The Role of Homalanthus nutans (G. Forst.) Guill., a Samoan Medicinal Plant, as an Insect Growth Regulator

The extract from the bark of Samoan medicinal plant ‘mamala’ (Homalanthus nutans, Family: Euphorbiaceae), is used to treat hepatitis in Samoa and other South Pacific islands. Its active component is prostratin, a non-tumor promoting phorbol ester and protein kinase C (PKC) activator, which has been shown to flush the HIV-AIDS latent viral reservoirs in humans. The development of insects is regulated by insect growth hormones, such as the juvenile hormone (JH), which acts by activation of PKC-dependent signaling. Given the role of prostratin in PKC activation and its abundance in mamala, our research explores the putative roles of the mamala bark extract in regulating the development of the mosquito Aedes polynesiensis, the main vector of the dengue virus in the South Pacific. The Ae.polynesiensis larvae were treated with different concentrations of mamala bark extract and compared with two commercial Juvenile hormone analogs (JHAs), Nyguard®EZ1 and Gentrol®. Both JHA’s and mamala bark extract, inhibited the successful adult emergence, induced mortality in larvae, and pupae in varying concentrations and time periods compared to untreated control. We determine that the mamala bark extract is a highly potent regulator of Ae.polynesiensis growth and assume that the developmental abnormalities are caused by the prostratin present in the mamala extract, needs to be confirmed.