

Optimization of Seed Hardening Technique in Pigeon Pea

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Abstract

A laboratory experiment was conducted during 2005-06 to study the effect of soaking period and quantification of solution required for seed hardening in pigeon pea. The results revealed that seeds soaked for two hours at ratio of 1 : 1, (seed : solution) recorded significant improvement in seedling establishment, early emergence (54%) and uniform germination (96%), as compared to control (34% and 83%). Significantly higher dry weight of the seedling, leaf size (leaf length and width) shoot length and root length was recorded with two hour of soaking at 1 : 1 ratio (seed to solution) as compared to control. Thus it indicates that seed hardening with two hours soaking period with ratio 1 : 1 (seed : solution) seems to be optimum. Thus, it implies that morpho-physiological re-organization, might be the cause for the seedlings to perform better.

Key words : Seed hardening technique, Pigeon pea.

Pigeon pea (*Cajanus cajan* (L) Mill sp.) major pulse crop in northern Karnataka. It is being grown under rain fed condition where drought is the common where drought is the common calamity effecting the productivity. One of the factor responsible for poor productivity is due drastic reduction in plant population with initial drought and significant flower and pod drop due to terminal drought. There is an urgent need to combat the drought. Seed hardening is on of the physiological pre-sowing seed management practice to resist drought and boost up the yield. Due to seed hardening no physiological re-organization, anatomical morphological and chemical changes occur. As a consequence seedlings are able to resist the drought effect. Pigeon pea in particular is more sensitive to soaking injury as compared to cereals. The information on optimization of hydration and dehydration in pigeon pea is lacking. Hence the present investigation was carried out to standardize the seed hardening technique in pigeon pea.

Methods

A laboratory experiment was conducted at college of Agriculture Bheemarayangudi during 2005-06 to study the effect of soaking period and quantification of solution required for seed hardening in pigeon pea. The trial was laid out in randomized block design and was replicated thrice. The pigeon pea seeds

of ICPL 8863 were subjected for hardening with CaCl_2 2% solution. Seeds were soaked for one hour, two hours, and three hours at the different ratio of seed : CaCl_2 2% solution i.e. 1 : 0.5, 1 : 1 and 1 : 2 ratio. Later, soaked seeds were dried back to original weight under shade. Such hardened seeds are subjected for germination and establishment of seedlings in pots. The observation like emergence, germination percentage root length, shoot length, leaf length and leaf width and weight of the 25 days old seedlings were recorded.

Results and Discussion

The pooled analysis of the results revealed that seeds soaked for two hours at ratio of 1 : 1 (seed : solution) recorded significant improvement in seedling early emergence (54%) and uniform germination (96%), as compared to control (34 and 83%). The results are in agreement with findings of Devarani and Rangaswamy (1) who reported early and uniform germination due to seed hardening with CaCl_2 in ragi. Significantly higher dry weight of the seedling, leaf size (leaf length and width), shoot length and root length were recorded with hour soaking at 1 : 1 ratio (seed to solution) as compared to control. Thus it indicates that seed hardening with two hours of soaking period with ratio 1 : 1 (seed : solution) seems to be optimum. Further it implies that morpho-physiologi-

Table 1. Effect of seed hardening on seedling establishment in pigeon pea.

Treatments (Soaking period and ratio of seed to solution)	Emergence 7 DAS (%)	Germination 15 DAS (%)	Shoot Length (cm)	Root Length (cm)	Leaf Length (cm)	Leaf Width (cm)	Seedling Dry/Wt G/pl
1h 1 : 05	44	84	18	3.2	5.8	1.5	0.79
1 h 1 : 1	49	81	19	3.3	5.7	1.4	0.82
1 h 1 : 2	56	85	18	3.8	5.6	1.8	0.82
2 h 1 : 0.5	53	90	18	4.1	6.6	1.7	0.85
2 h 1 : 1.0	54	95	19	4.2	6.8	2.0	0.91
2 h 1 : 2	48	96	17	4.1	6.2	1.6	0.81
3 h 1 : 0.5	48	92	16	3.4	6.4	1.6	0.87
3 h 1 : 1	44	86	16	3.2	5.6	1.5	0.81
3 h 1 : 2	46	85	17	3.8	6.1	1.4	0.82
Control	34	83	15	3.9	4.7	1.2	0.72
SE	3.21	5.2	0.50	0.25	0.21	0.11	0.02
CD 5%	9	NS	1.40	0.72	0.6	0.31	0.10

cal re-organization, might be the cause for the seedlings to perform better. Similar results were reported by Paul and Choudhary (2) in wheat and Kamalam and Rajappa Nair (3) in paddy, who reported increased seed germination and seedling vigor in seed hardened with CaCl_2 .

References

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