This study has confirmed earlier results and added information to the effect that for new variety JL-24 also gypsum application contributed to increased pod yield. There was no advantage due to a dose beyond 500 kg/ha and earthing up after gypsum application.

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Madras Agric. J. 72 (1) 53-56 January, 1985 https://doi.org/10.29321/MAJ.10.A02345

SEED SIZE IN RELATION TO IMBIBITION, EMERGENCE AND SPEED OF EMERGENCE IN PEANUT (*Arachis hypogae* L.) cv POL 1 AND TMV 2

A. S. Ponnuswamy[1] and V. Ramakrishnan[2]

A study was carried out to assess the influence of seed size relative to imbibition, radicle emergence and speed of emergence, in groundnut cv POL 1 and TMV 2. The study revealed that the imbibition rate increased with increase in duration of soaking irrespective of seed size. However, imbibition rate and speed of radicle emergence showed a negative correlation with seed size in laboratory study alone. In field emergence test, the graded seeds gave significantly higher percentage of germination than the ungraded seeds and were on par. The speed of field emergence decreased with increase in seed size in both the varieties.

Part of the thesis approved by the Tamil Nadu Agricultural University, Coimbatore for the award of M. Sc. (Ag.) degree in Seed Technology.

1, 2 Department of Seed Technology, Tamil Nadu Agricultural University, Coimbatore - 3.

Several investigators have studied the influenee of seed size on field emergence and speed of emergence. According to Schmidt (1921) and Williams (1956) the larger seeds emerged quicker than did small seeds in clover. Rogler (1954) observed in crested wheat grass that the rate of emergence was approximately the same for all weight classes planted at half an inch depth but high positive correlations were found between the seed weight and emergence at the deeper depths. Edwards and Hartwing (1971) reported that small and medium-sized soybean seeds gave more rapid emergence than the large seeds at different soil moisture levels, namely, 22.5, 25, 27.5 and 30 per cent.

The present study was taken with two popular groundnut varieties namely POL 1 and TMV 2, to determine the influence of seed size relative to imbibition, radicle emergence and speed of emergence.

MATERIALS AND METHODS

Seeds of two bunch type groundnut varieties namely, POL 1 and TMV 2 were obtained from the Regional Station, Tindivanam and multiplied under irrigated condition at the Seed Technology Department, TNAU. Coimbatore adopting the recommended package of practices for each variety with a view to eliminating the variability due to locality, if any. The kernals were separated and size-graded using metal sieves possessing 21/64", 20/64", 18/64" and 16/64" diameter round perforation, respectively. The studies comprised laboratory and field evaluation of seeds of different sizes excluding those passed through the sieve 16/64" as they comprised mostly shrivelled and immature ones.

The imbibition rate was worked out by soaking 25 seeds from each category and weighing at 4 hourly interval upto 16 hr and at 8 hourly interval upto 24 hr. The imbibition rate was calculted on moisture free basis and expressed in per cent of water absorption. Every time the seeds were weighed after soaking, the number of seeds in which radicle had emerged was observed and recorded for calculating the rate or speed of redicle emergence as per Maguire (1962) namely,

$$\text{Speed of radicle emergence} = X_1/Y_1 + (X_2 - X_1)/Y_2 \ldots\ldots (X_n - X_{n-1})/Y_n$$

where X_n = per cent of radicle emergence at nth counting hour

Y_n = number of hour from soaking to nth count

For recording speed of field emergence, the observations were made in the field trial laid out in randomised block design with different grades of seeds in 5.1 x 3 15m plots with a spacing of 22.5 cm between rows and 15 cm between plants within the rows. The seedlings just emerged above the field level, possessing the cotyledons unfurled were regarded as germinated. The emergence was counted daily from the 7th to 15th day after sowing. The field emergence per cent was computed on the final count. From the mean per

TABLE 1. Effect of seed size on imbibition, radicle emergence and speed of emergence in POL 1 and TMV 2 groundnut (Mean values)

Seed	Rate of imbibition in percentage after					Per cent radicle emergence after soaking for				Speed of radicle
Sizes	4hr	8hr	12hr	16hr	24hr	12hr	16hr	24hr	32hr	Emergence
POL 1										
21/64"	32 1	48.6	51.4	57.8	67.9	28	64	96	100	5.91
20/64"	36 5	50 6	55.3	61.2	70.6	36	88	100	100	6.75
18/64"	40.0	51.7	53.4	57·7	78.1	44	92	100	100	7.00
16/64"	48.1	61.1	63.0	77.8	88.9	60	95	100	100	7.17
Ungraded	35.3	52.9	57.6	61.4	76.5	30	72	100	100	6.28
TMV 2										
21/74"	35.9	52.2	55.3	57.6	64.1	8	24	68	100	4.47
20/64"	44.2	55.8	57.0	59.3	68.6	12	28	82	100	4.83
18/64"	50.0	59.0	65.2	66 7	71.2	16	32	85	100	4.83
16/84"	45.5	63.6	72.7	76.4	87.3	20	48	88	100	5.49
Ungraded	51.7	56.7	61.6	68 7	76.7	14	38	80	100	4.98
'r'	−0.773*	−0.824*	−0.791*	−0.865*	−0.946**	−0.463 N. S.	0.256 N. S.	−0.013 N. S.	—	—

Table 2. Effect of seed size on field emergence in POL 1 and TMV 2 groundnut (Mean Values)

Seed sizes	Field emergence percentage	Percentage on Ug	Speed (rate) of field emergence	percentage on Ug
POL 1				
21/64"	92.72	98.96	11.82	95.79
20/64"	92.99	99.25	12.20	98.87
18/64"	93.94	100.16	12.47	101.05
16/68"	94.96	101.36	12.76	103.40
Ungraded (Ug)	93.69	100.0	12.34	100.00
TMV 2				
21/64"	87.98	110.61	10.61	105.36
20/64"	90.80	114.16	11.36	112.91
18/64"	86.81	109.14	11.83	118.47
16/64"	85.36	107.32	11.27	111.92
Ungraded (Ug)	79.54	100.00	10.07	100.00
	Variety	Size	Var. x Size	
CD (P=0.05)	1.03	1.60	2.25	

cent of Seedlings emerged on each counting date, the emergence rate or speed, for each treatment was calculated by using the formula of Maguire (1962)

RESULTS AND DISCUSSION

The results of imbibition rate, per cent radicle emergence and speed of

radicle emergence are given in Table 1. The imbibition rate increased significantly with the increase in duration of soaking, irrespective of seed sizes. However, it was the highest in respect of smallest size seed upto 12th hr of soaking in both the varieties, and thus shows a negative correlation. The radicle commenced to emerge sometime between the 8th and 12th hr of soaking in seeds of all sizes, irrespective of varieties. The per cent emergence at the 12th hr was more in the smallest size seeds than the other grades in both the varieties. The speed (rate) of radicle emergence increased with decrease in seed size and lowest in respect of largest size in both the varieties. It is pertinant to point out, that only in the smallest seed the percentage of primary axis weight to the weight of cotyledons is high irrespective of varieties. It, therefore stands to reason that only in smallest seeds, all the attributes discussed above are more conducive for the rapid conversion of the insoluble reserve substances into a soluble state and their mobilisation and transport to the regions of intense growth activity.

The results of field emergence and emergence rate pertaining to various seed sizes are given in Table 2. The differences between percentages of field emergence was significantly higher in graded seeds than in ungraded in both the varieties and were on par in all the seed sizes. The field emergence of the ungraded seeds could have been adversely affected more by the presence of shrivelled and immature seeds. The speed of field emergence decreased with increase in seed size from 12.76 to 11.82 in POL 1, while in TMV 2 excepting 16 retained seeds (11.27) in other sizes, it progressively decreased from 11.93 to 10.61 with increase in seed size. In both the varieties, the largest seed recorded low speed of germination when compare with other seed sizes. Bremner *et al* (1963) in wheat and Edward and Hartwig(1971) in soybean observed rapid emergence only from small size seeds rather than the large seeds, apparently regardless within wide limits of the amount of reserve materials in the seed. The role of smaller embryonic axis and its relatively larger cotyledons in the quicker activation and enhanced rate of growth had already been discussed and the same might hold good to account for the rapid emergence in small size seeds. The results on the speed of field emergence in the groundnut varieties studied thus showed a negative correlation with seed size.

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