

Efficacy of Aquatain, a monomolecular surface film, against the malaria vectors *Anopheles stephensi* and *An. gambiae* s.s.

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1. What is Aquatain

- Silicone-based liquid which forms a monomolecular layer on the water surface
- Used as an anti-evaporation liquid
- Spreads around vegetation and is resilient to wind and rain
- Safe for the environment and certified for use on drinking water



2. Objectives

- To investigate the effect of Aquatain on the survival of young (1-3 days) and old (4-8 days) larvae and pupae.
- To determine the effect of Aquatain on oviposition

3. Materials and Methods

- Laboratory bioassays were performed, against larvae and pupae, with different concentrations of Aquatain
- Gravid females were subjected to a choice (access to both treated and untreated oviposition cups) and no-choice (access to either treated or untreated oviposition cup) situation

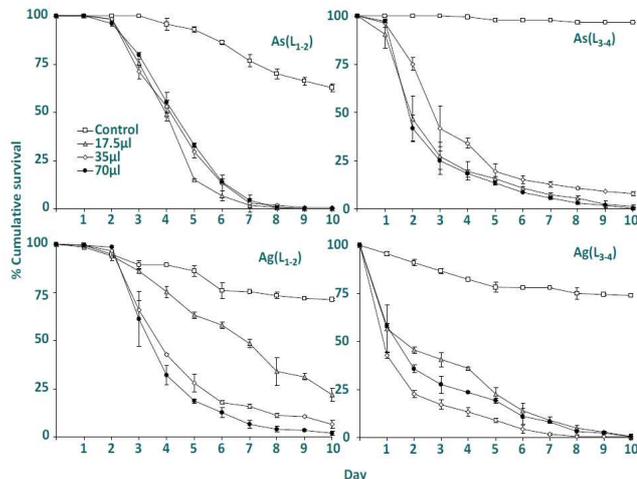


Figure 1 (above): Survival of young (L_{1-2}) and old (L_{3-4}) larvae of *Anopheles stephensi* (As) and *An. gambiae* (Ag) in untreated (control) and Aquatain-treated (17.5, 35, and 70 μ L) larval trays

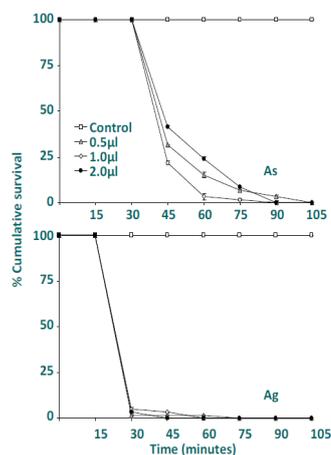


Figure 2 (on the left): Survival of *Anopheles stephensi* (As) and *An. gambiae* (Ag) pupae in untreated (control) and Aquatain-treated (0.5, 1, and 2 μ L) cups

4. Results

- 50 % of the larvae died within 3-5 days,
- Larvae were prevented from pupating
- Older larvae were more vulnerable than young larvae
- 100% of the pupae died within two hours
- There was either none or very low number of eggs laid in treated cups
- Gravid females drowned while attempting to oviposit

5. Conclusion/Next step

- Aquatain is a promising control agent and unique due to its ability to target multiple stages of mosquito life cycle
- Suitable for large, muddy and vegetated breeding sites
- Field trials will be conducted to test the efficacy in natural settings

Table 1: The number of eggs laid and the number of females that drowned in the choice experiment

Species	Cup	Eggs laid	Drowned
<i>An. stephensi</i>	Treated	0	1.5±0.64
	Untreated	265.5±23.7	0
<i>An. gambiae</i>	Treated	11.7±7.81	8.25±1.31
	Untreated	87.0±22.2	0

Table 2: The potential to lay eggs per cage, the number of eggs laid and the number of females that drowned in the no-choice experiment

Species	Treatment	Eggs±SE		Drowned
		laid+dissected	laid	
<i>An. stephensi</i>	Control	251 ± 51.9*	233 ± 34.9	0
	Aquatain	171 ± 1.52*	9 ± 9	6.3 ± 0.9
<i>An. gambiae</i>	Control	338 ± 98.8*	179 ± 57.5	0
	Aquatain	371 ± 87.7*	0	10.3 ± 0.9

* No significant difference ($p > 0.05$)

Aquatain not only reduced the survival of larvae and pupae but also prevented female mosquitoes from laying eggs at the treated site

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Reference: Bukhari T, Knols BGJ: Efficacy of Aquatain™, a Monomolecular Surface Film, against the Malaria Vectors *Anopheles stephensi* and *An. gambiae* s.s. in the Laboratory. *Am J Trop Med Hyg* 2009, 80(5):758-763.