

Aedes control in desert coolers through a long-lasting pyriproxyfen based formulation

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INTRODUCTION

Dengue control in India relies heavily on chemical vector control. Treatment of breeding sites in desert coolers is a common practice for control of immature stages of Aedes. The short duration of activity is a weak point of the larvicides currently in use. Novel formulations that provide longer-lasting efficacy in desert coolers are of high interest to overcome the short duration of the existing larvicides. The pyriproxyfen formulation Larva IGR (Inesfly Corporation SL, Spain) was tested in semi-field trials for its residual efficacy when applied on the inside of desert coolers.

MATERIALS AND METHODS

Larva IGR: 0.2% Pyriproxyfen water-based white liquid microencapsulation formulation in 500ml ready-to-use trigger spray.

The study was carried out in Maharashtra (India) as per WHO guidelines for field/small-scale field testing of mosquito larvicides. Larva IGR was sprayed at 67ml/m² to the inside surfaces of four coolers. After 24-48 hours drying period, the coolers were filled with water and operated regularly. Larval density and adult emergence were assessed over five months from August to December 2018 for the four treated and two control coolers.

CONCLUSIONS

- Larva IGR remained effective up to five months and completely prevented adult emergence from coolers under standard field operating conditions.
- The results suggest that Larva IGR will remain longer lasting than five months before depletion of the pyriproxyfen to sublethal dose rates.
- The advancement in insecticide formulation technology by Larva IGR promises to make Dengue control more effective and efficient.
- The use of Larva IGR may avoid regular reapplications, which involves cost, manpower commitment and intricate planning and coordination to cover the entire community.

FURTHER RESEARCH

Additional semi-field trials need to be conducted to determine the long-lasting efficacy beyond 5 months. This may be followed by large-scale cluster randomized trials to assess the impact of the novel larvicide on Aedes populations and disease transmission. We recommend trials at community level to assess this promising technology further.

FUNDING

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RESULTS

Breeding in the treated coolers was noticed on day 22, while the control showed larvae on the fifth day. Larval density was reduced in the treated coolers from 93.8% in the first month to 13% at month 5. No adult emergence was recorded during the five-month follow up in the pyriproxyfen treated coolers, while a 58.5% adult emergence was obtained in the control coolers.

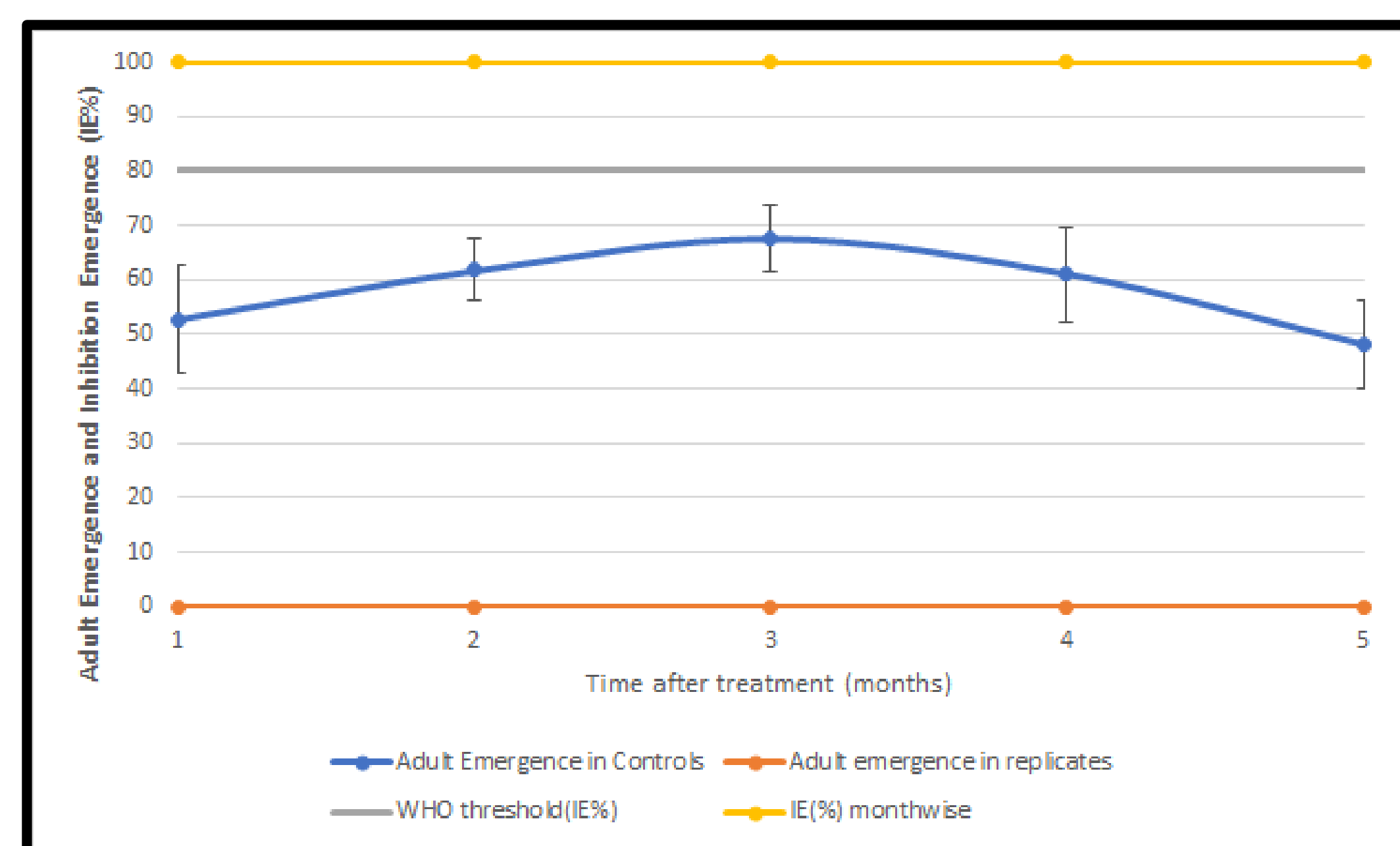


Fig 1. Adult emergence and Emergence Inhibition percentage of Aedes in desert coolers with and without treatment of Larva IGR™. Error bars show 95% confidence interval.

Month after treatment	Mean larvae density in treated coolers (SD)	Mean larvae density in control coolers (SD)
1	0,25 (0,44)	4.03 (1.58)
2	3,55 (0,60)	8.13 (1.64)
3	2,79 (0,35)	8.86 (1.29)
4	1,53 (0,34)	4.74 (1.29)
5	1,74 (0,31)	2.00 (0.5)

Table 1. Average monthly density of Aedes larvae in treated and control coolers during the period of observation in semi-field trial.



Fig 2. Spraying of the inner surface of desert cooler which holds water with the ready to use Larva IGR.