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STANDARDISATION OF SUITABLE SIEVE SIZE FOR SEED GRADING IN DHAINCHA (*Sesbania aculeata*)

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Abstract– Studies were conducted in the Seed Technology Unit of Department of Plant Breeding and Genetics, PAJANCOA & RI,to standardise the suitable sieve size for seed grading in Dhaincha. The seeds sieved through BSS 8 (2.00 mm) registered the maximum seed recovery (88.6%) along with superior seed quality in terms of both physical and physiological seed quality attributes studied. The seeds obtained from BSS 8 had maximum 100 seed weight (2.047g), physical purity (98%), seed germination (92%), seedling vigour in terms of seedling length, vigour indices I (2240) and II (13.00) as well as speed of germination (31.83) as compared to BSS 9 and BSS 10 sieves. The superiority was also found in field emergence (76%) as well as pure live seeds (90.81%). Hence, the sieve size of BSS 8 is suitable for grading of dhaincha seeds. The superiority of BSS 8 sieve (2.00 mm) was observed in both physical and physiological parameters studied including field emergence as well as pure live seeds. A sieve size of 2.00 mm (BSS 8) can be considered as optimum; hence, it ensures that seed quality parameters are within acceptable limits of seed standards for processing dhaincha seeds.

INTRODUCTION

Dhaincha is a green manure crop that grows quickly and is succulent. It can be introduced 8 to 10 weeks after sowing, when the crop is in the flowering stage. This crop can adapt to many soil and climatic conditions. Even under challenging situations like drought, water logging, salinity, etc., it may be grown. Dhaincha is a good crop for green manuring. It aids in boosting soil fertility by fixing nitrogen. By increasing organic matter, soil is able to maintain its beneficial physical, biological, and chemical characteristics. It promotes effective soil aeration. It aids in facilitating macro- and micronutrient availability. Reduced dhaincha seed yield could be caused by fewer pods, lighter seeds, or a combination of these factors. A large number of seeds may not grow in dense populations. Therefore, seed processing gains importance for complete removal of immature or under developed seeds in dhaincha for maintaining required population in the field (Meena *et al.*, 2018).

Additionally, scientific seed production acknowledges the value of seed processing to preserve the physical integrity of seeds in addition to recovering seeds of the ideal size for consistent crop establishment and growth. Because it affects how efficiently seeds behave in soil, seed size is a crucial indicator of seed vigour. When seeds are harvested, they come in a variety of sizes, but not all of them may be equally valuable for sowing. One important aspect of the seed industry engaged in providing farmers with high-quality seeds of improved kinds is seed processing. The earlier efforts of plant breeders in creating superior varieties and of seed producers might be ensured by a good seed processing job. There are two approaches to increase seed quality during processing: a) separating out weed seeds, inert matter, and other crop seeds; and b) upgrading or removing low-quality seed. Metal screen openings may come in various shapes, such as round, oblong, or triangular, whereas wire mesh screen perforations are quantified either in millimetres' or by the

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number of openings per length unit. These screens can be manufactured using either perforated sheet metal or woven wire mesh, typically mounted on a wooden frame.

However, a number of studies carried out on various crops have indicated that the ideal sieve size is one that produced the highest seed recovery while keeping the parameters of seed quality within the range of acceptable norms (Hanumantharaya, 1991) and (Bagli *et al.,* 2022). (Wood, 1977) conducted a thorough analysis of the role of seed size on crop growth and production potential, concluding that the effect of seed size on crop output remains equivocal. Keeping the above points in view, the present study was undertaken with thefollowing objective *i.e.,* To standardize screen sizes to enhance seed recovery and improve seed quality in dhaincha (*Sesbania aculeata*).

MATERIALS AND METHODS

The freshly harvested bulk seed lot of dhaincha obtained from the Department of Agronomy, PAJANCOA & RI, Karaikal was used for the study. The seeds were size graded using wire mesh sieves of BSS 8x8, BSS 9x9 and BSS 10x10 in ROTAP sieve shaker for 30 sec. The parameters of the seed quality were assessed after the seeds that remained to the screen were collected individually. The data obtained from different experiments were subjected to statistical analysis using the method outlined by (Panse and Sukhatme, 1954). In cases where it was deemed necessary, percentage values were converted into angular (arcsine) values before analysis.

RESULTS AND DISCUSSION

In scientific seed production, recognizing the importance of seed processing is crucial for maintaining the physical purity of seeds and obtaining uniformly sized seeds, which are essential for consistent crop growth. Seed size plays a vital role in seed vigor, as it directly influences how well seeds perform in the soil. When seeds are harvested, they often exhibit a wide range of sizes, but not all of them are equally suitable for planting.

Seed processing is a fundamental component of the seed industry because it ensures that farmers receive high-quality seeds of improved varieties. Utilizing high-quality seeds is paramount for achieving optimal crop yields, potentially increasing output by 15-20%. The extent of this increase is directly linked to the quality of the seeds used. Due to variations in production conditions and cultivation practices, seeds within a seed lot may differ in terms of size, weight, and density.

In the present investigation, dhaincha (*Sesbania aculeata*) seeds sieved through BSS8 registered the maximum seed recovery (88.6%) along with superior seed quality in terms of both physical and physiological seed quality attributes studied. The seeds obtained from BSS 8 had maximum 100 seed weight (2.047g), physical purity (98%), seed germination (92%), seedling vigour in terms of seedling length, vigour indices (2240) and II (13.00) as well as speed of germination (31.83) as compared to BSS 9 and BSS 10 sieves (Table 1). The superiority of BSS 8 sieve was also found in field emergence (76%) as well as pure live seeds (90.81%) (Table 2). Hence, the sieve size of BSS 8 is suitable for grading of dhaincha (*Sesbania aculeata*) seeds. The results are in line with (Anuradha *et al.,* 2009) in chickpea.

CONCLUSION

The salient findings of experiments conducted on "Standardization of suitable sieve size for seed grading in Dhaincha (*Sesbania aculeata*)" are summarised as the superiority of BSS 8 (2.00 mm)

Table 1. Effect of sieve size on seed quality in dhaincha (*Sesbania aculeata*)

Sieve No.	Sieve size (mm)	Seed recovery (%)	100 seed weight (g)	Physical purity (%)	Speed of Germination (%)	Seed Germination (%)	Pure live seeds (%)
BSS 8 (R)	2.00	88.60	2.047	98	31.83	92	90.81
BSS 9 (R)	-	7.38	1.912	96	26.35	89	86.38
BSS 10 (R)	1.70	3.17	1.801	95	26.95	86	82.62
BSS 10 (P)	1.70	0.85	1.269	10	22.76	57	6.53
Unprocessed	-	-	1.893	92	26.07	82	75.43
S.Ed.	-	-	0.028	0.82	2.24	0.84	2.92
CD (P=0.05)	-	-	0.060	1.74	1.78	1.80	6.51

Table 2. Effect of sieve size on seed quality in dhaincha (*Sesbania aculeata*)

Sieve No.	Sieve size (mm)	Shoot length (cm)	Root length (cm)	Dry weight of seedlings (g/10 seedlings)	Vigour index I	Vigour index II	Field emergence (%)
BSS 8 (R)	2.00	11.91	12.26	0.140	2240	13.00	76
BSS 9 (R)	-	11.83	11.30	0.129	2037	11.57	69
BSS 10 (R)	1.70	11.80	10.61	0.097	1937	8.41	68
BSS 10 (P)	1.70	11.43	7.86	0.066	1100	3.81	49
Unprocessed	-	11.51	10.06	0.061	1769	4.93	58
S.Ed.	-	NS	0.49	0.005	38.2	0.41	1.05
CD (P=0.05)	-		1.03	0.010	81.5	0.86	2.35

sieve was observed in both physical and physiological parameters studied including field emergence as well as pure live seeds. Hence, the sieve size of 2.00 mm is suitable for grading of dhaincha (*Sesbania aculeata*) seeds.

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