

Compatibility among Cucumis melo varieties inodorus, conomon, flexuosus, momordica, and utilissimus

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Naudin classified Cucumis melo into Cucumis melo var. cantaloupensis Naud.; Cucumis melo var. reticulatus Naud.; Cucumis melo var. inodorus Naud.; Cucumis melo var. flexuosus Naud.; Cucumis melo var. conomon Mak.; Cucumis melo var. chito Naud.; and Cucumis melo var. dudain Naud. based on fruit and plant characteristics (3). Pangelo reported that all the seven varieties reported by Naudin (3) hybridized readily with one another and there was apparently very little sterility even among progenies from crosses involving variant types (4). The snap melon (Cucumis melo var. momordica) and long melon (Cucumis melo var. var. utilissimus) were described by Kirtikar and Basu and were of typical Indian origin (1). The lines CS26 (Cucumis melo var. conomon) and CS52 (Cucumis melo var. momordica) collected indigenously differed from other melon varieties for their plant habit and fruit characteristics. CS26 is grown in the midlands of Kerala (India) for ripened fruits. These fruits are stored in the open for up to one year for year around use. CS52 is grown on the coasts of Kerala (India) during summer months for their ripened and cracked fruits which yield delicious flesh. The present study was carried out to determine compatibility of these two varieties with Cucumis melo var. inodorus Naud.; Cucumis melo var. flexuosus Naud.; and Cucumis melo var. utilissimus Duth and Full. (Table 1). The varieties were grown at a spacing of 1.5 m between plants and 3 m between rows with ten pits for each, having 2 plants/pit. Bagging of the male and female matured flower buds with butterpaper bags was done in the evening. Pollination was performed the next morning between 6:30-8:30 A.M., when the stigmas were receptive. The pollinated flowers were covered and labelled. along with selfs, 20 cross combinations (including reciprocals) among the five selected melons were made by hand pollination. The crossability index was then calculated (5). The genetic distances among the five botanical varieties were calculated as per Mahalanobis (2). The genetic distance was based on nodes to first female flower, fruit weight, seeds/fruit and fruits/plant.

All the five botanical varieties of Cucumis melo were found to be crossable with each other (Table 2). No significant reciprocal effect was observed indicating that the maternal parent did not have any influence on crossability index. The crossability index was the highest for oriental pickling melon x long melon (79.19%) and the lowest for muskmelon x snake melon (47.15%). It was lesser than 50% in muskmelon x snake melon, long melon x muskmelon, long melon x snap melon and snap melon x muskmelon. Crossability index was more than 70% in oriental pickling melon x long melon and snake melon x oriental pickling melon. In other crosses, crossability index varied from 50 to 70%.

Genetic divergance could also be considered as a measure of affinity (Table 3). Muskmelon and snake melon were the most divergent ($D^2 = 14.49$) while long melon and snap melon were the closest ($D^2 = 0.38$). In the order of affinity, the five melon varieties could be arranged as oriental pickling melon, long melon, snap melon, snake melon, and muskmelon.

Table 1. Source, chromosome number, and distinguishing morphological characters of five botanical varieties of Cucumis melo.

| Acc. No. | Botanical varieties | 2n. | Origin | Fruit rind | Fruit shape | Flesh color | Fruit flavor | Sweetness | Cracking |
|----------|--|-----|-------------------|-----------------------------|------------------------|-------------|--------------|------------|----------|
| CS26 | Oriental pickling melon (<u>C. melo</u> var. <u>conomon</u>) | 24 | Trichur (Kerala) | Golden yellow | Long oval | White | Poor | Less sweet | No |
| CML8 | Muskmelon (<u>C. melo</u> var. <u>inodorus</u>) | 24 | Ludhiana (Punjab) | Light green | Spherical | Light green | Good | Very sweet | No |
| CS4 | Long melon (<u>C. melo</u> var. <u>utilissimus</u>) | 24 | Pantnagar (U.P.) | Greenish white with stripes | Elliptical & elongated | Pale white | Poor | Less sweet | No |
| CS50 | Snake melon (<u>C. melo</u> var. <u>flexuosus</u>) | 24 | Pantnagar (U.P.) | Yellowish with mottling | Club shaped | Pale yellow | Poor | Less sweet | No |
| CS52 | Snap melon (<u>C. melo</u> var. <u>momordica</u>) | 24 | Cochin (Kerala) | Yellow | Oblong | White | Poor | Less sweet | Yes |

Table 2. Crossability index (CI) among five botanical varieties of Cucumis melo.

| | O | M | L | F | S |
|---|-----|-----|------|-----|------|
| O | --- | *** | **** | *** | *** |
| M | ** | --- | ** | * | *** |
| L | *** | * | --- | ** | * |
| F | *** | ** | ** | --- | **** |
| S | ** | ** | * | *** | --- |

* - CI < 50% (Generally crossable)

** - CI > 50% < 60% (moderately crossable)

*** - CI > 60% < 70% (highly crossable)

**** - CI > 70% (Perfectly crossable)

O - Oriental pickling melon, M - muskmelon, L - long melon, F - snake melon, S - snap melon.

Table 3. Genetic distance (D^2) among the five botanical varieties of Cucumis melo.

| Parents | O | M | L | F | S |
|---------|------|-------|------|-------|------|
| O | ---- | 5.29 | 2.62 | 3.88 | 3.40 |
| M | 5.29 | ----- | 9.16 | 14.49 | 8.79 |
| L | 2.62 | 9.16 | ---- | 2.94 | 0.38 |
| F | 3.88 | 14.49 | 2.94 | ---- | 1.58 |
| S | 3.40 | 8.79 | 0.38 | 1.58 | ---- |

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