

# Evaluating the impact of ovitrap size and substrate on the collection of *Aedes albopictus* (Diptera: Culicidae) eggs in a field study, in Athens, Greece

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## INTRODUCTION & AIM

*Aedes albopictus* (Asian tiger mosquito) is an invasive container breeding mosquito that transmits several pathogens to humans such as dengue, chikungunya and Zika viruses. Effective mosquito surveillance is vital for controlling mosquito populations. Ovitrap have been extensively used as a surveillance tool for *Ae. albopictus*, while their efficiency may vary depending on various factors such as the size and the substrate type. This study investigates the influence of ovitrap size and substrate material on *Ae. albopictus* egg catches under field conditions.

## MATERIALS AND METHODS

**Study area.** Field work was undertaken at the campus of the Agricultural University of Athens, Greece. Three discrete and vegetated sites were chosen with a distance >250 m between the sites.

**Ovitrap.** Eighteen cylindrical black PVC containers were deployed (small = 350mL, medium = 600mL, large = 1100mL). Each ovitrap was filled to 75% of capacity with tap water and fitted with one oviposition substrate:

- a rough-scored wooden tongue depressor (15×2 cm) held vertically against the inner wall, or
- a 2.5 cm<sup>3</sup> styrofoam cube floating at the water surface.



**Experimental design.** The six ovitrap-substrate combinations were arranged in a 6×6 Latin square. Within each site, six fixed sub-positions received one combination and ovitraps were rotated weekly for twelve consecutive weeks (June–August 2021). The ovitraps were placed in shaded positions at ground level. Substrates were collected every seven days and mosquito eggs were examined under a stereoscope. The effects of substrate material and ovitrap size on egg counts were analyzed using a zero-inflated negative binomial (ZINB) model. Fixed effects included substrate material and ovitrap size, while crossed random effects accounted for location and sampling week.

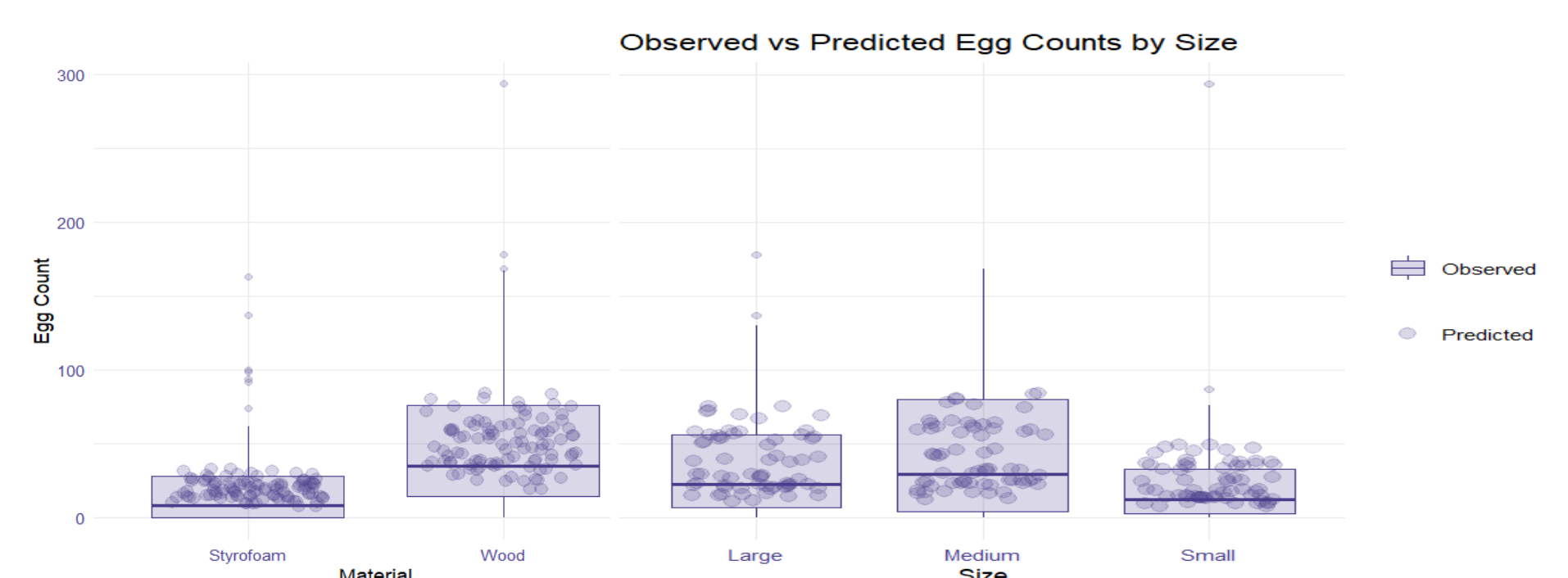
## RESULTS & DISCUSSION

- ✓ The collection of *Ae. albopictus* eggs in ovitraps was significantly affected by both substrate and ovitrap size.
- ✓ Wooden substrates were more effective, collecting almost two-fold higher number of eggs than styrofoam.
- ✓ Wooden substrates significantly reduced the probability of zero egg collections compared to styrofoam.
- ✓ Large and medium ovitraps significantly outperformed small ovitraps, while no profound difference was identified between large and medium sizes.

**Table 1:** Fixed Effects from Conditional Model (GLMM) and zero inflated part (zi=Material). The intercept represents the log count of mosquito eggs for the reference category (Styrofoam substrate and Small size)

Effect *	Estimate	Std. Error	Z-value	P-value
(Intercept)	2.8940	0.2178	13.286	< 0.001
Wood (substrate)	0.7015	0.1679	4.179	< 0.001
Medium (size)	0.5298	0.1946	2.723	< 0.001
Large (size)	0.4219	0.1950	2.164	0.0305
Zero inflated Model part				
(Intercept)	-1.1123	0.2571	-4.352	< 0.001
Wood	-1.9083	0.6244	-3.056	0.0225

\* Setting "Large and Wood" size as reference, no significant difference between medium and large size was identified (Estimate= 0.1080; S.E.= 0.1922; Z= 0.562; P= 0.5742)



**Figure 1:** Box bot diagrams for egg counts in different oviposition substrate (Styrofoam, wood) and ovitrap size (large, medium, small).

- ❖ Overall, our findings indicate wooden substrate and ovitrap size ≥ 600 mL as the best tested combination for effective egg catches using ovitraps to optimize mosquito surveillance of *Ae. albopictus*.

## REFERENCES

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