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Seed Vigour Assessment in Relation to Field Emergence of Okra (*Abelmoschus esulentus* (L.) Moench)

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ABSTRACT

An experiment was conducted for evaluation of seed vigour in five genotypes of okra and assessment in relation to field emergence in year 2011-2012, in the Department of Seed Science & Technology, C.S. Azad University of Agriculture & Technology Kanpur. On the basis of performance of five genotypes namely KS-442, 7019, AB-1, 7219 and AB-2 in various vigour tests, genotype 7019 exhibited highest vigour and followed by AB-1, KS-442, AB-2 and 7219. All vigour tests i.e. first count, standard germination, root length, shoot length, seedling length, dry weight of seedlings, vigour index-I (germination x seedling length), vigour index-II (germination x dry weight of seedlings), brick gravel test, electrical conductivity of leachate may be used to predict the field emergence of okra genotypes.

Keywords: Seed vigour, Germination and Vigour tests, Field emergence, Okra.

INTRODUCTION

Okra (*Abelmoschus esulentus* (L.) Moench) a member of the family Malvaceae and is native of South Africa and Asia. It is an annual fruit vegetable crop grown in tropical and subtropical parts of the world. Although okra is primarily as a rainfed crop, it also comes up well under irrigated conditions during kharif and summer seasons. In India, it is grown for tender fruits, which are vegetable. These tender fruits can be dehydrated and marketed for vegetable purpose. The green tender fruits of okra are highly nutritious vegetable containing 1107 mg of calcium and 8.9 mg of Iron for every 1000 g edible portion and fair amount of vitamins viz., A, B and C. It is also

rich in protein and crude fibre (Sona Thampi, & Indira, 2000). Apart from its nutritive value the stem and fruit sheath used in the manufacture of paper as they contain more of the crude fibre. Seed technologists and seeds men are therefore confronted mainly with two challenges maintaining the viability and vigour of seeds in storage. Secondly, exploring the utility of low quality carry over seeds, the vigour and viability of seeds in storage can be maintained over long periods by controlling storage environment. Seed (A living embryo) is a vital, cheap and basic input for attaining sustained growth in agricultural production in different agro climatic conditions.

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Thus a successful crop depends on the quality of the seed used for sowing or planting. Seed having poor germ inability and vigour invariably results in a poor crop stand which ultimately reduces the yield.

Seed testing aims to provide an estimate of the planting value of seed to give an impartial guarantee of seed quality to the grower in commercial transactions. Seed vigour is the sum total of those properties of the seed or seed lot during germination and seedling emergence. Seed vigour has been recognized as one of the important aspect of seed quality.

MATERIALS AND METHODS

Genetically pure five varieties KS-442, 7019, AB-1, 7219 and AB-2 of Okra (*Abelmoschus esculentus* (L.) Moench) were collected from Department of Vegetable Science of Chandra Shekhar Azad University of Agriculture and Technology Kanpur, for the present investigation. All genotypes were the produce of kharif 2011. The experimental works was conducted in the Seed Testing Laboratory of the Department of Seed Science and Technology Chandra Shekhar Azad University of Agriculture and Technology Kanpur. The following tests were employed to determine the seed vigour of different varieties of okra. The present investigation entitled “Seed vigour assessment in relation to field emergence of okra (*Abelmoschus esculentus* (L.) Moench)” was under taken on five cultivar of okra viz., 7019, AB-1, KS-442, AB-2 and 7219 to assess the seed vigour test method. The five varieties of okra were obtained from department of Vegetable Science C.S. Azad Univ. of Agriculture and Technology Kanpur. First count, standard germination, root length, shoot length, seedling length, dry weight of seedling, seed vigour index-I (Germination x seedling length), vigour index-II (Germination x dry weight of seedlings), brick gravel test, electrical conductivity of leachate and field emergence test were conducted. Seed vigour is an inherent character and an important attributes of seed quality and degree of aliveness. It has been observed that two seed

lot of one particular kind/variety having similar germination percentage performed differently under the field conditions.

RESULT AND DISCUSSION

The present investigation “Seed vigour assessment in relation to field emergence of okra (*Abelmoschus esculentus* (L.) Moench)” was under taken on five cultivars of okra viz. 7019, AB-1, AB-2, KS-442 and 7219 to assess the seed vigour test method. During present investigation first count conducted on fourth day of seed germination revealed that the varieties differed significantly. The difference occurred in variety was genetic. The correlation between first count test and field emergence test was found significantly and positive, showing association of first count test with field emergence test. These findings are in agreement with Yaklich and Kulik (1979). and Sinha et al. (1988) in cowpea.

Standard germination in the laboratory showed significant differences among varieties. This may be due to the genetic variations among varieties. The findings are in agreement with Edward and Harturg in soybean. Nazeer Ahmad (1977), in Mustard and China and Paul (1982) in Pearlmillet. Standard germination at final count showed very strong and positive association with field emergence. Maximum Standard germination was recorded in 7109 (86.00%) followed by AB-1 (83.00%), KS-442 (79.00%), AB-2 (77.00%) and 7219 (73.00%) respectively.

The seedling length was also significantly affected by the varieties. Long seedlings was measured from bold seeded varieties as seedling length is mostly governed by the reserved food material present in the seeds and the action of growth promoters like gibberelic acid and cytokinins. The correlation between seedling length and field emergence test was positive and significant showing good association seedling length and field emergence test. These results are in agreement with the findings of Edward and Harturg (1971), in soybean, Nazeer Ahmad (1977) in mustard, China and Paul (1982) in pearlmillet, and Vanagamudi et al, (1984) in bajra.

Maximum seedling length was exhibited by 7019(20.97cm) followed by AB-1 (19.55 cm), KS-442 (17.70 cm), AB-2 (16.98 cm) and 7219 (16.03 cm) respectively. But AB-1 was at par with 7019. The data on seedling dry weight exhibited significant differences among all the variety. The seedling dry weight was also governed by the reserve food material present in seed. The correlation between seedling dry weight and field emergence revealed significant positive correlation. This finding was supported by Lewis and Garcia (1977) in tall fescues, Vanagamudi et al. (1984) in bajra and Thete et al. (1988) in sorghum. During present investigation maximum seedling dry weight was recorded in variety 7019 (0.233 g) followed by AB-1 (0.192 g), KS-442 (0.185 g), AB-2 (0.177g) and 7219 (0.168g), respectively.

Significant differences in vigour index-I (germination x Seedling length) were recorded among different varieties during present investigation. These differences occurred due to germination performance and seedling length which may be due to genetic construction of the varieties. Positive and significant correlation were recorded in seed vigour index-I with field emergence test. Such findings have also been recorded by Singh and Khatra (1984) in groundnut, Vanagamudi et al. (1984), in bajra and Thete et al. (1988) in sorghum.

The maximum seed vigour index-I was recorded by variety 7019 (1808.65) followed by AB-1 (1617.80), K.S.-442 (1397.53), AB-2 (1307.88) and 7219 (1170.16) respectively. During present investigation the seed vigour index-II (Germination x dry weight of seedlings) were also recorded significant different among variety. These differences were due to germination performance and seedling dry weight which may be due to genetic constitution of the varieties and reserve food material. Such findings were supported by Singh and Khatra (1984) in groundnut, Vanagamudi et al. (1984) in Bajra and Thete et al. (1988) in sorghum.

The maximum seed vigour index-II was recorded in variety 7019 (20.269) followed by AB-1 (15.859), KS-442 (15.410), AB-2 (13.608) and 7219 (12.10) respectively. During present investigation the brick gravel test method showed significant and positive differences among all the varieties. The maximum germination was recorded by variety 7019 (76.00%) followed by AB-1 (71.00%), KS-442 (68.00%), AB-2 (67.00%) and 7219 (66.00%) respectively. This finding was also reported by Hussaini (1984), in maize.

Okra varieties differed significantly in electrical conductivity of seed leachate by number. The difference occurred in varieties were due to genetic constitution of seed. The minimum EC value was exhibited by 7019 variety which showed the highest storability. The correlation between leachate tests can also used to correlate the field emergence of okra. Several scientists studied the relationship of EC to field emergence like Sivasubramanian and Ramkrishnan (1974) in groundnut.

Regarding performance of five varieties of okra in various vigour tests and field emergence the highest vigour was exhibited by 7019 and followed by AB-1, KS-442, AB-2 and 7219. Among these test i.e. first count, standard germination, root length, shoot length, seedling length, dry weight of seedling, vigour index-I (germination x seedling length), vigour index-II (germination x dry weight of seedlings), brick gravel test, electrical conductivity of leachate and field emergence were conducted and found that except E.C. of leachate which was negative all the tests were found significantly positive correlated. All the conducted tests of vigour can be adopted to assess the field emergence of okra because all tests were highly significant and positively correlated with field emergence. Electrical conductivity test may also be used as it showed negative but significant correlation.

Table 1: Seed vigour assessment in relation to field emergence of okra

Treatments	Germination (%)	Seedling length (cm)	Dry weight of seedlings	Vigour Index-I	Vigour Index-II	Brick gravel test (%)	Leachate value (dsm ⁻¹)	Field emergence (%)
T ₁	79.00	17.70	0.185	1397.53	15.41	68.00	2.173	74.00
T ₂	86.00	20.97	0.235	1808.65	20.27	76.00	1.662	81.00
T ₃	83.00	19.55	0.196	1617.80	15.86	71.00	2.130	78.00
T ₄	73.00	16.03	0.166	1170.16	12.21	66.00	2.230	70.00
T ₅	77.00	16.98	0.176	1307.88	13.61	67.00	2.190	73.00
S.E. (d)	1.006	1.017	0.057	78.929	1.55	0.514	0.044	1.006
C.D.(P=0.05)	2.236	2.271	0.046	175.858	3.46	1.138	0.158	2.236

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