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Propagation Techniques in Vegetable Cowpea

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ABSTRACT

Cow pea (*Vigna unguiculata*) is a long bean with thin pods and is commonly grown throughout India and belongs to the family Fabaceae. Cowpea is cultivated in India for grains, vegetables and haulms as fodder. To sow one hectare area a quantity of 15 kg of seeds are required. The seeds should be treated with *Rhizobium* bacterial culture 600 g before direct sowing. Ripe and dry pods are harvested at half to two thirds of maturity by manually for seed collection. The seed production fields are to be inspected by seed certification agencies at appropriate stages of the crop growth as per seed and field certification standards. The cloth bags are used for storage of small quantity seeds, gunny bags are used for storage of large quantity and polythene bags are used for long term storage. The seeds are treated with one per cent of activated clay by weight of the seed or two grams of carbendazim 50% WP for one kilo gram of seed and combination of five parts of calcium hypochlorite + four parts of lime + one part of leaf powder of *Albizzia amara* @ 3 g/kg of seed. These pre-treated seeds are stored for eight months in cloth bag and 16 months in water proof bags without bruchid infestation. Few attempts were made to develop micro-propagation protocols in cow pea and there is no commercial tissue culture techniques followed.

INTRODUCTION

Cow pea (*Vigna unguiculata*) is a long bean with thin pods and is commonly grown throughout India and belongs to the family Fabaceae. It is rich in nutritive value. Cowpea is native to Central Africa. Cowpea is widely cultivated in India for grains, vegetables and herbage as forage. The fibreless types are harvested at tender stage for green vegetable.

The nutrients present in cowpea is furnished hereunder for 100g of edible part. (Choudhary, 1990).

Water - 84.6g, Amino acids - 4.3 g, Fat – 0.2 g, Fibre - 2.0 g, P - 74.0 mg, Beta carotene - 941 I.U., Vitamin B2 - 0.09 mg, Minerals - 0.9 mg, other carbohydrates - 8.0 g, Ca - 80 mg, Fe - 2.5 mg, vitamin B1 - 0.07 mg, Vitamin B3 - 0.9 mg, ascorbic acid - 14.0 mg.

It can be raised wide varieties of soils. Cowpea is commercially cultivated in Africa and India.

Different cultivars respond differently to temperature and day length. Usually lesser amount of water is required for this crop because the roots are spread on the top most layer of soil only. Pre-flowering and pod setting stages are critical stages foe water requirement in cowpea.

1. SEED PROPAGATION

SEED EXTRACTION AND HANDLING

Well matured and dried pods are collected from the plants for seed extraction. Usually harvesting was done in 65-70 per cent matured pods to prevent shedding of the seeds by splitting of pods. The seeds should not be injured during thrashing (Parthasarathy and Chakraborthi, 2003).

The colour of the pods changed from green to brown during maturation phase. This phase is ideal for extraction of seeds. Harvested pods are beaten by using soft woody sticks to minimize the damage of seeds during thrashing. Then the seeds are separated by winnowing from pods and plant debris. The winnowed seeds are dried on tarpaulin to reach the moisture of nine per cent for viability. The broken and puny seeds are removed from seed lot by using round holed sieves to retain well developed seeds. The size of the sieves used for cowpea is ranged from 3.50 -4.00mm which depends on the size of seeds.

SEED STANDARDS AND VIABILITY

Standards for field	
Permissible level of rogues	0.2%
Standards for field	
Minimum presence of pure seeds	98.0%
Maximum presence of Inert matter	2.0%
Maximum presence of other crop seeds	10 /kg
Maximum presence of weed seeds	10 /kg
Minimum amount of germination (including hard seeds)	75.0%

Moisture level	
Water proof containers	8.0%
Water permeable containers	9.0%

The viability of seeds are maintained for twenty four months under ambient storage environment.

STORAGE OF SEEDS

The seeds should be properly stored after harvest for maintaining viability and health. The cloth bags are used for storage of small quantity seeds, gunny bags are used for storage of large quantity and polythene bags are used for long term storage. The seeds may be treated with one per cent of activated clay by weight of the seed or two grams of carbendazim 50% WP for one kilo gram of seed and combination of five parts of calcium hypochlorite, four parts of lime, one part of leaf powder of *Albizzia amara* @ 3 g/kg of seed. The treated seeds can be stored for eight months in cloth bag and 16 months in water proof bags without bruchid infestation.

SEED TREATMENT AND SOWING

To sow one hectare area a quantity of 15 kg of seeds are required. The seeds are to be treated with *Rhizobium* bio-fertilizer @ 600g prior to sowing in the field. The seeds are mixed in the rhizobium inoculants uniformly by using minimum quantity of water or with rice gruel on the previous day. The treatment care must be taken not to damage the seed coat. The treated seeds are to be dried in clean space and sown in the field without any delay. The seeds are to be sown at the depth 2-3 cm with a row spacing of 1.5 – 2.0 feet by using country plough or seed drill. Under irrigated conditions, beds and channels are prepared before sowing. The seedlings are thinned to half feet space between two plants with in the row immediately after germination.

2. MICROPROPAGATION

The shoot formation through organogenesis was obtained by using hypocotyls and cotyledons as explants by Pellegrineschi (1997) in cowpea genotypes. The shoots were developed in multiple number within one and half months from the damaged part of the hypocotyl and cotyledons in the media with higher concentration of cytokinin. Among the genotypes used for explant collection, only five types developed whole plants by using *in vitro* protocols.

3. PLANTING IN FIELDS AND AFTER CARE TILL ESTABLISHMENT

Direct sowing of the crop is practised in the fields. Being a crop, cow pea does not need much manures. FYM @ 8-10 t along with 20-32 kg Nitrogen, 20-24 kg Phosphorus and 24 kg of Potassium per acre has been recommended. Farm yard manure is applied as basal dressing 2-3 weeks before sowing and fertilizers may be well mixed before sowing of seeds. There is a self-covering over the land and the weeds are killed by smothering. One single weeding may be beneficial.

About three to four irrigations may be given before rainfall. Meera *et al*., (2010) reported that application of chicken manure providing nitrogen equivalent to 4 t of FYM per acre in equal splits of one basal and one top dress at 30 days after sowing along with chemical fertilizers at

8:12:4 kg N, P and K per acre increased the plant height and dry matter production and seed yield of 168 kg/acre.

CONCLUSION

Cowpea has multiple uses. Cowpea is commercially propagated by seeds. Few attempts were made to develop tissue culture protocols for propagation in cowpea. However, the commercial application of micro-propagation is not followed so far. If the seeds of cowpea are produced as per certification standards, the seed producer can get maximum profit.

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