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***Correspondence to:**
Muhammad Naeem Iqbal, PSM Editorial Office, Pakistan Science Mission (PSM), Narowal (Noor Kot 51770), Pakistan.
Email:
editor@psmpublishers.org
driqbalnaeem@hotmail.com;
chairman@psm.org.pk

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Larvicides of Plant Origin: An Effective Insect Pest Management Approach

Muhammad Naeem Iqbal[1,2], Asfa Ashraf[2,3]

[1]The School of Life Sciences, Fujian Agriculture and Forestry University, Fuzhou 350002, China.
[2]Pakistan Science Mission (PSM), Narowal (Noor Kot 51770), Pakistan.
[3]The School of Life Sciences, Fujian Normal University, Fuzhou 350117, China.

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EDITORIAL

Plants are the chemical factories of nature, producing many chemicals, some of which have medicinal and pesticidal properties. Botanical pesticides have been used traditionally by human communities in many parts of the world against pest species of insects. The failure to discover a significant new class of insecticides has led many researchers back to bio discovery studies in the search for new and economically viable alternatives (Jacobson, 1958).

Larvicides of plant origin are currently receiving considerable attention because of their relatively harmless biodegradable properties. Because of the high cost of developing new drugs and vaccines, development of drug resistance, and concerns over drug residues associated with the continuous use of chemicals, there is a renewed interest in the use of botanicals for the safe, effective and cheap control of pests of agriculture and public health importance (Yildirim *et al*., 2012). Scientists all over the world are now actively engaged in research into the use of plants and plant-derived products to fight against dengue vector. Plants and plant derived products are rich in natural phytochemicals, which make them effective against different microbes and pests (Iqbal *et al.,* 2015; Kalim *et al.,* 2016; Hussain *et al.,* 2016; Ali *et al.,* 2017; Iqbal and Ashraf, 2019; Shuaib *et al.,* 2019; Ishtiaq *et al.,* 2019). Some of these chemicals have also been used successfully for controlling dengue vector because of their larvicidal, ovicidal and skin repellent effects (Shaalan *et al*., 2005). Wood (2003) lists some important phytochemical products such as pyrethrum, derris, quassia, nicotine, hellebore, anabasine, azadirachtin, limonene, camphor, and terpenes that have been used as insecticides. The immature mosquito stages--eggs, larvae, and pupae are much easier to control than are dispersed adult mosquitoes. Mosquito larvae are an important food for aquatic organisms. Large numbers fall prey to fish, insects, and spiders. Naturally-occurring bacteria, protozoa, fungi, and nematodes also kill mosquito larvae. Both bacteria and predatory fish have been used as biocontrol agents to control mosquito larvae.

In this issue, Ishtiaq et al. report the larvicidal activity of various extracts of boiled and unboiled leaves of *Citrus grandis* against *Culex quinquefasciatus*. All the extracts were found to possess significant larvicidal activity against *Culex* mosquito at 0.05 level of significance ($p<0.05$) however, the highest larval mortality was found in 30% boiled extract of leaves as it took least time (5 days) to give 97% mortality. Sattar et al. (2012) also observed increasing larval mortality with increase in extract concentration and increase in exposure time in all treatments. The results indicated that the aqueous leaf extract of *Citrus grandis* is effective against *Culex quinquefasciatus* mosquito larvae and need to be explored for its possible use in the control of mosquito population.

Many plants have been found to contain chemicals which are helpful for the control of insects (Robert, 2001) and are useful for field applications in mosquito control program. Naturally occurring botanical compounds contain a broad range of chemical active ingredients that can intervene in all biological processes of the mosquito, thus interrupt its life cycle and dispersal and reduce harms to humans and animals. Many medicinal plants are being used for their pesticide and repellent potential, as crude material, essential oils or individual active ingredients.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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