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SURVEY ON COMPATIBILITY OF MELON *(Cucumis melo* L.*)* AND CANTALOUPE (*Cucumis melo* var. cantaloupensis) LATERAL BRANCHES GRAFTED ONTO CUCURBITA ROOTSTOCKS

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Abstract. The study was conducted at the experimental farm of Can Tho University, aimed to determine the compatibility of melon and cantaloupe propagated by grafting lateral branches onto Cucurbita rootstocks for the best grafting survival rate, growth, yield and fruit quality. The experiment was arranged in a 2-factorial design with 4 replications, each replication had 5 plants. Factor 1 was 2 scion cultivars: (i) Melon (Kim Hong Ngoc), (ii) Cantaloupe (Kim Ngoc Duong) and factor 2 was 3 rootstocks: (i) "Gang" melon, (ii) Wax gourd, (iii) Luffa. The results showed that melon and cantaloupe grafted onto Cucrurbita rootstocks were similar in compatibility, were not significantly different in terms of survival rate 10 days after grafting, fruit weight of grafted melon was better than the grafted cantaloupe, fruit yield (fluctuated 14.9-15.9 tons/ha), fruit bearing rate was equivalent to 78.3%, yield components, plant growth (stem length, number of leaves, leaf size and rootstock diameter/scion diameter). The melon fruit quality (fruit flesh thickness and Brix) was higher than that of cantaloupe. Grafted plants with wax gourd and "Gang" melon rootstocks were similar in compatibility, had statistically lower survival rates 10 days after grafting than those grafted with luffa rootstocks, but had statistically higher than those grafted with luffa rootstock in terms of fruit yield (19.6-19.9 t/ha, approximately 2.9 times higher), fruit bearing rate (more than 2 times), yield components, plant growth and fruit flesh thickness. Luffa rootstock was compatible in nursery (highest survival rate) and not compatible from transplanting to harvesting.

Keywords: compatibility, Cucurbita rootstocks, grafting, lateral branches as scions, melon and cantaloupe, survival rate, yield

1 Introduction

Melon (*Cucumis melo* L.), cantaloupe (*Cucumis melo* var. cantaloupensis) are fruits with high nutritional value, rich in polyphenols-natural antioxidants that can prevent cancer, enhance immune activity [1] and are loved by consumers because of their high nutritional value, beautiful appearance and display value (for ornamental) [2, 3]. High consumer demand but slow growth in cultivated area due to high greenhouse costs, expensive and scarce imported F1 hybrid seeds. Grafting is a method of asexual plant propagation that has been widely used in horticulture, it has been most commonly used for the propagation of fruit trees grown commercially. While, vegetable crops are often grafted including tomato, chilli, watermelon, cucumber, mainly seedlings were sown from seed as scions and are grafted onto diseases resistant rootstocks. Khereba et al. [4] published the propagation of seedless watermelon using leteral branhes by grafting with the highest survival rate after grafting (94.4%) on *Lagenaria siceraria* rootstock, the grafted plants flowered earlier, had a 72.0% higher yield and better fruit characteristics than the control. At the same time, the grafted plants reduced some soil-borne diseases and some abiotic stresses [5]. Bitter gourd grafted on luffa (*Lufa cylindrica* (L.) Roem. rootstock gave 26% higher yield than ungrafted control [6]. Research results of Le Van Tan et al. [7] determined that melon and cantaloupe seedlings grafted onto wax gourd (*Benicasa cerifera*) and "Gang" melon (*Cucumis melo* var. conomon) rootstocks gave higher fruit yield than ungrafting as control. So far there has been no published research on the propagation of melons and cantaloupes using leteral branhes by grafting. In particular, Kim Hong Ngoc melon and Kim Ngoc Duong melon cultivars are quite expensive. Therefore, this study was conducted to determine the compatibility of melon and cantaloupe propagated by grafting lateral branches onto Cucurbita rootstocks for the best grafting survival rate, growth, yield and fruit quality.

2 Materials and methods

2.1 Materials

Kim Hong Ngoc melon cultivar F1 hybrid (distributed by Chia Tai Seed Company) and Kim Ngoc Duong cantaloupe cultivar F1 hybrid (distributed by Hai Mui Ten Do Company). The rootstocks of "Gang" melon (*Cucumis melo* var. Conomon), wax gourd (*Benincasa hispida* (Thumb.)) and luffa (*Luffa cylindrica* (L.) Roem.) rootstocks were all local varieties, nursery trays, plastic cups, razor blades, alcohol, grafting clips, 20-15-15 slow-release fertilizer, organic fertilizer, pesticides and some necessary materials.

2.2 Methods

Experimental design: The experiment was arranged in a 2-factorial design with 4 replications, each replication had 5 plants. Factor 1 was 2 scion species (melon and cantaloupe): 1/ Melon, Kim Hong Ngoc cultivar, 2/ Cantaloupe, Kim Ngoc Duong cultivar and factor 2 was 3 rootstock species in Cucurbitaceae, local varieties (Cucurbita rootstocks): 1/ Wax gourd, 2/ "Gang" melon and 3/ Luffa. The pots were arranged in rows with drippers in each pot.

Cultural practices

Research site and cultural practices: The study was conducted at the experimental farm of the College of Agriculture, Can Tho University from December 2023 to March 2024. Grafting plants were grown in pots, each pot was grown 1 grafting plant, fertilized with 20 g/pot of slow-release fertilizer 20-15-15 and 20 g chicken manure, drip irrigation, in a greenhouse. Applying the monocotyledon clip grafting method for melon and cantaloupe onto Cucurbitaceae.

Prepare the rootstocks: Soak the "Gang" melon, wax gourd and luffa seeds in warm water (ratio 2 boiling: 3 cold) and incubate the seeds in a damp cloth for 4-5 days and nights until the seeds germinate. When the seeds had just sprouted, sow them in a plastic cup (including soil, coconut dirt, organic fertilizer), perform grafting when the "Gang' melon and luffa rootstocks were 12 days old and the wax gourd rootstock was 15 days old after sowing.

Preparing the scions: Kim Hong Ngoc melon lateral branches and Kim Ngoc Duong cantaloupe lateral branches were cut from the mother plant at leaf axils 1-8 and 13-25 on the main stem (the mother plant bore 01 fruit at leaf axils 9-12).

Table 1. The combination of 2 factor experiments (2 types of melon and 3 types of rootstock)

Rootstocks (B)	**Scions (A)**	
	Melon (Kim Hong Ngoc)	Cantaloupe (Kim Ngoc Duong)
Wax gourd	Melon-Wax gourd	Cantaloupe-Wax gourd
"Gang" melon	Melon-"Gang" melon	Cantaloupe-"Gang" melon
Luffa	Melon-Luffa	Cantaloupe-Luffa

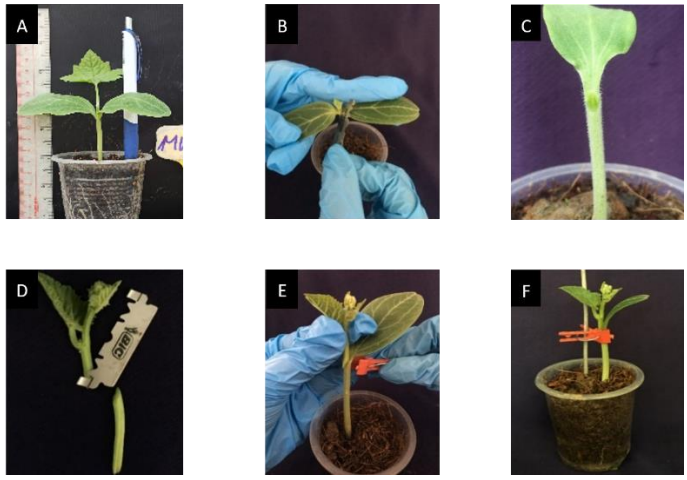

Figure 1. Monocotyledon clip grafting technique: (A) Luffa rootstock, (B) Cut and leave 1 cotyledon of the rootstock, (C) The rootstock cross section, (D) Cut off the tip of the melon shoot, (E) Press the 2 cut sides of the melon tip and the Cucurbita rootstocks and fix the graft with a clip, (F) Fix the grafted plant by a stick

Data collection: Survival rate after grafting of each treatments, anatomical observation of the grafted junction (one cultivar of each rootstock species), using with melon and cantaloupe were selected as the scions, and their anatomical analyses were performed on day 10 after grafting,-main stem length and leaf number per main stem (measured from the ground to the tip of the main stem), leaf size (leaf height: Measured the leaf blade from where the leaf attaches to the petiole to the leaf tip and leaf width: the widest width of the leaf at 10, 15 and 20 at the fruit bearing), ratio of rootstock diameter/scion diameter (base of rootstock and scion), fruit size (fruit height: from the fruit bottom to the top, fruit circumference measured at the widest part of the fruit), fruit weight, fruit bearing rate (plant rate bearing 1 fruit), fruit yield, Brix degree and fruit flesh thickness.

Statistical analysis: Statistical data processing using SPSS 22.0 software, analysis of variance (ANOVA) were used to test for significant differences among treatments. Significance between means was tested by Duncan's multiple range test at the 0.01 or 0.05 significance levels.

3 Results and discussion

3.1 Survival rate after grafting

The results presented in Table 2 and 3 showed that the survival rate (percentage of successful grafting) after grafting of melon and cantaloupe lateral branches (as scions) at below (axils 1-8) and above (axils 13-25) the fruit-bearing position (leaf axils 9-12) had no interaction between scions and rootstocks. Regarding scions, the average survival rate after grafting of melon and

cantaloupe lateral branches were not significantly different through statistical analysis and gradually decreased over the 3-time surveys, fluctuated from 95.6-95.9% (below) and 73.6-75.8% (above) respectively at 4 days after grafting (DAG) to 89.8-90.2% (below) and 55.4-56.9% (above) respectively at 10 DAG.

Regarding rootstocks, the average survival rate after grafting of luffa rootstock with lateral branches as scions of melon and cantaloupe were always the highest, 96.7 and 81.2% below and above the fruit position at 4 DAG, decreasing to 95.1 and 63.4%, respectively at 10 DAG. The lowest survival rate was in the combination of melon and cantaloupe lateral branches grafted on wax gourd rootstock, 94.7% (below) and 63.7% (above) at 4 DAG, decreasing to 85.8% (below) and 56.9% (above) at- 7 DAG down to 83.6% (below) and 45.6% (above) at 10 DAG. The reason why the survival rate after grafting of lateral branches in the position under the leaf bearing fruit was higher than that of the position above the leaf bearing fruit was because the lateral branches

Table 2. Survival rate after grafting of melon and cantaloupe lateral branches at below the fruit bearing position (axils 1-8) grafted onto Cucurbita rootstocks

Scions (A)	Rootstocks (B)	Survival rate (%)		
		4 DAG	7 DAG	10 DAG
Melon	Wax gourd	94.9	85.3	83.3
	"Gang" melon	96.0	92.0	91.3
	Luffa	96.9	95.0	95.0
	TB (A)	95.9	90.8	89.8
Cantaloupe	Wax gourd	94.5	86.4	84.0
	"Gang" melon	95.8	92.0	91.2
	Luffa	96.5	95.5	95.3
	TB (A)	95.6	90.9	90.2
TB (B)	Wax gourd	94.7^{B}	85.8^{C}	83.6^{C}
	"Gang" melon	95.9^{AB}	92.0^{B}	91.3^{B}
	Luffa	96.7^{A}	95.3^{A}	95.1^{A}
F(A)		ns	ns	ns
F(B)		**	**	**
F(AxB)		ns	ns	ns
CV (%)		1,03	1,50	1,06

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, ns: not statistically significant difference. DAG: Days after grafting

Table 3. Survival rate after grafting of melon and cantaloupe lateral branches at above the fruit bearing position (axil of leaf 13-25) grafted onto Cucurbita rootstocks

Scions (A)	Rootstocks (B)	Survival rate (%)		
		4 DAG	7 DAG	10 DAG
Melon	Wax gourd	65.4	55.8	45.5
	"Gang" melon	74.2	60.2	57.8
	Luffa	81.4	68.2	62.9
	TB (A)	73,6	61,4	55.4
Cantaloupe	Wax gourd	69.2	58.1	45.7
	"Gang" melon	77.3	64.1	60.9
	Luffa	80.9	67.3	63.9
	TB (A)	75.8	63.2	56.9
TB (B)	Wax gourd	67.3^{B}	56.9^{C}	45.6^{C}
	"Gang" melon	75.7^{A}	62.2^{B}	59.4^{B}
	Luffa	81.2^{A}	67.7^{A}	63.4^{A}
F(A)		ns	ns	ns
F(B)		**	**	**
F(AxB)		ns	ns	ns
CV (%)		5.79	3.82	2.81

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, ns: not statistically significant difference. DAG: Days after grafting

below the fruit bearing in the stage when the grafted plants were preparing to flower and bear fruit, they were very healthy while lateral branches above the fruit bearing were very weak, nutrients were concentrated to nourish the fruit, so all later lateral branches had female flower buds, grafted plants in reproductive stage, so the survival rate after grafting was low. This showed good compatibility of the grafted plants, new cells connect the two separate parts to form new vascular tissue, helping to conduct sap from the rootstock to nourish the grafted tip, helping the plant growth. These results were consistent with the finding of Le Thi Bao Chau [8], grafting melon (5-day-old seedlings) onto luffa rootstock was the highest survival rate at 10 DAG.

3.2 Cell anatomy of grafted plants at 10 DAG

The anatomical morphology at the graft junction of the melon and cantaloupe lateral branches with wax gourd, "Gang" melon and luffa rootstocks at 10 DAG showed the level of post-grafting recovery (Figure 2). With the double staining method, the soft tissue after staining with the dye

was shown in purple/pink (Figure 2D), the xylem was shown in green (Figure 2C). New xylem was also formed in the vascular system and connected the rootstock to the scion (Figure 2A). The differentiation of the graft tissue was more clearly observed in the 10 DAG sample with complete tissue fusion at the grafting interface (Figure 2 F, G, H, I, J, K). Observing the cross-sections, the connection between the rootstock and scion (cutting on mother plant from lateral branches 3-5 cm in length and 2,5-3,5 mm in diameter) could be assessed through anatomical features, a strong correlation was observed the anatomical features of the rootstock and scion, especially in the number of soft tissue cells and the size of the conductive tissue. Based on the images of the cross sections (at graft junction), it can be seen that the choice of rootstock played an important role in shaping the development of the grafted shoot. The cross sections of melon, cantaloupe lateral branches onto wax gourd, "Gang" melon rootstocks had compatibility, the xylem vessels (green) and the harmonious space between the soft tissues (purple/pink) were showed the rapid formation of vascular connection between the scion and the rootstock and the rapid recovery of the growth [9]. According to Trinchera et al. [10] reported that the formation of callus at the graft junction was the establishment of xylem and phloem to heal the graft wound continuously, connecting the cut vascular bundles of the scion and the rootstock, and finally cambium formation to form secondary vessels in the graft junctions.

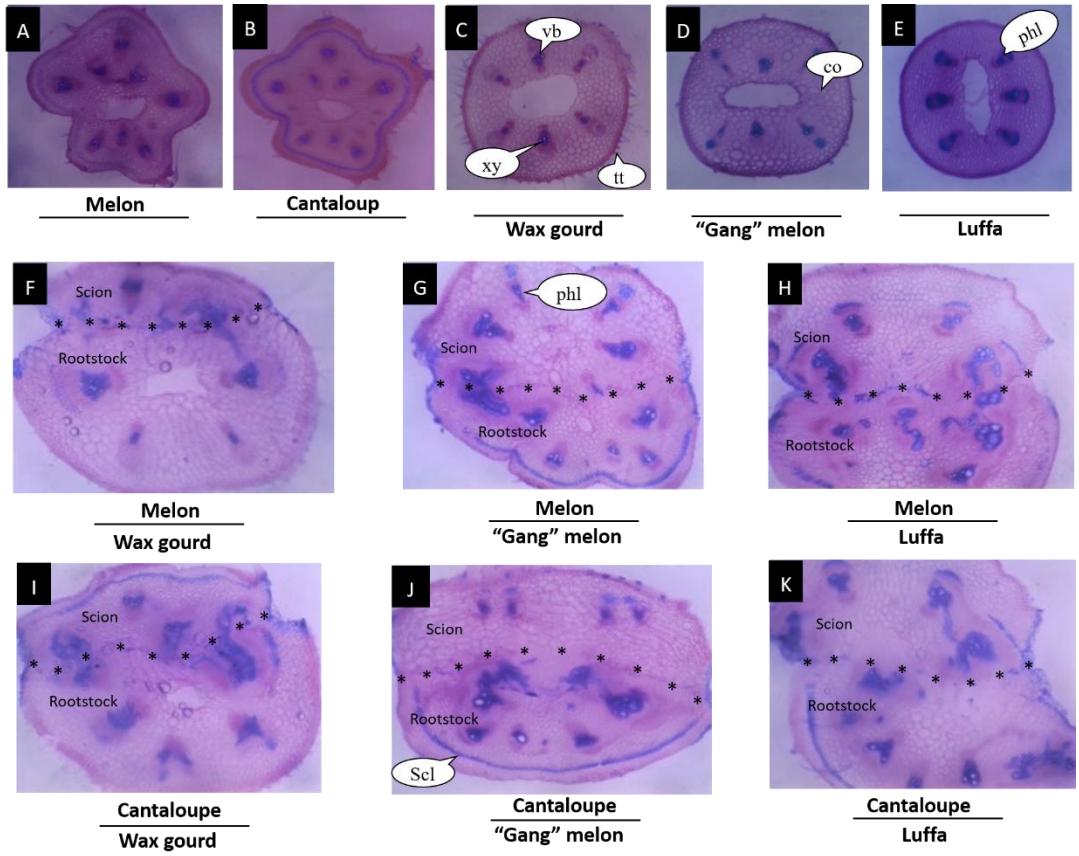

***Figure* 2.** Cross section of ungrafted stem base: A, B, C, D, E and cross section of graft combinations: Melon grafted onto three Cucurbitaceae species: F, G, H, Cantaloupe grafted onto three Cucurbitaceae species: I, J, K on day 10 after grafting. Microscopic observation of the new vascular tissue at graft junction. (co): Soft tissue, (scl): Hard tissue, (phl): Phloem, (tt): Protective hairs, (xy): Xylem, (vb): Vascular bundle. Asterisks indicate graft junction

3.3 Grafted plant growth

The results presented in Table 4 showed that the main stem length, the number of leaves per main stem, the length and width of the leaves on the grafted plants did not interact between the scions and rootstocks at harvest time (60 DAG). Regarding scions, the average length of the main stem (fluctuated from 146-157 cm), the number of leaves per main stem (25.1-25.7 leaves/stem), the length of the leaves (11.5-11.8 cm) and the width of the leaves (15.2-16.6 cm) were not significantly different through statistical analysis. Thus, melon and cantaloupe lateral branches grafted onto Cucurbita rootstocks did not affect the growth of the stem and leaves of the grafted plant. Regarding rootstocks, grafted plants onto wax gourd and "Gang" melon rootstocks were not

Table 4. Growth of melon and cantaloupe lateral branches as scions grafted onto Cucurbita rootstocks at harvest time

Scions (A)	Rootstocks (B)	Harvest time (60 DAG)			
		Main stem length (cm)	Number of leaves (leaves/main stem)	Leaf length (cm)	Leaf width (cm)
Melon	Wax gourd	195	29.0	13.1	18.4
	"Gang" melon	209	29.9	14.5	19.3
	Luffa	65.5	18.2	7.81	7.90
	TB (A)	157	25.7	11.8	15.2
Cantaloupe	Wax gourd	182	27,1	13,0	18,8
	"Gang" melon	187	28.7	14,7	21,0
	Luffa	70.0	19.7	6,88	10,1
	TB (A)	146	25,1	11,5	16,6
TB (B)	Wax gourd	189^{A}	28.1^{A}	13.0^{A}	18.6^{B}
	"Gang" melon	198^{A}	29.3^{A}	14.6^{A}	20.2^{A}
	Luffa	67.7^{B}	18.9^{B}	7.34^{B}	9.00^{C}
F(A)		ns	ns	ns	ns
F(B)		**	**	**	**
F(AxB)		ns	ns	ns	ns
CV (%)		20,6	17,9	11,0	9,94

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, ns: not statistically significant difference. DAG: Days after grafting

significantly different by statistical analysis, main stem length (189-198 cm) and leaves per main stem (24.2-25.7 leaves), leaf length (11.5-11.8 cm), except for the leaf width and higher through statistical analysis than that of luffa rootstock grafted with scions, main stem length (only 67.7 cm), leaf number per main stem (18.9 leaves), leaf length (7.34 cm) and leaf width (9.00 cm). Thus, the wax gourd and "Gang" melon rootstocks effectively increased the growth of grafted cantaloupe and melon lateral branches. This may be due to the longer the grafted melon stem, the more leaves and the larger the leaf size, the more photosynthetic efficiency increases. The number of leaves on the main stem played an important role in the process of photosynthesis to create material to nourish the fruit, this is the basis for increasing fruit size and increasing yield, however, it also depended on leaf size, the larger the leaf size, the better the ability of the plant to photosynthesize [11].

3.4 Stem diameter ratio

The results presented in Table 5 showed that stem diameter ratio (rootstock diameter/scion diameter) was interractive between scions and rootstocks at 35 and 45 DAG, but not at 15 and 60 DAG. Regarding scions, the stem diameter ratio melon and cantaloupe scions grafted onto

Cucurbita rootstocks had no significant difference, fluctuated from 1.34-1.36 at 15 DAG (large rootstock/small scion, not well compatible), but was significantly different through statistical analysis at 35 and 45 DAG. The data values had the same decreasing trend (the closer to 1 the better, well compatible) at 45 DAG (the fruit selection stage) and 60 DAG (harvesting). Thus, the growth of melon and cantaloupe lateral branches grafted onto Cucurbita rootstocks was similar. Regarding rootstocks, the rootstock diameter/scion diameter was significantly different through statistical analysis, the grafting wax gourd rootstock with melon and cantaloupe were always highest at 4 survey times, 1.78 at 15 DAG (planting time), gradually decreasing to 1.26 at harvest time (60 DAG), the next was "Gang" melon. While luffa rootstock combined with melon and cantoloupe scions were always lowest at 4 survey times, from 0.95 at 15 DAG, decreasing to 0.83 at 60 DAG, the older the grafted plants, the lower the ratio of rootstock diameter/scion

Table 5. Stem diameter ratio of melon and cantaloupe lateral branches as scions grafted onto Cucurbita rootstocks

Scions (A)	Rootstocks (B)	Rootstock diameter/scion diameter			
		Planting (15 DAG)	Female flowering (35 DAG)	Fruit selecting (45 DAG)	Harvesting (60 DAG)
Melon	Wax gourd	1.83	1.39^{a}	1.32^{a}	1.31
	"Gang" melon	1.29	1.21^{b}	1.13^{b}	1.14
	Luffa	0.94	0.81^{c}	0.79^{c}	0.79
	TB (A)	1.36	1.14^{A}	1.01^{B}	1.08
Cantaloupe	Wax gourd	1.72	1.24^{a}	1.18^{a}	1.20
	"Gang" melon	1.34	1.05^{b}	1.01^{b}	1.12
	Luffa	0.96	0.86^{c}	0.87^{c}	0.87
	TB (A)	1.34	1.05^{B}	1.02^{A}	1.07
TB (B)	Wax gourd	1.78^{A}	1.32^{A}	1,24^{A}	1.26^{A}
	"Gang" melon	1.33^{B}	1.13^{B}	1.07^{B}	1.13^{B}
	Luffa	0.95^{C}	0.84^{C}	0.83^{C}	0.83^{C}
F(A)		ns	*	*	ns
F(B)		**	**	**	**
F(AxB)		ns	*	**	ns
CV (%)		20,5	19,6	14,2	16,4

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, *: 5% difference, ns: not statistically significant difference. DAG: Days after grafting

diameter (the value is lower than 1, the rootstock stem base was small but the scion stem base was large).

This resulted in increasingly weak grafted plants, demonstrating incompatibility. But luffa rootstock combined with melon and cantoloupe scions showed the highest survival rate at 10 DAG (Table 1), thus the lufa rootstocks was only compatible in the nursery stage.

3.5 Fruit size and weight

The results presented in Table 6 showed that the fruit size and weight of melon and cantaloupe lateral branches as scions grafted onto Cucurbita rootstocks. There were interaction between scions and rootstocks in fruit height and fruit circumference of melon and cantaloupe, except for fruit weight. Regarding scions, the height and the weight of grafted melon and cantaloupe fruits were not significantly different (fluctuated 11.3-11.4 cm and 0.62-0.78 kg/fruit, respectively), the circumference of grafted cantaloupe fruit was 34.6 cm, significantly higher than the grafted melon

Table 6. Fruit size and weight of melon and cantaloupe lateral branches as scions grafted onto Cucurbita rootstocks

Scions (A)	Rootstocks (B)	Fruit height (cm)	Fruit circumference (cm)	Fruit weight (kg/fruit)
Melon	Wax gourd	12.6^{a}	36.6^{a}	0.91
	"Gang" melon	12.6^{a}	36.4^{a}	0.91
	Luffa	7.58^{c}	22.1^{c}	0.47
	TB (A)	11.4	31.1^{B}	0.78
Cantaloupe	Wax gourd	11.2^{a}	34.8^{ab}	0.74
	"Gang" melon	12.1^{a}	36.2^{ab}	0.83
	Luffa	9.89^{b}	31.0^{b}	0.28
	TB (A)	11.3	34.6^{A}	0.62
TB (B)	Wax gourd	11.9^{A}	35.7^{A}	0.83^{A}
	"Gang" melon	12.4^{A}	36.3^{A}	0.87^{A}
	Luffa	8.57^{B}	25.9^{B}	0.38^{B}
F(A)		ns	*	ns
F(B)		**	**	**
F(AxB)		**	**	ns
CV (%)		14.3	13.5	30.7

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, *: 5% difference, ns: not statistically significant difference.

fruit (31.1 cm). Thus, the fruit height and weight of melon and cantaloupe lateral branches grafted onto cucurbit rootstocks was similar. Regarding rootstocks, grafted plants onto wax gourd and "Gang" melon rootstocks were always similar in fruit height (from 11.9-12.4 cm), fruit circumference (35.7-36.3 cm) and fruit weight (0.83-0.87 kg/fruit), all of them were significantly higher than the plants grafted on luffa rootstock (8.57 cm, 25.9 cm and 0.38 kg/fruit, respectively). Wax gourd and "Gang" melon rootstocks grafted with melon and cantaloupe lateral branches gave higher fruit size and fruit weight than those grafted onto luffa rootstock, possibly because their ratio of rootstock diameter/scion diameter were higher than 1. This means that large rootstocks of wax gourd and "Gang" melon had better water and nutrient absorption capacity than luffa rootstock (rootstock diameter/scion diameter was smaller than 1).

3.6 Fruit bearing rate, yield and quality

The results presented in Table 7 showed that the fruit bearing rate, yield and quality of melon and cantaloupe lateral branches grafted onto Cucurbita rootstocks did not interact. Regarding scions, grafted melon and cantaloupe plants had no significant difference in fruit bearing rate (plant rate bearing 1 fruit) and fruit yield, the fruit bearing rate was equivalent 78.3% and the fruit yield fluctuated 14.9-15.9 tons/ha. While fruit flesh thickness and Brix of melon grafting (19.9 mm and 11.4%, respectively) were significantly higher than cantaloupe grafting (18.7 mm and 10.0%, respectively). Thus, both melon and cantaloupe propagated by grafting lateral branches onto Cucurbita rootstocks gave similar fruit bearing rate and yield. Because of the same fruit weight, main stem lenght, number of leaf per main stem and leaf size, however lateral branches of melon grafting onto Cucurbita roorstocks gave higher fruit quality (fruit flesh thickness and Brix content) than grafted cantaloupe. This result may be due to the longer growth period of cantaloupe than that of melon, which were harvested at the same time in this experiment.

Regarding rootstocks, grafted plants onto wax gourd and "Gang" melon rootstocks had no significant difference in fruit bearing rate (fluctuated from 92.5-100%), fruit yield (19.6-19.9 tons/ha) and fruit flesh thickness (fluctuated from 19.7-21.3 mm), but all of them were higher than the combination of luffa rootstock with melon and cantaloupe lateral branches (42.5%, 6.71 tons/ha, 16.8 mm, respectively). The reason why wax gourd and "Gang" melon rootstocks grafted with melon and cantaloupe lateral branches had a very high fruit yield (approximately 2.9 times higher than grafting plants with luffa rootstock), because of the fruit bearing rate and fruit weight (more than 2 times grafted plants onto luffa rootstock), and the growth indicators (stem length, number of leaves, leaf size) were all higher than grafting plants with luffa rootstock. At the same time, the wax gourd and "Gang" melon rootstocks had the compatible ratio (rootstock diameter/scion diameter) were slightly higher than 1 from flowering to harvesting while grafted plants with luffa rootstock had the incompatible ratio (only 0.83-0.84

from flowering to harvesting). About quality, wax gourd and "Gang" melon rootstocks grafted with melon and cantaloupe lateral branches had higher fruit flesh thickness than grafting plants with luffa rootstock, but all wax gourd, "Gang" melon and luffa rootstocks grated onto melon and cantaloupe were not significantly different on Brix content in fruit flesh (fluctuated 10.6-10.9%). The results on plant growth, fruit yields of melon grafted on Cucurbita rootstocks were consistent with the study of Le Thi Bao Chau [8].

Table 7. Fruit bearing rate, yield and quality of melon and cantaloupe lateral branches as scions grafted onto Cucurbita rootstocks

Scions (A)	Rootstocks (B)	Fruit bearing rate (%)	Fruit yield (ton/ha)	Fruit flesh thickness (mm)	Brix (%)
Melon	Wax gourd	100	21.3	22.2	9.75
	"Gang" melon	95.0	20.3	20.8	10.4
	Luffa	40.0	5.69	16.4	10.0
	TB (A)	78.3	15.9	19.8^{A}	11.4^{A}
Cantaloupe	Wax gourd	100	18.5	20.4	11.5
	"Gang" melon	90.0	18.7	18.7	11.3
	Luffa	45.0	7.74	17.1	11.3
	TB (A)	78.3	14.9	18.7^{B}	10.0^{B}
TB (B)	Wax gourd	100^{A}	19.9^{A}	21.3^{A}	10.6
	"Gang" melon	92.5^{A}	19.6^{A}	19.7^{A}	10.9
	Luffa	42.5^{B}	6.71^{B}	16.8^{B}	10.6
F(A)		ns	ns	*	*
F(B)		**	**	*	ns
F(AxB)		ns	ns	ns	ns
CV (%)		2.03	21.6	22.7	15.5

Note: In the same column, numbers followed by different letters were statistically different; **: 1% difference, *: 5% difference, ns: not statistically significant difference

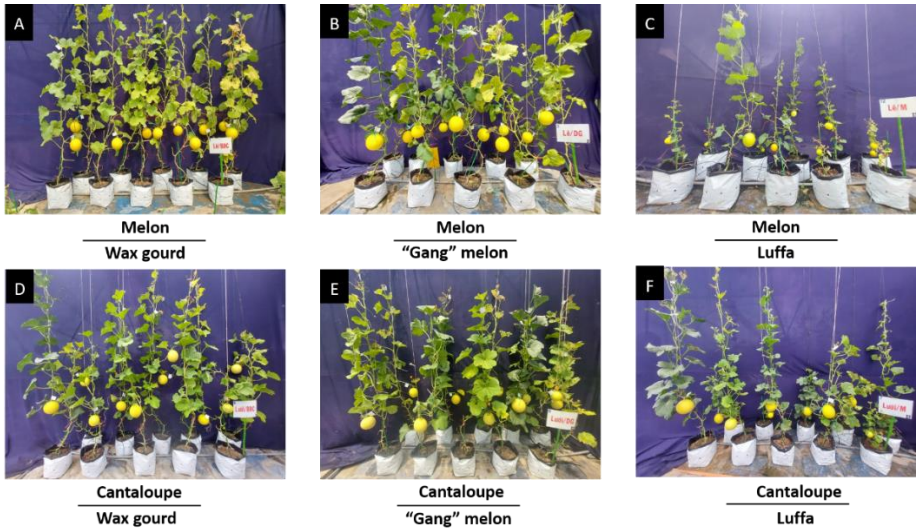

Figure 3. Grafted plant growth and fruit-bearing of Cucurbita rootstocks with melon lateral branches as scions: A, B, C and with cantaloupe lateral branches as scions: D, E, F at experimental farm, College of Agriculture, Can Tho University

4 Conclusion

Melon (Kim Hong Ngoc variety) and cantaloupe (Kim Ngoc Duong variety) propagated by grafting lateral branches onto Cucurbita rootstocks were similar in compatibility, in terms of survival rate 10 DAG, fruit yield (fluctuated from 14.9-15.9 t/ha), fruit bearing rate, yield components (fruit weight, fruit height), plant growth (stem length, number of leaves on stem, leaf size and rootstock diameter/scion diameter at harvesting time). The quality of melon (Kim Hong Ngoc) with fruit flesh thickness and Brix was higher than that of cantaloupe (Kim Ngoc Duong).

Wax gourd and "Gang" melon rootstocks grafting with melon and cantaloupe lateral branches were similar in compatibility, gave lower survival rate 10 DAG in nursery than that of luffa rootstock but higher than that of luffa rootstock in terms of compatibility (from planting to harvesting), fruit yield (fluctuated from 19.6-19.9 t/ha), fruit bearing rate, yield components (fruit weight, fruit height), plant growth (stem length, number of leaves on stem, leaf size, rootstock diameter/scion diameter from 15-60 DAG) and fruit flesh thickness. Luffa rootstock was compatible in nursery and not compatible from transplanting to harvesting.

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