



TOXIC AND RESIDUAL ACTIVITIES OF SELECTED INSECTICIDES AND NEEM OIL AGAINST COTTON MEALYBUG, *PHENACOCCCUS SOLENOPSIS* TINSLEY (STERNORRHYNCHA: PSEUDOCOCCIDAE) UNDER LABORATORY AND FIELD CONDITIONS

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ABSTRACT

Laboratory and field studies were carried out during Kharif 2009-10 and 2010-11 to evaluate the efficacy of Commando (97% DF), Confidor (20% SL), Lannate (40% SP), Actara (25 WG) at field recommended doses and neem oil at 1.5 and 2.0% concentrations against cotton mealybug, *Phenacoccus solenopsis* on cotton. Under laboratory environment Commando at recommended dose resulted into 95.2% mortality of the 2nd instar nymphs of *P. solenopsis* 72 hours after exposure period. Commando, under laboratory and field conditions, was found not only more toxic but also persisted longer in its efficacy than the rest of the trialed insecticides. Under field conditions, Commando caused 80.6% mortality of the mealybug that was significantly higher than that caused by Confidor (73.29%), Lannate (70.93%), Actara (74.38%) and neem oil (@ 1.5% (40.48%) and 2.0% (52.97%) concentration. Neem oil at both concentrations was less toxic than the rest of the synthetic insecticides; however, it significantly reduced the population of mealybug and remained effective up to more than 72 hours at both concentrations.

Keywords: Cotton mealybug, insecticides, neem oil, cotton, efficacy

INTRODUCTION

Cotton, (*Gossypium hirsutum* L.) plays a pivotal position in the economic development of many countries including Pakistan in terms of source of foreign exchange and employment. Cotton crop is attacked by a variety of insect pests from seedling stage to harvest. About 1326 species of insect pests and mites have been reported to attack cotton crop at various stages of crop growth around the world (Hargreaves, 1948; Manjunath, 2004). However, this crop is attacked by 145 species of insect and mite pests in Pakistan (Husque, 1994). Yield losses due to sucking insect pests are estimated around 4.6%, while chewing pests cause 19.21% loss in the yield of seed cotton (Satpute *et al.*, 1998). Apart from these, recent outbreak of mealybug in Pakistan has caused 14 percent loss to cotton crop (Anonymous, 2005). Cotton mealybug, *Phenacoccus solenopsis* Tinsley (Sternorrhyncha: Pseudococcidae) is a highly polyphagous pest of more than 52 plant families (Arif *et al.*, 2009). It was first recorded in 2005 and since then it has become a serious threat to successful cotton cultivation in all the cotton growing countries of Asia (Ben-Dov, 2004; Wang *et al.*,

2010). It not only causes direct damage to the crop by sucking cell sap from stems, branches, tender shoots, leaves and fruiting parts but also encourages the development of black sooty mould leading to significant reduction in yield. The infected plants have fewer, deformed and smaller bolls. The plants become stunted and in severe cases may die resulting in drastic yield losses. In Pakistan, a survey of cotton growing areas of Punjab showed 28.2% area having mealybug infestation above the threshold level that required control (Anonymous, 2008). The estimated yield losses in cotton due to mealybug were around 12% in 2006 and almost 40% in 2007 in the Punjab province (Kakakhel, 2007).

In recent years, interest is developing in an integrated pest management (IPM) strategy for the control of pest insects. In Pakistan, farmers mainly rely on synthetic insecticides for the management of mealybug but the control of mealybug using foliar insecticides is difficult due to mealy secretion which covers the bodies of adult females. However, the crawler stage is the most vulnerable to these chemicals. Various insecticides, like pro-fenophos, triazophos, carbaryl, thiodicarb, buprofezin and imidacloprid etc. have been recommended by various scientists for the management of

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shouldered tool with a profiled probe is rotated and slowly plunged into the joint line between two pieces of sheet

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