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Determination of optimum dosage, efficacy and persistence of chitin synthesis inhibitor, Novaluron against malaria vectors, *Anopheles culicifacies* and *An. subpictus* in the gem pits

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An. culicifacies is considered as the primary vector and *An. subpictus* is considered as the secondary vector of malaria in Sri Lanka. Shallow gem pits are known to be one of the major breeding places of these vectors. Pyriproxyfen (0.5% sand granule formulations) has been used to control larvae in the gem pits. At present very few larvicides are available to control mosquito larvae. The chitin synthesis inhibitor, novaluron could be used to control Anopheline vectors and has never been evaluated or tested for activity and efficacy against Anophelines. Therefore experiments were carried out to determine the optimum dosage of novaluron EC required for controlling *An. culicifacies and An. subpictus* under laboratory conditions and the efficacy and persistence of seven concentrations of novaluron EC in the gem pits.

This laboratory study was carried out using five concentrations within the activity range (0-100%) of Novaluron 10%EC and each concentration was replicated four times and 4 beakers were left untreated as control. Twenty 4^{Th} instar mosquito larvae were added to each beaker and mortality at larval, pupal and adult stages was counted every day until all individuals die or emerge as adults. LD_{50} (Lethal Dose) values for *An. culicifacies* and *An. subpictus* were 0.25 and 0.39 PPM and LD_{90} values were 5.4 and 10 PPM respectively. Efficacy and persistence of seven concentrations (0.005, 0.01, 0.1, 0.25, 1, 2.5 and 5 PPM) of 10% EC formulation of novaluron was evaluated against *An. culicifacies* using five gem pits for each treatment with five pits as controls. The mortality rate of each treatment was monitored using emergence bucket bioassays. A single application of 0.01 and 0.1 PPM of novaluron showed 100% mortality up to 116 days and 0.25, 2.5 and 5 PPM showed up to 124 days after the initial treatment. The lowest concentration (0.005 PPM) of this series showed 100% mortality only up to 16 days of post-treatment. Therefore application of novaluron 10% EC could be used as an effective and convenient larval control method to control larvae of malaria vectors in the gem pits.

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