance is essential for successful insecticide-based dengue control interventions. Here, we report the resistance profile of the dengue vector, *Aedes aegypti* to commonly used insecticides in Cambodia.

Methods

This study characterised the insecticide resistance status of eight populations of *Ae. aegypti* from four different geographical areas. Urban and rural villages were selected as collection points within each area. Villages were selected by the National Dengue Control Programme according to geographical representation, dengue incidence, and recent use of temephos (within the previous two years). The susceptibility of *Ae. aegypti* to temephos, permethrin, and deltamethrin was evaluated in accordance with World Health Organization "Monitoring and managing insecticide resistance in Aedes mosquito populations" protocol. Field populations were compared with the United States Department of Agriculture’s susceptible strain.

Results

All the field populations showed resistance to temephos when compared with the sensitive strain, with resistance ratio 50 (RR) varying from 3.3 to 33.78 and RR90 from 4.2 to 47, demonstrating an installed and generalised resistance of larvae to temephos in Cambodia. *Ae aegypti* adult populations were highly resistant to permethrin regardless of province or rural/urban classification, with an average mortality of 0.02 percent. Seven of the eight field populations showed resistance to deltamethrin.

Conclusion

From a regional point of view, it seems essential that control methods are changed and temephos is replaced with another intervention. These results are alarming for dengue vector control, as widespread resistance may compromise the entomological impact of larval control operations. Finally, and perhaps most worrying, it seems that in the event of an epidemic, the adulticides used in the Southeast Asia region are no longer effective. Innovative vector control tools are needed to replace ineffective pesticides in Cambodia.