

Effect of plant products and insecticides on bruchid (*Callosobruchus chinensis*) infestation, seed viability and vigour of soybean during storage

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ABSTRACT

Storage study on soybean seeds cv. JS-335 was initiated by treating the seeds with plant products and insecticides viz., Asafoetida (1 g/kg), sweet flag rhizome powder (5 g/kg), lakke leaf powder (5 g/kg), neem seed powder (5 g/kg), malathion (5%) dust (1 g/kg) and methyl parathion 50 EC (1 ml/kg). The treated seeds were kept in the plastic jars and five pairs of freshly emerged adult bruchids were released and jars were covered tightly with muslin cloth. There was complete bruchid mortality with zero per cent bruchid population build up and no seed weight loss in seeds treated with sweet flag rhizome powder, neem seed powder, malathion dust and methyl parathion. The treatments were effective in maintaining satisfactory germination (70%) as per minimum seed certification standards up to six months besides higher seedling vigour.

Key words : Soybean, seed, *Callosobruchus chinensis*, Plant products, Seed viability, Vigour.

INTRODUCTION

Soybean is referred to as miracle crop and is valued greatly in daily human diet because of its high protein (40%), oil (20%), and carbohydrates (15%) besides, appreciable quantity of calcium, iron vitamins and minerals. Soybean is grouped under poor storer owing to delicacy of its seed coat, susceptibility to mechanical damage and lipid peroxidation (Delouche *et al.*, 1973). Further, storage seeds are also infested by the bruchids (*C. chinensis*) resulting in heavy quantitative and qualitative losses (Mookherjee *et al.*, 1970). Control of bruchids in storage by use of synthetic insecticides cause a health hazards. Therefore, it has become imperative to use natural plant products (*botanicals*) such as sweet flag rhizome, neem seed, lakke leaf were reported to control storage pests in several crops (Pandey *et al.*, 1976; Ghosh *et al.*, 1981 and Das and Karim, 1986). Further, plant products are cheap, easily accessible, non toxic and eco-friendly and may be used as alternative to control storage insects.

Information available on the efficiency of plant products on control of bruchids in relation to seed viability and seedling vigour during storage is meager. Hence, the present study was under taken in the department of Seed Science and Technology, University of Agricultural Sciences, Dharwad during 2009-10.

MATERIALS AND METHODS

Freshly harvested, un-infested soybean seeds (JS-335) were obtained from soybean scheme, University of Agricultural Sciences, Dharwad and one kg of seeds were treated with sweet flag rhizome powder (*Acorus*

calamus) (5g), neem seed powder (*Azadirachta indica*) (5g), lakke leaf powder (*Vitex nigunda*) (5g), Asafoetida (Ingu) (1g), Malathion (5%) dust (1g) and methyl parathion 50 EC (1 ml) and were stored in plastic jar. Five pairs of freshly emerged adult bruchids (*Callosobruchus chinensis* L.) were released in to the containers. The treatments were replicated thrice. The mouth of the jars were covered with muslin cloth and tightly fastened with rubber band. The samples were drawn monthly for recording observations on per cent germination (Anonymous, 1999) and seedling vigour index (Abdul Baki and Anderson, 1973). Per cent mortality of adult bruchid was recorded at 24, 48 and 72 hours after release of the insects. Adult bruchid population was also recorded at 90 and 180 days after release of the insects. Per cent weight loss of the seed was also computed by taking initial and final weight. The data was statistically analyzed and presented in Table 1, 2 and 3.

RESULTS AND DISCUSSION

Significant differences in bruchid mortality were noticed in seeds treated with different plant products and chemicals (Table 1). Cumulative adult mortality was cent per cent in seeds treated with sweet flag rhizome powder, methyl parathion 50 EC, malathion dust and neem seed powder at 72 hours after release of the bruchids. In case of lakke leaf powder treatment, there was only 16.67 per cent mortality, *i.e.* while, *Asafoetida* treated seeds could not cause any adult bruchid mortality.

Adult insect population build up at 90 days after release was significantly higher in *Asafoetida* (191.0) treated seeds followed by lakke leaf powder (188.0),

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