

(44)

**Impact of Botanicals Exhibiting Insecticidal Properties on Parthenium Beetle,
Zygogramma bicolorata Pallister**

Arsh, A.R.A., Pakeerathan, K.*

*Department of Agricultural Biology, Faculty of Agriculture, University of Jaffna, Jaffna,
Sri Lanka.*

**pakeerathank@univ.jfn.ac.lk*

Abstract

The invasive, fast spreading, most problematic weed *Parthenium hysterophours* can be managed eco-friendly using parthenium beetle *Zygogramma bicolorata* Pallister. The infestation potential of *Z. bicolorata* on parthenium weeds in farmer fields was lower compared to the parthenium weeds growing around uncultivable land. This observation, supported by research, confirmed that agrochemicals may be toxic to the infestation stages of the parthenium beetle. However, no detailed studies have been conducted on the impact of plants with insecticidal properties on the parthenium beetle. Therefore, the current investigation was designed to investigate the effects of various botanicals with insecticidal properties on the survival of *Z. bicolorata*. Extracts of *Azadirachta indica*, *Ricinus communis*, *Cascabela thevetia*, *Senna alata*, *Nicotiana tabacum*, *Datura stramonium*, *Prosopis juliflora*, *Pavetta indica*, *Adhatoda vasica* and *Tagetes patula* were derived and tested on Parthenium beetle in laboratory and field. Isolated phytochemicals were chemically characterized. A Completely Randomized Design (CRD) was chosen. Data collected were subjected to ANOVA and DMRT mean separation using SAS 9.4 version at $P < 0.05$. Results show that *N. tabacum* is highly toxic to *Z. bicolorata*, significantly reducing its survival rate ($5\% \pm 1.25\%$), and extracts of *A. indica* and *D. stramonium* were less harmful in both laboratory and field conditions, with the mortality percentage of $40 \pm 12.28\%$ and $30 \pm 13.42\%$, respectively. These findings highlight the importance of selecting appropriate plant extracts to ensure the survival and effectiveness of *Z. bicolorata*. The toxic effect observed could be attributed to the high concentration of phytochemicals, such as alkaloids and glycosides present in *N. tabacum*. However, FTIR analysis is needed to confirm the active ingredient for the observed effects, and to plan the way for optimizing the biological control efficacy of *Z. bicolorata*.

Keywords: *Datura stramonium*, *Nicotiana tabacum*, *Parthenium*, *Zygogramma bicolorata*