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Pathogenicity of Entomopathogenic Fungi, Beauveria bassiana Against Red Palm Weevil, (Rhynchophorus ferrugineus)

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Abstract : Entomopathogenic fungi are considered effective bio-control agents for the management of a range of insect pests including red palm weevil. The research studies were conducted under laboratory and field conditions against 5th and 6th instars larvae and adults of [Rhynchophorus ferrugineus (Olivier)] at the faculty of Agriculture, Gomal University Dera Ismail Khan (KPK) Pakistan. The 5th instar larvae were used under field conditions whereas, the 6th instar larvae and newly emerged adults were used under lab conditions. Conidial suspensions were used at five different concentrations of 1×10^4, 1×10^5, 1×10^6, 1×10^7 and 1×10^8, conidia per ml. The data were recorded on the mortality, total larval duration, weight of larvae, pre-pupal and pupal durations, percent pupal formation, pupal weight, percent adult emergence, and adult longevity (♂ and ♀) of red palm weevil. The B. bassiana had varying degrees of pathogenicity against different developmental stages of red palm weevil. The maximum larval duration (113.40 days) was noted when 5th instar larvae were treated with the maximum concentration (1×10^8) of B. bassiana, whereas; the minimum total larval duration of 87.20 days was recorded on the lowest concentration (1×10^4) of B. bassiana. The maximum pre-pual and pupal durations were noted at the maximum concentration. The maximum life span of adult male and females were noted at the lowest concentration, whereas; the minimum values were noted at the maximum concentration. The earliest mortality of red palm weevil was observed 1-day after treatment at higher concentrations of 1×10^7 and 1×10^8, whereas; it was recorded 3 and 4 days after treatment at lower concentrations of 1×10^5 and 1×10^4. At 10 days after treatment, the entomopathogenic fungus caused > 80% cumulative mortality of 5th and 6th instar larvae and adult weevils at the maximum concentrations which were more than double than those recorded at the lowest concentration. Overall, the 5th instar larvae of red palm weevils were most susceptible to the fungus compared to the 6th instar larvae and adult weevils. Based on current findings, it is suggested that entomopathogenic fungi could be used for the safer management of red palm weevil.

Keywords : entomopathogenic nematodes, mortality, red palm weevil, sub-lethal effects
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