

Publication

Active dispersal of *Aedes albopictus*: a mark-release-recapture study using self-marking units

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BACKGROUND: Understanding the dispersal dynamics of invasive mosquito species is fundamental to improve vector surveillance and to target control efforts. *Aedes albopictus* has been deemed a poor flyer as its range of active dispersal is generally assumed to be limited to a few hundred metres, while laboratory studies suggest this mosquito could actually fly several kilometres. The discrepancy may be due to differences in the local environment or to the methodological approach. In Switzerland, *Ae. albopictus* has been present since 2003 and has since then expanded its range. While passive dispersal is a key driver, it remains unclear how far this mosquito spreads through active flight and what the age structure and size of the local population are, all important parameters for vector surveillance and control. **METHOD:** We investigated the active dispersal, daily survival rate and population size of *Ae. albopictus* in mark-release-recapture studies in Coldrerio and Lugano, two areas of intensive control in Switzerland. To mark mosquitoes emerging from breeding sites, we used self-marking units with fluorescent pigment that have minimal impact on mosquito survival and behaviour. We recaptured the adult mosquitoes with BG-Sentinel traps within a radius of 1 km from the marking units over 22 consecutive days. **RESULTS:** We found that 77.5% of the recaptured *Ae. albopictus* individuals flew further than 250 m, the limit that is usually deemed sufficient for vector containment. The average age of females and males was 8.6 days and 7.8 days in Coldrerio and Lugano, respectively, while the estimated mosquito population densities were 134 mosquitoes/ha in Coldrerio and 767 mosquitoes/ha in Lugano. **CONCLUSIONS:** Self-marking units are an effective tool to mark wild mosquitoes. Using this approach, we found that mosquitoes survive long enough to potentially transmit arboviral disease in our study area and that host-seeking *Ae. albopictus* females may travel further than previously assumed for European mosquito populations. This finding has direct implications for vector control as emergency treatments around positive cases, as well as surveillance and control around detections of new infestations, might need to be extended beyond the usual recommended range of just a few hundred metres.

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