

Maternal Effect on Growth of Melon Seedlings

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Seed size varies considerably in melon (*Cucumis melo* L.). Weight of 100 seeds varies from less than 0.5 g to more than 7 g. This seed size variation influences seedling size and is very troublesome in growth studies on young plants.

We reported here observations made on 2 lines, 'Persian Small Type' (P) and 'Freeman's Cucumber' (FC), and their reciprocal F1 hybrids.

Methods

11 January : sowing in 6x6 cm pots in heated greenhouse

11 February : measure of one cotyledon on 10 plants

27 February : measure of young seedlings on 7 plants repotting in 12x12 cm pots

12 April : measurements on 7 plants

Plants were not pinched.

Statistical comparison of means is made by Student's t test.

Results

The dates of unfolding of successive leaves are reported in Figure 1.

Other observations are reported in Table 1.

Figure 1. Date of unfolding of successive leaves.

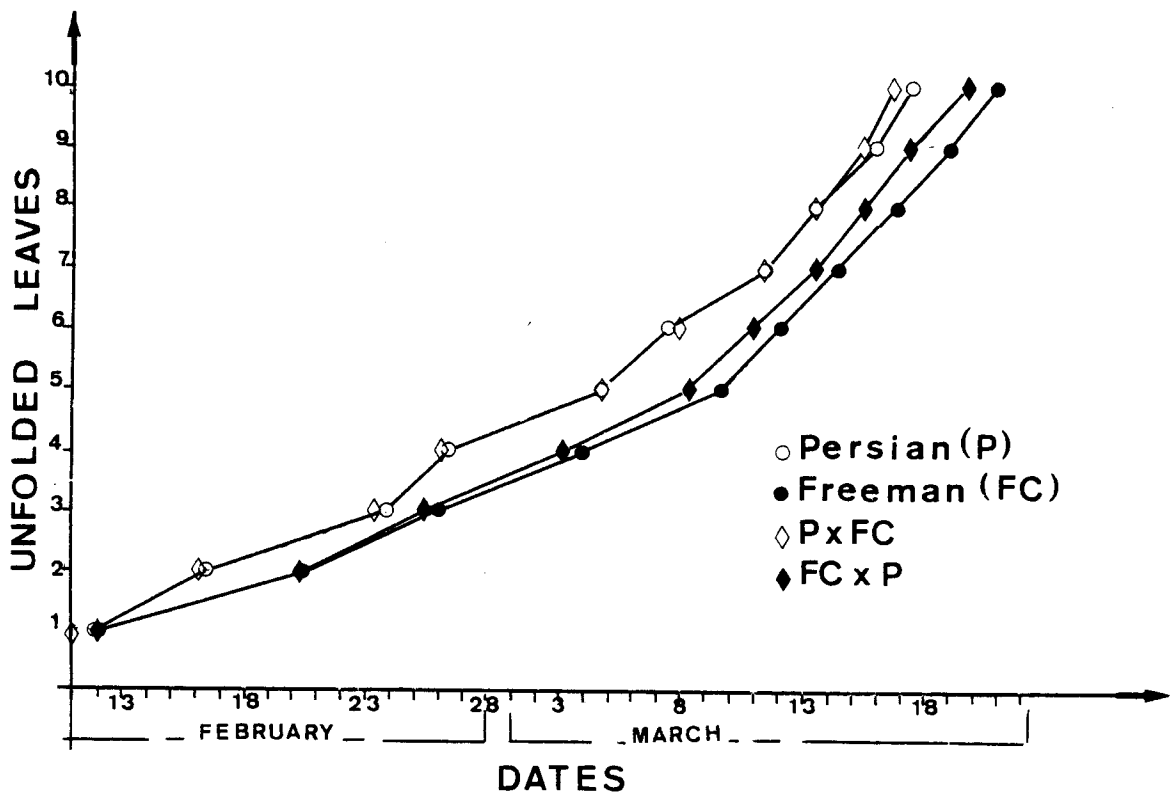


Table 1. Measures of different characters on 'Persian Small Type' (P), 'Freeman's Cucumber' (FC) and their reciprocal F1 hybrids.

Date of measures	Observation	FC	FCxP	PxFC	P	$\frac{P}{F}$	$\frac{PxFC}{FCxP}$
	Weight of 100 seeds ^Y	2.0	2.0	5.3	5.0	2.5	
11 February	cotyledon length = L (mm)	22 a ^z	24 b	38 d	36 c	1.6	1.6
	cotyledon width = l (mm)	14 a	14 a	23 c	21 b	1.5	1.6
	cotyledon ^Y Lxl (mm ²)	306	341	851	761	2.5	2.5
27 February	hypocotyl length (mm)	38 a	54 b	70 c	84 d	2.2	1.3
	number of leaves ^Y	3.0	3.0	3.6	3.9	1.3	1.2
	length of the first leaf (mm)	59 a	67 b	81 d	76 c	1.3	1.2
	total length of leaves	115 a	130 b	192 d	186 c	1.6	1.5
12 April	fresh weight (g)	107 a	119 a	139 b	128 b	1.2	1.2
	number of leaves on main stem	17.6	17.4	18.2	16.8	1.0	1.0
	main stem length (cm)	86	117	119	109	1.3	1.0
	ramification number	2.3 a	2.9 b	2.8 b	3.7 c	1.6	1.0
	total length of ramification (cm)	122	123	160	131	1.1	1.3
	number of plants with female flowers ^Y	3	2	6	0		
		date of first ramification ^Y	14/03	12/03	10/03	11/03	
	date of tendrill apparition ^Y	9/03	10/03	4/03	12/03		
	date of male flower apparition ^Y	3/04	3/04	1/04	3/04		

z = mean separation in rows by student's t test, 5 % level

y = no statistical analysis

Discussion

As expected, cotyledon size is very dependent on maternal seed size and a significant maternal effect is measured on one month old seedlings. At the end of the trial, when the plants were more than 2 months old, maternal effect was still significant for fresh weight but not significant for the other measured characters.

The F1 hybrid PxFC is earlier than the reciprocal FCxP for apparition of ramifications, tendrils, male and female flowers. We cannot exclude that other factors than seed size may contribute to the maternal effect but surely seed size is a major factor because it is found in every observed cross.

Conclusion

The influence of seed size cannot be neglected when breeders wish to screen young plants for vigor or in adaptation studies.