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GERMINATION AND VIGOUR OF SESAMUM (Sesamum indicum L.) CV. CO.1 SEEDS RELATIVE TO THE POSITION OF CAPSULE ON THE PLANTS

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ABSTRACT

Seeds of sesamum cv. Co.1 collected from the capsules in upper and lower portions of the main shoot, first and second primary branches from the bottom of the plants and secondary branches borne in the first and second primary branches borne were evaluated. Recovery of bigger sized seeds retained by B.S.S. 12 x 12 sieve was more from the second primary branches and from the lower portion of the plant. Seeds obtained from the second primary branch recorded more germination and vigour. Bigger seeds and the seeds collected from the lower portion of the branches proved superior.

Sesamum is an important oil seed crop in the rained as well as irrigated farming systems. Maintenance of adequate plant population stands foremost in influencing the sesamum yield, which in turn is largely determined by the seed quality.

Sesamum cv. Co.1 is characterised by bushy nature with main shoot as well as branches bearing the capsules and by the indeterminate pattern of growth. Seed formation and maturation in different capsules are temporally and specially separated. Their quality may be influenced by the position on the plant as was reported in carrot Hegarty, 1971, peas Gzhesyuk and Guretski, 1980 and rape Diepenbrock, 1982. Hence, an experiment was conducted in sesamum cv. Co.1 with the objective of evaluating seed germination and vigour as related to their position on the plants.

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MATERIALS AND METHODS

Two hundred plants were randomly selected in sesamum cv. Co.1. Capsules in the lower half(L) and upper half (U) of the main shoot (MS), first primary branches from the bottom of the plant (P_1), secondary branches in the first primary branches (P_1S), second primary branches (P_2) and the secondary branches in the second primary branches (P_2S) were collected separately.

Seeds were extracted manually from the capsules and sun dried between 8-11.30 a.m. for four days to reduce their moisture content to 8 per cent. They were size graded using B.S.S. 12 x 12 (G_1) and B.S. 14 x 14 (G_2) wire mesh sieves. Percentage recovery of seeds retained by the sieves was calculated on weight basis.

Seeds retained by the B.S.S. 12 x 12 and B.S.S. 14 x 14 sieves were evaluated treatment wise for 100 seed weight and percentage germination in between paper-towel medium (ISTA, 1976). The length was recorded separately in respect of ten normal seedlings. The dry matter produced by the ten seedlings was determined by the hot air oven method after measuring length. The vigour index (Percentage germination x seedling length in cm) was determined using the formula of Abdul-Baki and Anderson (1973). A portion of the seed was subjected to accelerated ageing at 40°C and 100 per cent RH for four days (Delouche and Baskin, 1973) and then evaluated for percentage germination.

RESULTS AND DISCUSSION

Recovery of bold seeds (retained by B.S.S. 12 x 12 sieve) was significantly more in the second primary branch (P_2) and less in the secondary branches of the first primary branch (P_1S). Seeds from the lower half of the branches recorded higher recovery of bold seeds (Table 1), probably due to the inclusion of more mature and well-filled seeds. In the upper half of the branches, flowering occurs late and hence the capsules particularly at the tip portion would have not matured fully at the time of harvest. Gzhesyuk and Guretski (1980) found largest seeds from the lower part of the pea plants.

Seeds collected from the lower portion of the branches and that retained by the B.S.S. 12 x 12 sieve recorded significantly more weight probably due to their larger size. Sekaran (1978) observed that bigger the size of seed, more was the weight in sesamum.

Mean weight of 100 seeds was maximum in the second primary branch and minimum in the secondary branches of the second primary branch (P_2S). Diepenbrock (1982) reported similar variations in the weight of rape seed collected from different branches.

Seeds from the second primary branch followed by that from the first primary branch recorded significantly higher percentage germination. Similarly, germination of seeds from the lower portion was significantly more. Increased weight in these seeds could have been the cause for better germination. However, Sankaran (1975) found that in

TABLE 1. QUALITY OF SIZE GRADED SEEDS OF Sesamum cv. Co.1 AS RELATED TO THEIR POSITION ON THE PLANT.

	Seed recovery (Angular values of percentages)				100-seed weight (g)				Germination (%)			
	Up (U)		Low (L)		Up (U)		Low (L)		Up (U)		Low(L)	
	G_1	G_2	G_1	G_2	G_1	G_2	G_1	G_2	G_1	G_2	G_1	G_2
MS	52.3 (46.3)	45.8 (42.6)	65.5	23.1	0.287	0.220	0.321	0.224	72 (58)	34 (36)	80 (63)	85 (67)
P_1	45.8 (42.6)	50.2 (45.1)	57.3	31.5	0.290	0.197	0.311	0.227	93 (75)	78 (62)	93 (75)	73 (59)
P_1S	38.3 (38.2)	58.5 (49.9)	51.0	37.0	0.293	0.214	0.307	0.230	79 (63)	68 (56)	72 (58)	73 (59)
P_2	54.2 (47.4)	44.5 (41.8)	65.4	24.0	0.292	0.218	0.329	0.233	93 (75)	63 (53)	90 (72)	91 (73)
P_2S	42.4 (40.6)	54.9 (47.8)	60.0	29.3	0.293	0.229	0.243	0.230	81 (64)	73 (59)	83 (66)	75 (60)
MS	729	723	775	311	12.0	6.7	9.7	6.3	52 (46)	35 (36)	62 (52)	58 (50)
P_1	871	678	973	746	11.7	5.3	11.0	7.0	60 (51)	53 (47)	63 (53)	51 (46)

MS = main shoot
L = lower half
U = upper half

P_1 = first primary branch.

TABLE 1. (CONTINUED)

P_1S	572	660	732	633	7.3	10.7	10.3	7.3	62 (52)	55 (48)	62 (52)	48 (44)
P_2	811	785	922	618	10.0	7.7	12.0	6.7	65 (54)	55 (48)	63 (53)	62 (52)
P_2	714	668	779	843	9.7	10.0	10.3	10.3	60 (51)	53 (47)	53 (47)	53 (47)

CD (P = 0.05) Angular values are given in parenthesis

	Portion (P_0) (Up or Low)	Position(P)	Size Grade (G)	P_0 x P	P_0 x G	P x G
Seed recovery	NS	NS	1.8	NS	3.9	2.5
100-Seed weight	0.010	0.007	0.007	0.015	0.015	NS
Germination	5.8	3.7	3.7	8.2	NS	5.2
Vigour index	97	NS	61	137	137	86
Dry weight of seedlings	NS	NS	1.4	NS	2.2	NS
Germination after accelerated ageing	2.5	1.6	3.5	NS	NS	NS

cotton, seeds obtained from the upper zone of the plant was better in quality. Germination of seeds retained by the B.S.S. 12 x 12 sieve was 84 per cent as compared to 70 per cent in those retained by B.S.S. 14 x 14 sieve. Similar variation in germination due to size of the seed was reported by Sekaran (1978) in sesamum.

Vigour index value was maximum in seeds collected from first primary branch, which was on par with that collected from second primary branch. Bigger seeds recorded higher vigour index value because of more germination and seedling length recorded in those seeds.

Dry matter production of seedlings did not exhibit significant variation due to position. However, size grade exerted significant influence. Bigger seeds recorded more dry weight than the smaller ones.

Storability as evident from germination after accelerated ageing was maximum in the seeds from second primary branches and from the lower portion of the branches. Seed size exhibited similar trend as in other parameters.

In sesamum, initiation of flowers as well as the development and maturation of capsules and seeds occur at different periods as the plant grows. Quality of seeds is influenced by the environmental factors such as nutrient availability, soil moisture and weather factors not quoted in reference. Hence, further studies on the association of these environmental factors monitored during the maturation of seeds will throw more light on the cause for variation in the germination and vigour of seed as related to their position on the plant.

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