Research Paper :

Bioefficacy of botanicals material against *Callosobruchu chinensis* (Linnaeus) in stored chichpea

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SUMMARY

Different materials *viz.*, vegetable oils, powders of different plant materials and inert dust (ash) were tested for their efficacy against the pest, *Callosobruchus chinensis* (Linnaeus) during August to December, 2007. Treatment ash in chickpea seeds was found more effective up to 4 months and with neem oil up to 2 months on the basis of oviposition. Chickpea seeds treated with ash and neem oil were also found more effective on the basis of adult mortality and adult emergence up to 4 months and seed damage.

Key words : *Callosobruchus chinensis*, Chickpea, botanicals

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Pulses are important source of dietary protein, and have unique property of maintaining and restoring soil fertility through biological nitrogen fixation as well as conserving and improving physical properties of soil by virtue of their leaf fall. Pulse crops leave behind reasonable quantity of nitrogen in the soil and add up to 30 kg N/ha.

Chickpea is the most important pulse crop of India, and occupies 7.1 million hectare with a production of 5.75 million tonnes, accounting for 30.9 per cent and 39.9 per cent of total pulse area and production, respectively (Anonymous, 2006). In Gujarat, chickpea is cultivated in about 1,22,700 hectare area within annual production of 98,500 m tonnes with yield of 803 kg/ha (Anonymous, 2005).

Pulse beetles, *Callosobruchus* sp. is major pest during storage of chickpea. It causes heavy losses to the tune of 10 to 60 per cent (Gupta and Kashyap, 1971). Among five known species of *Callosobruchus* from India, three *viz.*, *Callosobruchus chinensis* (Linnaeus), *Callosobruchus maculatus* (Fabricius) and *Callosobruchus analis* (Fabricius) are the important pests of stored pulses (Raina, 1970).

Infestation starts right from the field and continues to the store, attains its peak in January and shows no incidence from February to July under field conditions. In stored conditions maximum damage is caused in months of July to September (Borikar and Pawar, 1994 and Butani *et al.*, 2001). Pulse beetle causes not only quantitative but also qualitative losses like nutritive loss, germination loss and makes the chickpea unfit for marketing as well as for human consumption (Kenghe and Karawade, 1996).

Many synthetic insecticides have been found effective against pulse beetle (Patil *et al.*, 1994 and Jolli *et al.*, 2005) but these are hazardous due to their residues in food. These adverse effects of insecticides need diversified efforts for evolving more convenient, safer and alternative methods to minimize the losses on chickpea. The botanical materials offer the potential for developing safe pesticides that can be used in integrated pest management strategies. The use of indigenous plant materials has acquired an important position in the modern approaches of pest control as they are comparatively safer to mammals due to their rapid biodegradable nature.

MATERIALS AND METHODS

A laboratory experiment was carried out to evaluate bioefficacy of different materials *viz.*, vegetable oils, powders of different plant materials and inert dust (ash) against the pest, during August to December, 2007. Plant materials were collected and dried under shade and powdered in the electric grinder and sieve through domestic sieve. The wooden ash was obtained from local hearth. Each treatment was