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Original Research Article

Influence of Seed Encrustation on Germination, Establishment and Seed Yield in Rapeseed /Mustard

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A B S T R A C T

An experiment was conducted on mustard cv. Pusa Vijay comprising three treatments viz., seed encrusted with- 1:1.2 buildup with Thiram, 1:1.2 buildup with Thiram and Mycorrhiza and 1:1.2 build up with Thiram and Genius coat along with control (without seed encrustation). The seed encrustation improved the germination, seedling length, vigour index, uniform field emergence, plant height, total number of siliquae / plant, siliqua length, number of seed / siliqua, 1000 seed weight and finally seed yield (q/ha) in comparison to the control. The maximum seed yield (22.45 q/ha) was observed by the treatment consisted of seed encrustation with 1:1.2 buildup with Thiram and Genius coat followed by seed encrustation with 1:1.2 buildup with Thiram and Mycorrhiza (21.37 q/ha). Thus, seed encrustation technology needs to be exploited in order to facilitate the precision sowing, uniform and vigorous emergence and development, and increasing seed yield in rapeseed/mustard in particular and in small seeded crops in general.

Keywords

Seed encrustation, thiram, mycorrhiza, genius coat, quality seed, rapeseed-mustard

Introduction

Rapeseed – mustard (*Brassica spp*.) being the third largest vegetable oil trading in the world next to soybean (*Glycine max*) and palm (*Elaeis guineensis*) oils, is grown globally with largest area of about 8 million ha in Canada followed by China (7 million ha) and India (6 million ha). Majority of the countries grow rapeseed whereas India has largest area under mustard. The productivity, being about 11.61 q/ha of rapeseed-mustard in India, is the quite low against the World average of 21.44 q/ha and highest productivity of 36.40 q/ha of European Union (1). It is grown across the country pre-dominantly in North, North-Western and North-Eastern region of the country. Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh and West Bengal contribute more than 80% of area and also more than 85% of production of mustard in India. The above yield gap could be minimized by integrating quality seed of improved varieties accompanied by advanced technologies of mustard.

Rapeseed - mustard is comparatively a small seeded oilseed crop which led a problem for uniform seeding. Encrustation enabled direct seeding of small seeded crops (2). Keeping these in view, the present investigation was carried out with the seed encrustation of mustard cv. Pusa Vijay in order to study its impacts on possibility of improvement in small seeded crop like mustard.

Materials and Methods

The experiment was conducted with mustard cv. Pusa Vijay comprising three treatments viz., seed encrusted with 1:1.2 buildup with Thiram, seed encrusted with 1:1.2 buildup with Thiram and Mycorrhiza and seed encrusted with 1:1.2 build up with Thiram and Genius coat TM supplied by Division of Seed Science and Technology, Indian Agriculture Research Institute, New Delhi. Normal seed without seed encrustation was served as control. The experiment was laid out in randomized block design with three replications during *Rabi* 2016-17. The plant population was maintained at a spacing of 30 x 10 cm apart in plot size of 4 x 5 m. Fertilizers N: P: K was applied at the rate of 80:40:40 kg/ha. Half dose of nitrogen and full doses of phosphorus and potassium were supplemented in soil prior to sowing. Rest half nitrogen was equally applied at vegetative and prior to flowering stages. Other package of practices was followed time to time in order to raise an ideal crop. Ten random plants were selected and recorded the observations on plant height, total number of siliquae / plant, siliqua length (cm), number of seed / siliqua,. The seed yield was recorded on plot basis which converted in q/ha. 1000 seeds were randomly counted treatment wise, weighed and noted. Apart from field experiment, treated seed along with control were subjected in BOD incubator for recording the germination (%), seedling length and thereafter computed the vigour index as per ISTA rules (3). Data were statistically analyzed.

Results and Discussion

Effect of different seed encrustation on germination, seedling length, vigour index and field emergence in mustard cv. Pusa Vijay is presented in table 1. It is visualized that the encrusted seed depicted significantly higher germination percentage in comparison to the control under laboratory condition. It is worthy to note that the mustard seed requires a minimum of 85% germination as per Indian Minimum Seed Certification Standards under its seed production system. The seedling length was also found to be higher in seed encrusted treatments as compared to control. The seed encrustation further increased the vigour index computed on basis of germination and seedling length. These observations being recorded under laboratory were tested by observing field emergence under field condition. The field emergence was significantly higher in the plots of seed encrusted once. This confirmed the similarity between the laboratory and field response of mustard seed to its encrustation. Almost similar types of observations have been reported in vegetable seeds (4).

Table.1 Effect of seed encrustation on germination, seedling length, vigour index and field emergence in mustard cv. Pusa Vijay

Treatment (seed encrusted 1:1.2 buildup with)	Germination (%)	Seedling length (cm)	Vigour index	Field emergence (%)	
				15 DAS	30 DAS
Thiram	88	16.07	1413	82	82
Thiram and Mycorrhiza	89	16.11	1433	83	88
Thiram and Genius coat	90	16.49	1448	85	88
Control	87	14.15	1231	70	76
CD (5%)	2.71	1.07	119	7.21	6.18

Table.2 Effect of seed encrustation on seed yield and its contributing traits in mustard cv. Pusa Vijay

Treatment (seed encrusted 1:1.2 buildup with)	Plant height (cm)	No. of siliquae/ plant	Siliqua Length (cm)	No. of Seed / siliqua	1000 seed weight (g)	Seed yield (q/ha)
Thiram	171	402	5.36	16	4.9	20.74
Thiram and Mycorrhiza	176	411	5.48	18	4.9	21.37
Thiram and Genius coat	184	432	5.85	22	5.1	22.45
Control	160	351	4.83	14	4.2	18.85
CD (5%)	14.23	55.34	0.62	4.03	051	2.07

It could be seen from table 2 that seed encrustation increased the plant height and seed yield contributing traits namely, number of siliquae /plant, siliqua length, number of seeds /siliqua and seed weight in comparison to control. As such the seed yield was also increased significantly as compared to its control. Mycorrhizae establish symbiotic relationships with plants and play a significant role in plant growth, disease protection and overall soil quality and which resulted in enhancement in germination, growth and development and ultimately the seed yield.

The Genius oat used in seed encrustation also activated the physiological and disease protection process and finally increased the seed yield.

The seed encrusted with 1:1.2 build up with Thiram and Genius coat resulted in higher seed germination, field emergence, seed yield and its contributing traits and comparably followed by the seed encrusted with 1:1.2 buildup with Thiram and Mycorrhiza. It is therefore concluded that seed encrustation technology could be exploited for precision sowing, enhancing growth and development, disease protection, soil fertility restoration and finally seed yield in rapeseed-mustard in particular and in small seeded crops in general.

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