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Effect of pulse beetle damage on seed quality of moth bean

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ABSTRACT
Seeds of moth bean damaged by pulse beetle during storage were graded into five categories on the basis of holes made by pulse beetle as one holed, two holed, hole near micropyle, multi holed andnormal seeds and these were evaluated for 100 seed weight, viability, vigour and extentof fungal Infection. The 100 seed weight, viability and vigour were significantly lower in damaged seeds than the normal seeds. The fungi, *Aspergillus* sp., *Curvularia* sp., *Fusarium*sp., *Penicillium* sp. And *Rhizopus* sp. Were observed associated with different categories of seeds. The maximum incidence percentage of fungal flora was found on multi holed seeds as compared to other damaged and normal seeds.

KEY WORDS: Moth bean, pulse beetle, damage, storage)

INTRODUCTION

Improper storage and high moisture content both favour development of Insects and storage fungi which results in deterioration of seed quality. During storage, pulse seeds are badly dmaamged by pulse beetles (Yadav, 1985). Its infestation, either originates in the field or in storage and causes serious loss of the seeds. Pulse beetles being internal feeders, derive their food from cotyledon and lead to gradual weight loss of the seed. Yadav (1985) reported that moth bean was found to be suitable host to pulse beetles. An investigation was initiated to know the effect of damage by pulse beetles on seed weight, viability, vigour and fungal flora of moth bean.

MATERIAL AND METHODS

One year old seed sample of moth bean collected from State Seed Testing Laboratory, Nagpur in Feb. 2016. Pulse beetle infested seeds were collected at random and classified under the following categories(i) one holed, (ii) tow holed, (iii) multi holed (iv) hole near micropyle, and (v) normal seeds. These seeds from each category were separated out for studies on 100 seed weight, viability and vigour purposes. The germination tested was conducted using rolled paper towel method as prescribe by International rules for seed testing (Anonymous, 1985). The first germination count was recorded on 4th day and the final count on 8th day.

At first count, ten seedling s were taken randomly for shoot and root length measurement (cm). thevigour index was workout following the method of Abdul-Baki and Anderson (1973). The fungal flora of the seeds were detected by blotter method as recommended by ISTA (Anonymous, 1976). The different types of fungal growth on the seed were expressed in percentage.

RESULTS AND DISCUSSION

The present study revealed that the 100 seed weight of mothbean varies significantly andit was highest in normal seeds (3.92 g) which was closely followed by one holed (3.09 g), hole near micropyle (2.88 g), two holed (2.19 g) and multi holed (1.27 g) damaged seeds. Since the pulse beetls have eaten off major portion of the cotyledons which led to reduction in weight of the seed and inturn affected the seedling establishment because of lack of stored food. This is in conformity with the findings of Yadav (1985) and Narayanaswamy (1985). The germination followed the same trend as of 100 seed weight. It was highest in normal seeds (80%) followed by that in one holed (37%), hole near micropyle (30%), two holed (18%) and multi holed grains (8%). This might be due to infestation of germs of seeds by pulse beetles. Seed germination decreased with an increase of seed infestation. Similar results were reported by earlier workers (Khare, 1972 and Shivankar et al. 1990). Further, the normal seeds have highest vigour index (1682) followed by one holed (678), hole near micropyle(517), two holed (419) and multiholed ones (186). Similar observations were also made earlier by Narayanaswamy (1985) in green gram, Gadewar et al. (2016) in arhar.

The fungi *Aspergillus* sp., *Curvularia* sp., *Fusarium* sp., *Penicillium* sp. And *Rhizopus* sp. Were found to be associated with different categories of seeds .the maximum incidence percentage of fungal flora was found on multi holed seeds followed by two holed, one hole near micropyle, one holed and normal seed. Aspergill was predominant over all other fungi and it ranged from 20 to 100% in case of normal to multi holed damaged seeds. Dominance of Aspergilli on

stored grain has been earlier reported by Maheshwari et al., (1985) the isolated fungi were most inhibitory to germination and seedling vigour. Similar results were obtained by earlier workers (Teggi and Heremath, 1990, Gadewar et al. (2016) in arhar). Storage fungi directly damaged seed germ and indirectly enhanced the multiplication of storage insects (Kaurav and prakash, 1980). Yadav and Pant (1975) suggested the role of metabolic wastes of insect in bringing down germination. This clearly showed that the normal seeds have higher seed weight, viability, vigour and lower incidence percentage of fungal flora as compared to damaged seeds due to pulse beetle.

Table No. 1: The Effect of pulse beetle infestation on seed weight, germination vigour and incidence percentage of fungal flora in moth bean seeds.

Category of seed	100 seed weight	Viability (%)	Vigour index	Percentage fungi encountered on mothbean seeds				
	(g)		(VI)	Aspergillus sp.	Cruvularia sp.	Fusarium sp.	Penicillium sp.	Rhizopus sp.
Normal	3.92	80	1682	20			10	12
One holed	3.09	37	678	42			17	22
Two holed	2.36	18	419	66	7	14	20	24
Hole near micropyle	2.88	30	517	62	6	10	14	17
Multi holed	1.27	8	186	100			25	31
SE (m)	0.13	2.67						
CD at 5% 1.68	0.39	8.01						

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