Research Paper Agriculture

Influence of Specific Gravity Grading using Seed Blower on Seed and Seedling Quality Characteristics in *Sesamum Indicum*.

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ABSTRACT

The attempt made to separate the illfilled seeds of gingelly using seed blower at 0.25 water pressure some of the seeds were retained in the bottom portion. Hence the grading of seed at 0.25 water pressure at different durations viz., 15, 30 and 60 seconds revealed that as the duration increase the recovery of blown seeds were higher. At 15 seconds the seeds retained at bottom portion was heavier with 92 per cent recovery. The seed and seedling quality characters in terms of germination and vigour index were also higher in these seeds compared to bulk and blown seeds.

KEYWORDS grading,seed blower,seed recovery,sesame,specific gravity

INTRODUCTION

Sesame (Sesamum indicum L.), thought to have originated from Africa, is considered to be the oldest oilseed crop known to man and is now grown in many parts of the world. . More than 80 per cent of the crop is cultivated in kharif and a small quantity is cultivated in rabi . Therefore, sesame seed is available throughout the year in the country.

Homoginising the heterogeneous seed lot is the prime aim of any post harvest seed management techniques. The homogenisation is mainly based on physical characters, as it could be easily adoptable. Balamurugan (1993) in sunflower, Paul et al. (1997) in mustard, Singh et al. (1998) in groundnut, Rajasekaran (2001) Niger, Balamurugan (2002) in sesame, Chandrashekar (2004) in safflower opined grading of seed is a prime requirement for oil seeds.But Balamurugan (1993) recommend density grading in sunflower for seed quality enhancement, while Rajasekaran (2004) recommended size grading for seed quality upgradation in niger. Sesamum is a crop expressing all possible variation in physical character such as weight, colour and size necessitating the need for processing the seeds before sowing.

MATERIALS AND METHODS

Genetically pure seeds of sesamum (Sesamum indium.) cv. CO1 obtained from Department of oilseeds, TNAU, Coimbatore, formed the base material for the study. The field experiments and laboratory experiments were conducted at Department of Seed Science and Technology, Tamil Nadu Agricultural University, Coimbatore (11° N latitude and 77°E longitude with an altitude of 427 m above mean sea level) during 2004-2005.

The bulk seeds were blown in a South decota air blower with a air pressure of 0.25 for the duration of 15, 30 and 60 seconds. The seed blown off and collected at the top and that retained in the bottom mesh were collected separately and evaluated for seed and seedling quality characters as detailed (Seed recovery was calculated for blown and retained seeds)

Seed Recovery (%)

Sinkers (%) =	Weight of sinkers / Total weight of seed	x 100

Floaters (%) =	Weight of floaters / Total weight of seed	x 100

100 seed weight (mg)

Eight replicates of hundred seeds were drawn from each treatment, weighed in sensitive electronic balance and expressed in milligrams (ISTA, 1999).

Germination (%)

Four replicates of hundred seeds were sown in sand medium and kept under the test conditions of 25° ± 1°C and 95° ± 3 per cent relative humidity maintained in a germination room illuminated with fluorescent light. After the test period of seven days the normal seedlings were counted and the mean values expressed as percentage (ISTA, 1999) to the total number of seeds placed for germination.

Root length (cm)

At the time of germination count, ten normal seedlings were taken at random. The length between the collar and tip of the primary root was measured as root length and the mean length expressed in centimeter.

Shoot length (cm)

From the ten seedlings used for measuring the root length, the length between collar and tip of the primary shoot was measured as shoot length and the mean value expressed in centimeter.

Drymatter production (mg 10 seedlings^{-1})

Ten normal seedlings from the germination test were selected at random, dried in a hot air oven maintained at 85°C for 48 h and cooled in a desiccators for 30 minutes, and weighed in an electronic digital balance. The mean weight was expressed as dry matter production 10 seedlings^{-1} in milligram (Gupta, 1993).

Vigour index

The Vigour index values were computed, adopting the procedure of Abdul-Baki and Anderson (1973) as given below and expressed as whole number.

Vigour index = Germination (%) x Total seedling length (cm)

RESULTS AND DISCUSSION

Highly significant differences were observed between blower fractions and durations of blowing for all the evaluated parameters viz., seed recovery, 100 seed weight, germination, root length, shoot length, drymatter production and vigour index for the seed grades based on density. The interaction effect was also highly significant for all the parameters except

for seed recovery (Table1).

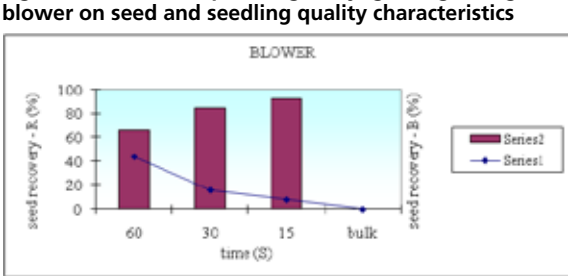
Seeds are graded based on specific gravity adopting different methodologies viz., salt water floatation (Anon, 1999), water floatation (Srimathi, 1997), specific gravity separator (Natarajan, 2000) and organic solvent floatation technique (Natarajan, 2003). Seed blower is one of the seed testing equipment recommended for separation of inert matter from working sample (Tanwar and Singh, 1993) using differential air flow rate. Hence an attempt was made to separate the illfilled seeds of gingelly using seed blower.During blowing when the water pressure was kept at 0.5 all the seeds were found to blown and settled at top portion. But at 0.25 water pressure some of the seeds were retained in the bottom portion. Hence the grading of seed at 0.25 water pressure at different durations was evaluated for seed quality characters. The experiment conducted with 3 different durations viz., 15, 30 and 60 seconds revealed that as the duration increase the recovery of blown seeds were higher. At 15 seconds grading the seeds retained at bottom portion was heavier with 92 per cent recovery leaving only 8 per cent as the reject material. 100 seed weight recorded by the retained seeds were higher than the blown seeds irrespective of the duration of blowing.The analysis on seed quality characters in terms of germination and vigour characters expressed that the blown seeds of 30 and 60 seconds were with higher quality leading to heavier loss of quality seed material, but the seeds blown at 15 seconds recorded a germination of 86 per cent which was 6 per cent lesser than the bulk seeds. (Fig:1)

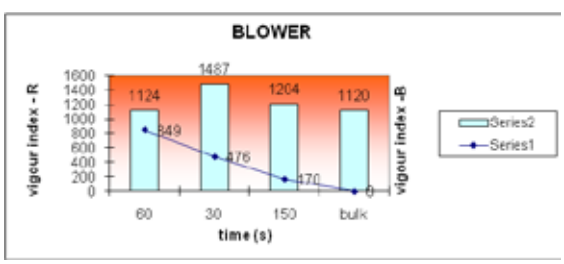
Hence considering both the recovery and quality of seed, grading using seed blower could be adopted with the specification of 0.25 water pressure for 15 seconds.The principle behind the separation might be the relationship between the seed weight and seed quality characters as discussed elsewhere. Thus the study expressed that grading of seed with seed blower at 0.25 water pressure for 15 seconds improved the seed and seedling quality characters.

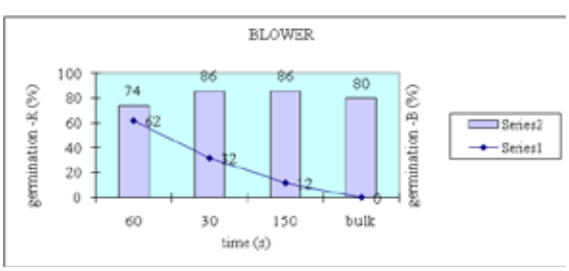
Table 1.Influence of specific gravity grading using seed blower on seed and seedling quality characteristics

Blowing duration at 0.25 water pressure(D) in sec.	Seed recovery (%)		100 Seed weight (mg)			Germination (%)			Root length (cm)			Shoot length (cm)			Dry matter production 10 seedling^{-1} (mg)			Vigour index		
	Blower fractions (G) R-Retained, B-Blown seeds																			
	R	B	R	B	Mean	R	B	Mean	R	B	Mean	R	B	Mean	R	B	Mean	R	B	Mean
60	66	44	312	108	210	74	62	68	8.1	7.2	7.7	7.1	6.5	6.8	32.1	28.1	30.4	1124	849	986
30	84	16	328	123	226	86	32	59	9.1	7.4	8.2	8.2	7.5	7.9	38.2	32.2	35.2	1487	476	982
15	92	8	308	298	303	86	12	50	7.5	7.8	7.6	6.5	6.4	6.5	37.3	39.0	38.3	1204	170	687
Bulk	0	0	305	0	152	80	0	40	7.9	0	0	6.1	0	3.1	38.2	0	19.1	1120	0	560
Mean	60	17	313	132	222	81	27	54	8.2	5.6	5.6	8.2	5.2	6.2	36.4	25.6	30.7	1234	374	804
CD (P=0.05) D	0.999			1.030			1.131			0.103			0.082			0.375			0.082	
G	0.706			0.728			0.817			0.072			0.058			0.265			0.058	
DG	1.413			1.456			1.541			0.1456			0.117			0.531			0.117	

Fig 1.Influence of specific gravity grading using seed blower on seed and seedling quality characteristics







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