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Colonized *Aedes albopictus* and its sexual performance in the wild: implications for SIT technology and containment

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Abstract

Background: Mating is a physiological process of crucial importance underlying the size and maintenance of mosquito populations. In sterile and incompatible insect technologies (SIT and IIT), mating is essential for mass production, persistence, and success of released individuals, and is a central parameter for judging the effectiveness of SIT/IIT programs. Some mosquitoes have an enormous reproductive potential for both themselves and pathogens and mating may contribute to persistence of infection in nature. As *Aedes albopictus* can transmit flaviviruses both sexually and horizontally, and as infected insects are usually derived from laboratory colonies, we investigated the implications of mating between a long-term laboratory colony of *Ae. albopictus* and wild populations.

Methods: Through a series of mating experiments, we examined the reproductive outcomes of sexual cross-affinity between laboratory-raised and wild adults of *Ae. albopictus*.

Results: The results indicated appreciable mating compatibility between laboratory-reared and wild adults, and equivalent levels of egg production among reciprocal crosses. We also observed comparable larval eclosion in lab females mated with wild males, and increased adult longevity in female offspring from wild females × laboratory males crosses.

Conclusions: Taken together, these data suggest that *Ae. albopictus* can preserve its reproductive fitness over a long period of time in the laboratory environment and has valuable attributes for SIT application. These observations together with the ability to successfully inseminate heterospecific females indicate the potential of *Ae. albopictus* to act as an ecological barrier if non-sterilized males are massively released in areas occupied by *Aedes aegypti*. The observed substantial reproductive fitness combined with the capability to reproduce both, itself and viruses illustrates the potential of *Ae. albopictus* to pose a serious threat if infected and released accidentally.

Keywords: *Aedes albopictus*, Laboratory strain, Wild strain, Mating affinity, Containment

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