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## FIXATION OF ISOLATION DISTANCE FOR PRODUCTION OF OKRA SEEDS

V. KRISHNASAMY and G.R. PALANIAPPAN

Vegetable Research Station, Palur 607 113

### ABSTRACT

A study was made to refix the isolation distance requirement for okra (*Abelmoschus esculentus* L.) seed production. Red pigmentation character of CV 'CO<sub>1</sub>' was used as marker. Plants of CV 'Pusa Sawani' were raised at different distances from the contaminant source (Plants of CV 'CO<sub>1</sub>'). Progenies of 'Pusa Sawani' plants were observed for the occurrence of pigmented plants. Out-crossing could be recorded only upto 30m in two trials. It is suggested that the isolation distance for okra seed production can be refixed as 30m for certified and 50m for foundation seed classes.

Genetic purity is the primary attribute of a quality seed. Maintaining isolation distance in space is a means of achieving high genetic purity in seeds. Okra (*Abelmoschus esculentus* L.) is an important vegetable crop grown extensively in our country. For seed production in this crop, an isolation distance of 400m for foundation seed class and 200m for certified seed class is recommended (Anon., 1971). The present study was conducted with the objective of elucidating information on percentage outcrossing at different distances of the seed crop from the contaminating source in okra.

### MATERIALS AND METHODS

The study was conducted with okra CV 'Pusa Sawani' as seed crop and CV 'CO<sub>1</sub>' as contaminating source in the Vegetable Research Station, Palur.

#### Fixing marker character

Plants of okra CV 'Pusa Sawani' and CV 'CO<sub>1</sub>' were raised during February, 1988 and the direct and reciprocal crosses were made. Crossed seeds were sown in June '88 for progeny observation.

#### Out-crossing study

First trial was laid out in November '88. Plants of CV 'CO<sub>1</sub>' were raised in the eastern end of the farm in an area of 40m<sup>2</sup> plot. Plants of 'Pusa Sawani' were raised at every 10 m interval upto 490m from the 'CO<sub>1</sub>' plot. Each 'Pusa Sawani'

plot consisted of 4 rows of 3 m length. Recommended package of practices were followed.

Matured pods were harvested in three pickings from the 'Pusa Sawani' plots. Whole quantity of seeds obtained from each plot was sown in April '89 for progeny evaluation. Number of seedlings showing red pigmentation was recorded, removed from the plot and seeds harvested from these progeny plants were again shown (500 seeds from each plot) in September '89 for observing the second generation progeny plants for red pigmentation.

Meanwhile, the trial was repeated with 'CO<sub>1</sub>' plants on the western side and 'Pusa Sawani' plants at 10m interval upto 300m from 'CO<sub>1</sub>' plot. In this trial also, three pickings of fruits were done in the 'Pusa Sawani' plots. Plot size and package of practices were the same as in the previous trial. Seeds were sown in September '89 for progeny evaluation (first generation).

### RESULTS AND DISCUSSION:

Plants of okra CV 'CO<sub>1</sub>' is characteristic of having red pigmentation on the stem, petiole and fruits. Crossing was done between these plants and the plants of CV 'Pusa Sawani' to ascertain whether the red pigmentation character can act as a marker. Monogenic control of pigmentation of calyx, corolla and fruit colour in okra has been reported. White fruit colour is dominant to green

Table 1. Per cent out-crossing in okra CV 'Pusa Sawani'

Distance (m)	Per cent out-crossing					
	Trial I			Trial II		
	PI	PII	PIII	PI	PII	PIII
10	3.5	0.0	0.0	1.3	2.4	2.1
20	6.7	0.0	0.0	1.2	0.5	1.8
30	3.4	0.0	0.0	1.0	0.0	1.5
40	0.0	0.0	0.0	0.0	0.0	0.0

(Thakur and Arora, 1986). In the present study, all the plants from the seeds of direct and reciprocal crosses of 'Pusa Sawani' x 'CO 1' revealed red pigmentation confirming that this colour is dominant to green colour and can act as a marker in the isolation experiment.

Okra is potentially a self-pollinated crop. Because of its showy corolla, the possibility of cross pollination by insects cannot be ruled out. Consequently cross pollination to the extent of 4.0 to 42.2 per cent has been reported (Thakur and Arora 1986). In the present study, percentage out crossing varied from 0.5 to 6.7 depending upon the distance of the contaminating source and picking (Table 1). In trial I, crossing was noticed only in

first picking seeds; whereas, in trial II crossing was observed in all three pickings. In both the trials, no crossing could be recorded beyond 30m isolation provided. Hence, it became evident that for okra seed production, the isolation distance requirement can be reduced to 30m for certified seed and 50 m for foundation seed class (providing an additional safeguard of 20m). For cotton, (*Gossypium histutum* L), the recommended isolation distances are 30 and 50m for certified and foundation seed classes, respectively. It will be interesting to note that both okra and cotton belong to the same family, Malvaceae, with similar floral structures.

Second generation seeds of the first trial did not give any pigmented plant. It was expected since all the pigmented plants from first generation seeds were removed before flowering and more so this character was governed by a single dominant gene.

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## CHARACTERISTICS OF ROOTS AND NODULATION IN LEGUMES

R.MURUGESAN, S.ANTHONI RAJ and S.R.SREE RANGASAMY

Dept. of Microbiology, Tamil Nadu Agrl. University, Coimbatore.

#### ABSTRACT

A comparative study on the characteristics of root system was made between certain profusely nodulating and non-nodulating (21 legumes; 14 genera) to assess the influence of various factors on nodulation. There existed no relation between root hair or thickness of the root or reduction in the cortex and nodulation in these legumes. The low or high levels of sugars, total phenols and aminoacids in roots also had no relation to the nodulation of legumes. The results indicated that the factors tested in this investigation may not be the sole reasons for non nodulation of certain legumes.

Leguminous species exhibit a wide variation in nodulation (Lim and Burton, 1982). Nodulation is common in Papilionoideae and Mimosoideae plants while about 70 per cent of Caesalpinoideae lack nodulation (Allen and Allen, 1961). Based on the nodulation profile of the genus *Cassia* of Caesalpinoideae it was concluded that the absence of nodulation was due to morphological factors like absence of root hairs, meagre production of rootlets, reduced cortex, presence of antibacterial

compounds like phenols and immobilization of rhizobial cells even if they enter into the root system (Allen and Allen, 1976). In the present investigation a comparative study was made on the characteristics of root system viz., colour, thickness of roots and cortex and the contents of sugars, aminoacids and phenolic compounds in selected nodulating and non-nodulating legume species and the results are presented here.