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"Management of land use systems for enhanced food security: conflicts, controversies and resolutions"

The Physic Nut Plant *Jatropha curcas* (Euphorbiaceae) in Pest Management

Farouk Bourogâa[1], Klaus Becker[2], Stefan Vidal[1]

[1] *Georg-August-Universität Göttingen, Dept. of Crop Science, Germany*
[2] *University of Hohenheim, Dept. of Animal Production in the Tropics and Subtropics, Germany*

Abstract

The physic nut tree, *Jatropha curcas* (Euphorbiaceae) is an oil seed plant widely distributed in tropical and subtropical regions. Traditionally, this tree is grown as a natural hedge and used in ethno medicine. Several phytochemicals from this plant are known for their toxic properties against herbivorous insects. In fact, the toxicity of the seed oil is attributed to several phytochemicals including saponins, lectin (curcin), phytates, protease inhibitors, and curcalonic acid; but the main toxic action has been assigned to the Phorbol Esters, a diterpenoid fraction contained in the seed oil. In this study, we tested the insecticidal effects of two different extracts: the Phorbol Ester Enriched Fraction (PEEF) and the essential oil extracted from the seeds (JP-32). The PEEF was tested on the cotton bollworm *Helicoverpa armigera* (Lepidoptera) by mixing the artificial medium with different concentrations. This fraction was also tested on the cabbage root fly *Delia radicum* (Diptera) by soil drench of cabbage plants infested with the eggs of this pest. Also, different concentrations of the essential oil of the seeds (JP-32) were tested on the black bean aphid *Aphis fabae* (Hemiptera) under greenhouse conditions. The results evidenced the insecticidal effect of PEEF on *H. armigera* and show a significant effect at 10 % of PEEF on the survival rate of *D. radicum* compared to the control plants. The essential oil of the seeds shows a concentration-dependent toxicity on *A. fabae* after 5 days. These bioassays allow insight into the biocidal effects of phorbol esters and the opportunities provided by *Jatropha curcas* as an additional measure in pest management.

Keywords: *Aphis fabae*, *Delia radiucm*, *Helicoverpa armigera*, *Jatropha curcas*, mortality, phorbol esters

Contact Address: Farouk Bourogâa, Georg-August-Universität Göttingen, Dept. of Crop Science, Göttingen, Germany, e-mail: fbourog@gwdg.de