

ABSTRACT

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The study was conducted from 2008 to 2014 to explore the status of pesticide use in Nepal and develop environment friendly technologies to manage the potato tuber moth (PTM) as an alternative of chemical pesticides. The specific objectives were to know the status of pesticide use against agricultural insect pest management; distribution and abundance of PTM in Nepal; develop indigenous plant materials based technology suitable to manage PTM; adaptation testing and developing rearing technologies of exotic parasitoids of PTM; and to evaluate the efficacy of newly developed management technologies on PTM.

For this, five research activities were conducted; pesticide survey was carried out in 20 districts across the country covering all ecological zones to assess the status of on-farm pesticide use in agriculture. Five hundred four respondents were selected through Stratified Random Sampling and interviewed focusing on pesticide use and its related issues. The result indicated that more toxic, environmentally persistent and inexpensive chemicals were being used in Nepal, though there are Pesticide Acts and Laws; however, law enforcement was weak. Monitoring of PTM through pheromone trap was carried out in 15 districts across the country for a year. Wider distribution of PTM was observed in plain (121-326 masl) and mid hill below 2000 masl except Jumla (25250 masl), Solukhumbu (2840 masl) and high hill site of Sindhupalchowk district (1546- 2460 masl). Seasonal fluctuation of PTM was found higher in mid-hills of Nepal than in plain. The highest population of PTM was observed on May and nil in October to December in plain, whereas the highest population was recorded in July and minimum in December in mid-hills. The seasonal abundance of PTM was observed from March to July in plain and March to October in mid-hills.

Indigenous botanicals (*Acorus calamus* (Linnaeus), *Aegle marmelos* (Linnaeus), *Calotropis gigantea* (Linnaeus), *Lantana camara* (Linnaeus), *Melia azedarach* (Linnaeus), *Vitex nigundo* (Linnaeus), *Jatropha* sp., *Adathoda vasica* (Linnaeus), *Curcuma domestica* (Linnaeus), *Chenopodium* spp., *Eucalyptus* spp., *Carum copticum* (Linnaeus), *Solanum* sp., *Solanum nigrum* (Linnaeus), *Mentha* sp., *Polygonum hydropiper* (Linnaeus) including *Acorus calamus* (Linnaeus)) were tested and the results revealed that the plant efficiently killed PTM larvae when treated @ 5, 2, 1 and 0.67 gm dust/kg potato tuber among all the tested plants. Adaptation experiments revealed that mass rearing of PTM, exotic parasitoids, *Copidosoma koehleri* (Blanchard) and *Orgilus lepidus* (Muesebeck) imported from International Potato Center (CIP), Lima, Peru was successful in Nepal. Their rearing technologies have been developed utilizing locally available materials to make the rearing more practical and cost effective. These technologies could be utilized in field level under Nepalese condition. *O. lepidus* preferred to parasitize 1 to 4 days old PTM larvae with the successful mass rearing of it under Khumaltar condition. Combined effect of bacteria and virus based microbials and plant materials tested in the experiments showed that field treatment of potatoes by *PhopGV*, neem, Bt and malathion could not reduce PTM infestation in the store

significantly, but *A. calamus* could manage PTM infestation when applied @ 2gm dust/ kg of potato tuber up to 3 to 4 months.