

EFFECT OF BRUCHIDS INFESTATION ON SEED QUALITY OF ARHAR DURING STORAGE

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Arhar (*Cajanus cajan* L.) is an important source of protein. Seed infested by bruchids during storage is a major problem. The effect of bruchids damage on 100 seed weight, germinability, vigour index and incidence of fungi were studied. The 100 seed weight, germinability and vigour index were significantly more in the normal seed which is closely followed by one holed, hole near micropyle, two holed and multiholed damaged seeds. The incidence of fungi such as species of *Alternaria*, *Aspergillus*, *Curvularia*, *Fusarium*, *Penicillium* and *Rhizopus* were found associated with all categories of seeds.

Keywords: Bruchids infestations; *Cajanus cajan*; Seed quality.

Arhar (*Cajanus cajan* L.) is an important pulse crop. Seeds are badly damaged by bruchids during storage. Its infestation, either originate in field or in storage, causes serious loss to the seeds. Bruchids being internal feeder, derive their food from cotyledon and lead to gradual weight loss of the seed. The feeding behaviour of *Collosobruchus maculatus* (Fab.) and *Collosobruchus chinensis* (L.) on *Vigna radiata* (L.) was reported earlier by Yadav¹. Since information of the effect of bruchids damage on 100 seed weight, germinability, vigour index and incidence percentage of fungi in arhar is lacking an experiment was conducted on this aspect.

One year old bruchids infested seed samples of arhar were collected from State Seed Testing Laboratory, Nagpur. Bruchids infested seeds of arhar were collected randomly from the crop seeds, under the following categories viz. i) one holed ii) two holed iii) multiholed iv) hole near micropyle, were separated out for 100-seed weight, germinability and vigour index purpose/s and remaining 100 seeds for filter paper method. Germination test was conducted using rolled paper towel method as prescribed in International rules for seed testing². At the first germination count ten seedlings were taken randomly for shoot and root length the first germination count Ten seedlings were taken randomly for shoot and root length measurement (cm). The vigour index was worked out following the method of Abdul-Baki and Anderson³, four replicates of 25 seeds in each category were placed in the petri plates. The experiment was conducted at 20±1°C for 8 days. The different types of fungal growth on the arhar seeds were expressed in percentage.

It was observed (Table 1) that the 100 seed weight

of arhar varies significantly and highest in normal seeds (9.68g) which was closely followed by one holed (7.97g), hole near micropyle (7.71g), two holed (6.82g) and multiholed (5.09g) damaged seeds. Since the bruchids have eaten off major portion of the cotyledons which leads to reduction in weight of the seed and in turn affects the seedling establishment because of lack of stored food and is in conformity with earlier findings^{1,4-6}.

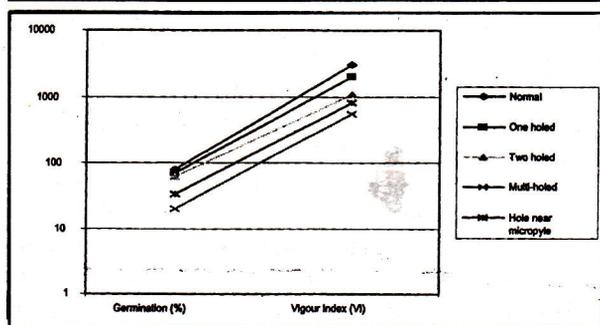
The germination percentage of Arhar seeds followed the same trend of 100-seed weight. It was highest in normal seeds (80.56%) followed by one holed (70.18%), two holed (60.97%), holed near micropyle (34.06%) and multiholed (20.36%). Once germ of seed is infested by bruchids, seed fails to germinate and thus, seed viability decreases with increase of seed infestation (Fig.1). Similar results were obtained by earlier workers^{4,7}.

Further, the normal seeds have highest vigour index (3102) followed by one holed (2005), two holed (1096), hole near micropyle (821) and multiholed (560) damaged seeds (Fig. 2). Charjan and Tarar⁴, Charjan and Tarar⁷ and Narayanswamy⁸ also reported highest vigour index in normal seeds as compared to damaged seeds.

The following fungi were found to be associated with different categories of seeds. The percent discoloured seeds yielding a particular fungus viz *Alternaria* sp. (8 to 20%), *Aspergillus* sp. (27 to 59%), *Curvularia* sp. (5 to 19%), *Fusarium* sp. (4 to 38%), *Penicillium* sp. (9 to 90%) and *Rhizopus* sp. (6 to 46%). *Aspergillus* sp. and *Penicillium* sp. were predominant fungi. In case of normal seeds *Aspergillus* sp. and *Penicillium* sp. was 17 and 9 percent, but it was much more in other categories and other fungi too. Mucunguzi⁹ reported *Aspergillus* sp. as an

Table 1. Effect of infestation of bruchids on 100-seed weight, germinability, vigour index and incidence of fungi on Arhar seeds.

Category of seeds	100 seed weight (g)	Germination (%)	Vigour Index (VI)	Percentage Fungi encountered on seeds					
				<i>Alternaria</i> sp.	<i>Aspergillus</i> sp.	<i>Curvularia</i> sp.	<i>Fusarium</i> sp.	<i>Penicillium</i> sp.	<i>Rhizopus</i> sp.
Normal	9.68	80.56	3101	8	17	5	4	9	6
One holed	7.97	70.18	2005	9	34	6	10	23	12
Two holed	6.82	60.97	1096	11	42	6	19	41	29
Multiholed	5.09	20.36	560	20	59	19	38	90	46
Hole near micropyle	7.71	34.06	821	9	39	7	18	35	20
SE±	0.19	2.51							
C D at 5%	0.57	7.53							

**Fig.1.** Graph showing Germination % and vigour of various holed seeds by pulse beetle.

predominantly fungi on pulse beetle damaged seeds of *Acacia*. Storage fungi directly damage the seed germ and indirectly enhance the multiplication of storage insects and pests and is in conformity with the earlier findings^{4,6,7,10}.

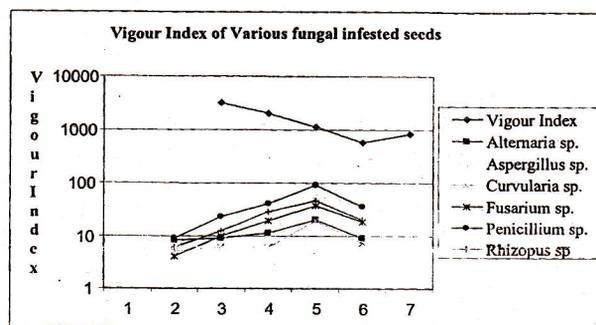
Thus, it can be concluded that the normal arhar seeds will give higher 100 seed weight, germinability, givour index as compared to various degrees of seeds infested by bruchids. The incidence percentage of fungi was observed to be lower in normal seeds as compared to infested seeds.

Acknowledgement

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**Fig.2.** Graph showing Vigour Index of various pulse beetle infested seeds and associated fungal infections.

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