

Prediction of Plant Height in Okra [*Abelmoschus esculentus* (L.) Moench] through Seedling Markers

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Okra is especially valued for its tender and delicious fruits in different parts of the country. It has a great potential for earning foreign exchange and accounts for about 60% of the export of fresh vegetables excluding potato, onion and garlic. Plant height in okra affects the effective flowering branches and ultimately fruit yield. Wide range of plant height has been observed in okra and farmers fail to understand the plant habit on or before sowing of the crop. The present investigation was carried out with 25 okra cultivars at Indian Institute of Vegetable Research, Varanasi to find out seedling markers for plant height in okra. The observation were recorded on germination percentage, plumule length/shoot length, radical length, total seedling length, seedling fresh weight, seedling dry weight, dry matter percentage and plant height. The plant height ranged from 43.36 cm (No. 315) to 125.06 cm (IIVR-10). The maximum plumule length was found in HRB-55 (17.5 cm) and IIVR-10 (17.47) while minimum was recorded from No. 315 (10.60) and VRO-5 (11.60). Results indicated that varieties No. 315 and VRO-5 were found bushy in nature as well as with shortest plumule and radical length. None of the other characters had any direct relationship with plant height. Therefore, on the basis of plumule and radical length, the plant height in okra could be predicted.

Key Words: Okra, Variability, Correlation, Path analysis

Introduction

Okra (*Abelmoschus esculentus* L.) belongs to family *Malvaceae* known for its tender and delicious fruits in different parts of the country. It has a great potential for earning foreign exchange and accounts for about 60% of the export of fresh vegetables excluding potato, onion and garlic. Due to high iodine contents, the fruits are considered useful for control of goitre. Plant height in okra affects the effective flowering branches and ultimately fruit yield. Wide range of plant height has been observed in okra and farmers fails to understand the plant habit on or before sowing of the crop. So, present investigation was carried out with 25 okra cultivars at Indian Institute of Vegetable Research, Varanasi to find out seedling markers for plant height in okra.

Materials and Methods

Twenty-five okra genotypes selected for this study were diverse in plant height. A total of 75 seed of each genotype were grown in three replications in nursery bed. The observations were recorded on germination percentage, plumule length (cm), radical length (cm), total seedling length (cm), seedling fresh weight (g), seedling dry weight (g), and finally plant height (cm). For plant height, the seed were sown in the field and all the recommended package of practices were followed for raising a good crop.

Results and Discussion

The analysis of variance due to genotypes were found highly significant for all the characters studied. The germination percentage ranges from 43.33 to 93.33 (Table 1). The genotype EMS 8-1 showed the maximum (93.33 %) germination followed by NRO-4 (85.33%) and DVR-1 (84.66%) while Prabhani Kranti showed the minimum germination percentage (49.33%). Highest plumule length (shoot length) was found in HRB-55 (17.5 cm) followed by IIVR-10 (17.46 cm) and Larm-1 (17.03 cm) while lowest was recorded from No. 315 (10.6 cm) followed by VRO-5 (11.60 cm). Maximum radical length was found in VROH-2 (6.01 cm) followed by Arka Anamika (5.76 cm) and minimum radical length was recorded in no. 315 followed by VRO-5 (3.16 cm). The maximum total seedling length was found in HRB-55 (23.26 cm) followed by Arka Anamika (22.6 cm) and IIVR-10 (22.24 cm) whereas shortest seedling length was found in No. 315 (13.66 cm) followed by VRO-5 (13.66 cm).

The maximum seedlings fresh weight was recorded from cultivars P-7 (2.79 g) followed by DVR-3 (2.77 g) Larm-1 (2.77 g) and VRO-5 (2.76 g) whereas minimum was recorded in Arka Abhey (2.23 g) and VROH-4 (2.30 g). There is no significant difference for seedling dry weight among genotypes (Table 2). The maximum seedling dry matter per cent was found in

Table 1. Seedling characters of different genotypes of okra

Genotypes	Germination per cent	Plumule length (cm)	Radical length (cm)	Total length of seedlings (cm)
Arka Abhey	66.66	13.03	3.93	19.96
Arka Anamika	61.33	16.83	5.77	22.60
DVR-1	84.66	12.70	4.03	16.73
DVR-2	77.33	15.60	4.33	19.93
DVR-3	84.67	16.60	5.20	21.80
EMS-8-1	93.33	13.51	4.63	18.14
HRB-55	73.33	17.50	5.77	23.26
HRB-9-2	69.33	13.69	4.50	18.16
IIVR-10	76.66	17.47	4.77	22.24
IIVR-11	73.33	16.17	5.03	20.53
Larm-1	53.33	17.03	4.83	21.86
No. 315	70.66	10.6	3.07	13.66
P-7	70.66	16.50	5.30	21.86
Parbhani Kranti	49.33	15.80	4.13	19.93
Punjab Padmini	53.33	15.10	4.70	19.86
Pusa Makhamali	66.66	15.43	4.73	20.16
Pusa Sawani	50.66	15.10	4.33	19.73
VRO-5	80.00	11.60	3.17	14.76
VRO-6	84.00	14.60	4.07	18.66
VROH-1	80.00	14.33	5.07	19.40
VROH-2	80.00	16.63	6.01	21.91
VROH-3	70.66	14.07	4.53	18.60
VROH-4	85.33	12.63	3.60	16.23
VROH-5	74.66	14.43	4.23	18.66
VROH-6	74.66	16.03	5.77	21.80
CD at 5%	5.22	1.35	0.72	1.70

Table 2. Seedling characters of different genotypes of okra

Genotypes	Seedling fresh weight (g)	Seedling dry weight (g)	Dry matter (%)	Final plant height (cm)
No. 315	2.44	0.11	4.50	43.36
DVR-2	2.44	0.13	5.11	113.42
VROH-2	2.72	0.12	4.65	104.14
IIVR-11	2.53	0.11	4.34	125.06
DVR-1	2.65	0.13	5.18	95.16
VRO-5	2.76	0.12	4.47	61.03
Arka Anamika	2.67	0.13	4.42	99.70
VRO-6	2.40	0.11	4.70	121.2
Pusa Sawani	2.39	0.13	5.68	106.8
P-7	2.79	0.11	4.14	83.9
VROH-4	2.30	0.13	5.63	109.66
Punjab Padmini	2.66	0.13	5.21	96.76
VROH-3	2.55	0.14	5.48	98.36
EMS-8-1	2.48	0.11	4.29	65.36
HRB-9-2	2.51	0.13	5.31	77.03
VROH-5	2.66	0.13	4.99	123.60
HRB-55	2.59	0.11	4.24	71.1
Arka Abhey	2.23	0.12	5.00	96.03
Larm-1	2.77	0.11	4.08	106.0
Parbhani Kranti	2.69	0.12	4.55	93.83
Pusa Makhamali	2.57	0.12	4.67	75.47
DVR-3	2.77	0.13	4.79	97.97
IIVR-10	2.70	0.11	4.19	125.06
VROH-6	2.57	0.13	4.79	141.24
VROH-1	2.56	0.14	5.42	105.08
CD at 5%	0.38	0.03	0.74	12.42

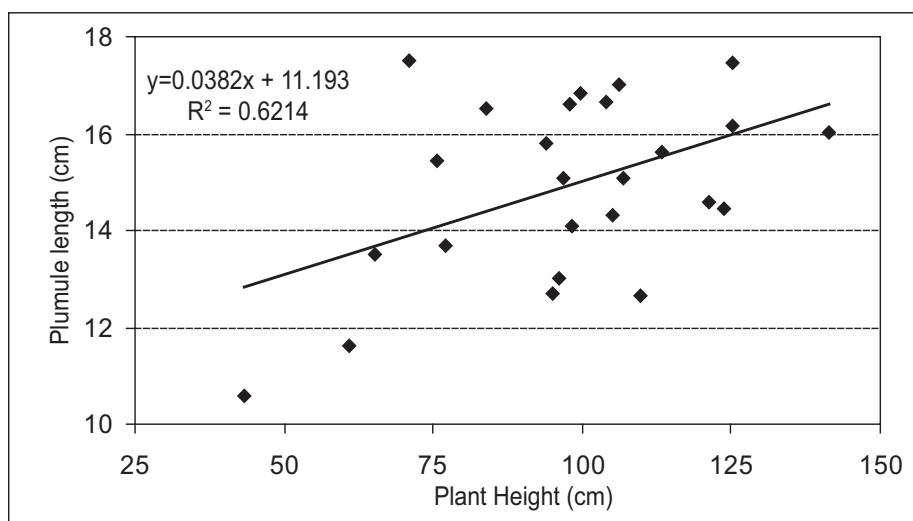


Fig. 1: Scatter plots illustrating the correlation between plant height and plumule length

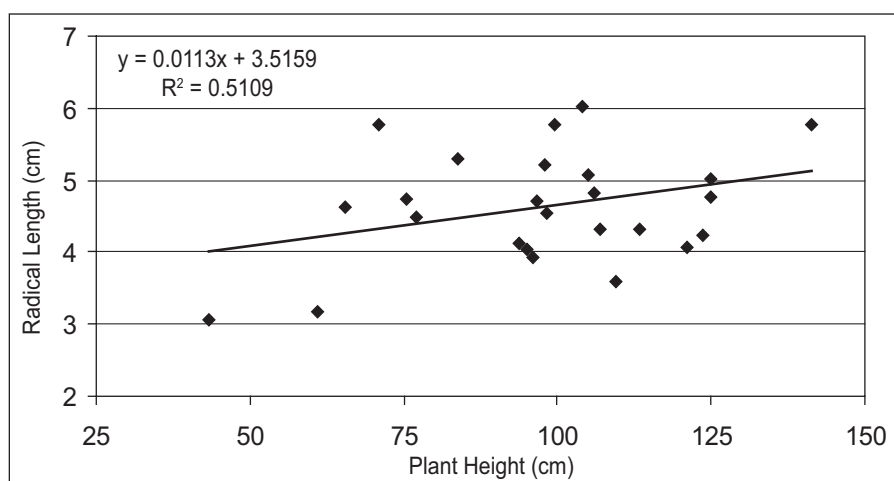


Fig. 2: Scatter plots illustrating the correlation between plant height and radical length

Pusa Sawani (5.68%) followed by VROH-4 (4.14%) while minimum was found in Larm-1 (4.08%) followed by P-7 (4.14%) and IIVR-10 (4.19%). The tallest genotype was VROH-6 (141.24 cm) followed by IIVR-10 (125.06) and IIVR-11 (125.06) while the smallest genotype was No. 315 (43.36 cm) followed by VRO-5 (61.03 cm).

Relationship between Plant Height and Plumule and Radical Length

There is a linear relationship between plant height and plumule length (Fig. 1) and also with radical length (Fig. 2). The genotypes which have higher plant height also have higher plumule and radical length. Martin and Rhode (1983) also found the linear relationship of plant height with radical length. The genotype No. 315 and VRO-5 were found bushy in nature as well as with shortest

plumule and radical length. With the increase in plant height, plumule and radical length also increased. All other characters did not have any clear cut relationship with plant height. These results are in close agreement with the finding of Berry *et al.* (1998). Thus, it is concluded that based on plumule and radical length, the nature of plant growth at seedling stage in okra can be predicted.

References

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