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Bitter Melon—an Asian Vegetable Expanding in Florida[1]

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IFAS Assessment

Central, North

High Invasion Risk

Predicted to be invasive and not recommended by IFAS. Will be reassessed every 10 years. In particular cases, this species may be considered for use under specific management practices that have been approved by the IFAS Invasive Plant Working Group.

view assessment

South

Invasive (No Uses)

Invasive and not recommended by IFAS. Will be reassessed every 10 years. Specified and limited uses may be considered by the IFAS Invasive Plants Working Group.

view assessment

Bitter melon (*Momordica charantia* L.) is a member of the cucumber family: Cucurbitaceae. This melon is also known as bitter gourd, bitter squash, Goya melon, karela, and balsam pear (Stephens 2012). It is a tropical and subtropical vegetable crop with long climbing vines which is widely cultivated in Asia, Africa, and the Caribbean. The fresh fruiting vegetable is one of the most popular vegetables grown in China, India, Thailand, the Philippines, and Vietnam. It has also been grown as a minor vegetable in tropical and subtropical regions of the United States including parts of Florida (Stephens 2012). The unripe fruit is used as a vegetable with a pleasantly bitter taste.

Invasive Status

This crop is rapidly expanding in Florida due to its significantly economic value and potential health benefits. However, it is not native to Florida and may pose ecological risks if it escapes cultivation. According to the UF/IFAS Assessment of Non-Native Plants in Florida's Natural Areas, the species is predicted to be invasive and is not recommended for general use by UF/IFAS because of its potential to establish, spread, and impact native ecosystems. Species in this category are reassessed every 10 years.

Under the UF/IFAS Status Assessment, this species is classified as "Caution – Manage to Prevent Escape." While it may have agricultural, horticultural, educational, or research value, its cultivation should include appropriate management practices to minimize the risk of spread beyond intended areas. Use may be considered under specific conditions approved by the UF/IFAS Invasive Plant Working Group. Assessment results are based on available scientific evidence, field observations, ecological impacts, and regulatory considerations and are periodically reviewed to ensure science-based recommendations. (*Momoridca charantia* - UF/IFAS Assessment)

Planting

This crop is propagated via seeds with stiff testae (seed coats) which need warm (60–95°F) and moist soil conditions for germination (Figure 1). It may fail or take a long time to germinate if the soil is dry or the temperature is not high enough. Bitter melon is a dicotyledonous species that grows vines up to 16 feet long with many branches. After germination, the first pair of true leaves is round; the others are simple and alternate leaves measuring 2 to 5 inches across, with three to seven deeply separated lobes. Once the plant has grown four to six leaves, its vines start bearing tendrils for climbing (Figure 2). A trellis support system is necessary for high yield and quality bitter melon production. The trellis system is usually 6 feet high (Figures 3 and 4).

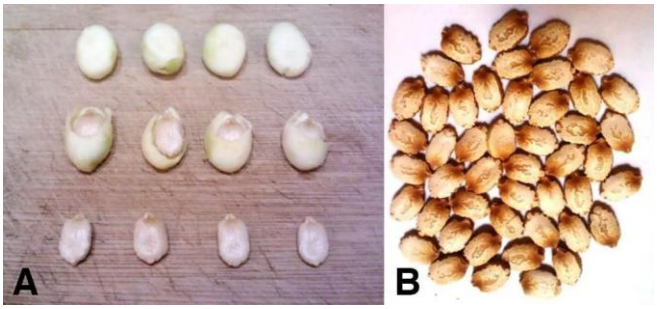

Figure 1. A) Immature seeds of bitter melon. The top two lines of seeds have edible arils (specialized outgrowths from seeds that completely cover the seeds). The bottom line has thick and hard testae (seed coats). Seed germination is usually slow because of the thick testae. B) Mature seeds (0.4–0.6 inches in length) of bitter melon. The seed testae have uneven surfaces with nonlinear stripes. Credit: Guodong Liu, UF/IFAS



Figure 2. The bitter melon vine starts bearing tendrils for climbing when the plant has between four and six leaves. Credit: Guodong Liu, UF/IFAS



Figure 3. Six-foot tall trellis systems provide support for bitter melon vines.
Credit: Yuqi Cui, UF/IFAS



Figure 4. Bitter melon field with permanent trellis during harvest in south Florida.
Credit: Qingren Wang, UF/IFAS

In Florida, bitter melon starts blooming approximately four weeks after seeding. Each plant bears both male (Figure 5) and female (Figure 6) flowers separately. Bitter melon is a cross-pollinating species and needs insects, such as bees, to carry out the pollinating process for setting fruit. When pollinators are lacking, manual pollination (i.e., picking up male flowers and transferring pollens to female flowers) can be an option for bitter melon production in backyards or small gardens. Female flowers have a baby fruit between the flower and the vine stem (Figure 6). This pollination should be completed during the daytime when flowering is active. If the pollination is successful, the baby fruit will grow into a full-size fruit.



Figure 5. Bitter melon's male flower.
Credit: Guodong Liu, UF/IFAS



Figure 6. Bitter melon's female flower.
Credit: Guodong Liu, UF/IFAS

Varieties

There are two types of bitter melon: Chinese variety and Indian variety, named due to the preference of these varieties in China and India, respectively. The former is longer and larger in size (usually 8 to 12 inches in length and 2 to 3 inches in diameter), smooth, light green in color, and oblong-shaped with a distinct warty appearance. The latter is shorter and smaller in size with rough skin, dark green coloration, and pointed ends. Both types have ridges, but Chinese bitter melon ridges are smooth (Figure 7), and Indian bitter melon ridges are pointed (Figure 8).



Figure 7. Chinese bitter melon.
Credit: Guodong Liu, UF/IFAS



Figure 8. Indian bitter melon fruit.
Credit: Guodong Liu, UF/IFAS

How to Cook Bitter Melon

According to the USDA-ARS National Nutrient Database, bitter melon is an excellent source of vitamin C, folate (vitamin B9), and other nutrients such as zinc and potassium (Table 1). Bitter melon fruit are harvested when the fruit is green or slightly yellow. They are cut into halves and the seeds are removed and discarded. The sliced fruit is then consumed with stir-fry cooking (Figure 9). The fruit flesh is often used in Chinese cuisine with sliced garlic, chicken eggs, pork, or "douchi," a type of fermented and salted black soybean (Figure 10). In Indian dishes, the sliced fruit is marinated in a solution of salt and tamarind before being pan-fried with spices.



Figure 9. Two halves of Chinese bitter melon.
Credit: Guodong Liu, UF/IFAS



Figure 10. Cooked bitter melon with douchi, a type of fermented and salted black soybean.
Credit: Guodong Liu, UF/IFAS

Bitter melon has been used in Asian and African herbal medicine systems for a long time. Ethnobotanical uses in India suggest that this crop can lower blood sugar levels in diabetic patients (Paul and Raychaudhuri 2010). There are also studies that show its efficacy against various cancers such as breast cancer, choriocarcinoma (a fast-growing form of cancer that occurs in a woman's uterus), Hodgkin's disease, human bladder carcinomas, lymphoid leukemia, lymphoma, melanoma, prostate cancer, skin tumor, and squamous carcinoma of the tongue and larynx (Grover and Yadav 2004). Bitter melon extracts are also reported to have anti-obesity effects as well as other medicinal effects (Wang and Ryu 2015).

Cultural Practices

Bitter melon is relatively new to most Floridians, particularly in north Florida, but certain growers have been cultivating this crop for several years. This crop can be direct seeded or transplanted. Direct seeding dates are usually from February to April and July to early August for the spring and fall growing seasons in north Florida. The corresponding dates for central Florida are from January to March and early September to February. For south Florida, it can be seeded from September through February. Distance between rows should be 5 to 6 feet and spacing between plants should be between 3 and 5 feet (Freeman et al. 2015). Fruit should be started harvesting approximately 50 days after seeding in north Florida. For central and south Florida, fruit can be harvested earlier after seeding. Transplanting can expand the growing season and make the fruit available earlier. This early availability of fruit is beneficial to growers' profitability. If harvested at maturity, fruit turns from green to orange. The seed cover, or aril tissue, turns bright red (Figure 11) and starts to taste sweet. If harvested too late, the fruit opens naturally at the fruit end, and seeds may drop onto the ground.

Disease Control

Disease control recommendations can be found in the EDIS publication entitled *Diseases of Bitter Melon in South Florida* (Zhang et al. 2019).

Fertilization

Fertilization recommendations for this crop are not available. Growers are suggested to apply fertilizers based on commercial cucumber production: N 150 lb/A; P_2O_5 and K_2O both are the same, 120, 100, and 80 lb/A for very low, low, and medium, respectively (Liu et al. 2).

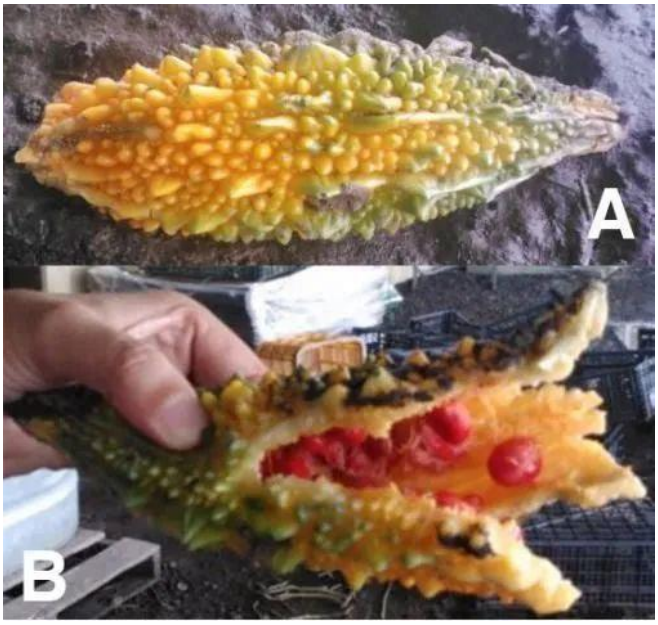

Figure 11. A) Bitter melon fruit at maturity. Mature fruit will begin to turn orange; B) Mature fruit opens to drop the seeds to the ground for the next generation. The seed arils (not the testae) turn red in color and taste sweet.
Credit: Guodong Liu, UF/IFAS

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Tables

Table 1. Nutritional value of bitter melon.[z]

Nutrient (Proximates)	Unit	Value		1 cup (1/2" pieces)		0.5 cup (1/2" pieces)	
		100 g (3.5 oz)	% of daily value	124 g (4.3 oz)	% of daily value	62 g (2.2 oz)	% of daily value
Water	g	93.95	—	116.5	—	58.25	—
Energy	kcal	19	—	24	—	12	—
Energy	kJ	79	—	98	—	49	—
Protein	g	0.84	—	1.04	—	0.52	—
Total lipid (fat)	g	0.18	—	0.22	—	0.11	—
Ash	g	0.71	—	0.88	—	0.44	—
Carbohydrate, by difference	g	4.32	—	5.36	—	2.68	—
Fiber, total dietary	g	2	—	2.5	—	1.2	—
Sugars, total	g	1.95	—	2.42	—	1.21	—
Minerals							
Calcium, Ca	mg	9	1	11	1.24	6	0.62
Iron, Fe	mg	0.38	3	0.47	3.72	0.24	1.86
Magnesium, Mg	mg	16	5	20	6.2	10	3.1
Phosphorus, P	mg	36	5	45	6.2	22	3.1
Potassium, K	mg	319	7	396	8.68	198	4.34
Sodium, Na	mg	6	—	7	0	4	0
Zinc, Zn	mg	0.77	8	0.95	9.92	0.48	4.96
Copper, Cu	mg	0.033	—	0.041	0	0.02	0
Manganese, Mn	mg	0.086	4	0.107	4.96	0.053	2.48
Selenium, Se	µg	0.2	—	0.2	0	0.1	0
Vitamins							
Vitamin C, total ascorbic acid	mg	33	40	40.9	49.6	20.5	24.8
Thiamin	mg	0.051	—	0.063	0	0.032	0
Riboflavin	mg	0.053	—	0.066	0	0.033	0
Niacin	mg	0.28	—	0.347	0	0.174	0
Pantothenic acid	mg	0.193	—	0.239	0	0.12	0
Vitamin B6	mg	0.041	—	0.051	0	0.025	0
Folate, total	µg	51	13	63	16.12	32	8.06
Folic acid	µg	0	—	0	0	0	0
Folate, food	µg	51	—	63	0	32	0
Folate, DFE	µg	51	—	63	0	32	0
Choline, total	mg	10.8	—	13.4	0	6.7	0
Vitamin B12	µg	0	—	0	0	0	0
Vitamin B12, added	µg	0	—	0	0	0	0
Vitamin A, RAE	µg	6	1	7	1.24	4	0.62
Retinol	µg	0	—	0	0	0	0

Nutrient (Proximates)	Unit	Value		1 cup (1/2" pieces)		0.5 cup (1/2" pieces)	
		100 g (3.5 oz)	% of daily value	124 g (4.3 oz)	% of daily value	62 g (2.2 oz)	% of daily value
Carotene, beta	µg	68	1	84	1.24	42	0.62
Carotene, alpha	µg	0	—	0	0	0	0
Cryptoxanthin, beta	µg	0	—	0	0	0	0
Vitamin A, IU	IU	113	—	140	0	70	0
Lycopene	µg	0	—	0	0	0	0
Lutein + zeaxanthin	µg	1323	—	1641	0	820	0
Vitamin E (alpha-tocopherol)	mg	0.14	1	0.17	1.24	0.09	0.62
Vitamin E, added	mg	0	—	0	0	0	0
Vitamin D (D2 + D3)	µg	0	—	0	0	0	0
Vitamin D	IU	0	—	0	0	0	0
Vitamin K (phylloquinone)	µg	4.8	5	6	6.2	3	3.1

[z] Source: USDA-ARS, National Nutrient Database

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