

Long Bean—an Asian Vegetable Emerging in Florida¹

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Food diversity, nutritional food supply, and profitability are the priorities of agricultural and horticultural industries. To diversify vegetable products and increase the Florida vegetable industry's competitiveness, a number of new vegetable crops are rapidly emerging in the state. For example, there are more than 20 Asian vegetable crops, such as luffa (*Luffa cylindrica* (L.) Roem), shalihon (*Brassica juncea* (L.) Czern), and tahn ho (*Chrysanthemum coronarium* L.), grown across Florida. Due to Florida's favorable climate, these vegetable crops grow well and have high market potential. The objective of this article is to provide a general overview on one of the Asian vegetable crops grown in Florida, long bean.

Long bean (*Vigna unguiculata* subs. *sesquipedalis*, Family: Fabaceae) is a leguminous vegetable crop with climbing vines that produce long pods consumed as a cooked vegetable. It is a popular crop in Asian countries such as in China. The subspecies name, "*sesquipedalis*", means "one-and-half-foot long" and is an approximation of the pod length. It is also known as asparagus bean, Chinese long bean, long-podded cowpea, and yardlong bean. Long bean is called as bora, bodi, pea bean, and snake bean. This vigorous annual crop is a member of the genus *Vigna*, which is different from the common bean, which belongs to the genus *Phaseolus*.

This crop was recorded in Chinese literature as early as the Song Dynasty in 1008 CE, though China as the origin of

long bean is not completely established. This crop is also considered to have originated from tropical Africa because wild species of *Vigna* can be found there (Yamaguchi 1983).

Long bean has two cotyledons (seed leaves), a significant part of the seed, and so is a dicotyledonous species. As an annual climbing vine crop, it has the following morphological (structural) features: purple or black colored kidney-shaped seeds (Figure 1) at maturity, two cotyledons (Figure 2), 3 to 4-inch-long trifoliate (divided into three leaflets) leaves with ovate (egg-shaped) leaflets (Figure 3); and violet or yellow flowers (Figure 4). This crop requires cross-pollination, usually by bees or other insects (Figure 5). The green, straight or irregularly twisted, limp pods are usually 2 to 4 feet long (Figures 4–7) (Duke 1981). There are two types of long beans: light green (Figures 4 and 5) and dark green (Figure 7). As a leguminous crop, it has the ability to fix atmospheric nitrogen. Root inoculation with the nitrogen fixing bacteria *Rhizobium* can improve root nodule formation and reduce nitrogen fertilizer dependence.

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Figure 1. Seeds of long bean.
Credits: Guodong Liu, UF/IFAS



Figure 2. The cotyledons and true leaves of long bean seedlings.
Credits: Guodong Liu, UF/IFAS



Figure 3. Fully developed leaves of long bean.
Credits: Guodong Liu, UF/IFAS



Figure 4. Flowers of long bean.
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Figure 5. Pollination of long bean is mediated primarily through bee activity.
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Figure 6. Long bean plants bearing pods in Hastings.
Credits: Guodong Liu, UF/IFAS



Figure 7. White yardlong pods developing on long bean vines grown in Hastings in fall 2015.
Credits: Guodong Liu, UF/IFAS



Figure 8. Long bean pods growing in Miami-Dade County.
Credits: Qingren Wang, UF/IFAS



Figure 9. Dark green pods of long bean.
Credits: Qingren Wang, UF/IFAS

Long Bean Can Be Grown Twice a Year in Florida

Florida has a favorable climate for producing long bean. It can be grown in north Florida in both spring and fall. The spring season starts in early March and ends in late July. The fall season begins in late July and finishes in mid-November. In south Florida, such as in Miami-Dade, long bean is grown from September or October through April and is harvested multiple times. Generally speaking, the fall growing season in north Florida is more profitable because many competitors in some states in the north are unable to grow this crop in open fields and thus compete with Florida growers.

Long bean can be grown in a wide range of soil types from sandy loam to clay. The crop can tolerate a broad range of soil pH; however, recommended pH for best growth is 5.5–6.5. Long bean is a suitable crop for arid and semi-arid growth conditions because it is able to tolerate high heat, humidity, and drought stress. The crop grows well in warm climates with average monthly temperatures of 68 to 86 °F. Its preference for heat to germinate and grow makes it a suitable crop throughout the southeastern United States. However, plant growth is adversely affected by water logging, cold temperatures, and frost (Duke 1981). In south Florida, the extremely high humidity during the hot, rainy summer season often makes long bean susceptible to powdery mildew (Wang et al. 2014).

Planting

Long bean seeds can retain their viability for several years if they are kept in seed storage. This crop can be either transplanted or directly seeded. The seedlings can be transplanted when they have developed two true leaves. Transplanting allows earlier crop establishment and expands the growing season but also requires more labor. In Florida, direct seeding is the more common practice. The seeds are planted approximately 2 inches deep on raised beds with plants spaced 3 feet apart and beds space 6 feet apart. Plants can grow 9 to 12 feet tall, so a trellis support is needed. A trellis system of 6 feet height provides a good support for the climbing vines and facilitates harvesting (Lawrence 2012).

Fertilizer Application

This is a new crop in north Florida. There is no IFAS fertilizer recommendation yet, but IFAS is working on this crop. Before the IFAS recommendation becomes available, growers can apply fertilizers based on other leguminous crops such as snap bean, lima bean, and pole bean.

Harvesting

Long beans are ready to harvest 40 to 70 days after seeding, depending on location. This crop should be harvested at an immature stage when seeds are not fully matured. It is manually harvested on a daily basis when the pods are 10 to 12 inches long. Alternatively, it can be harvested as dried beans after seeds are fully developed and matured. Young leaves can be used to feed livestock, and the plant's large, attractive violet flowers with draping pods can serve as an ornamental plant in urban parks and gardens (Lawrence 2012).

Long Bean Is a Good Source of Human Nutrition

Long bean is a good source of protein, vitamin A and C, thiamin, riboflavin, and mineral nutrients including iron, magnesium, manganese, phosphorus, and potassium (Table 1).

Further Information

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Table 1. Nutrient value per 100 g (3.5 oz) of raw long beans (USDA-ARS)

Nutrient	Unit	A serving		1 cup slices		1 pod	
		(100 g)	% daily value	(91 g)	% daily value	(50 g)	% daily value
Water	g	87.85		79.94		43.93	
Energy	kcal	47		43		23.50	
Energy	kJ	197		179		98.50	
Protein	g	2.8		2.55		1.40	
Total lipid (fat)	g	0.4		0.36		0.20	
Ash	g	0.6		0.55		0.30	
Carbohydrate, by difference	g	8.35		7.6		4.18	
Minerals							
Calcium, Ca	mg	50	5	46	4.6	25.00	2.50
Iron, Fe	mg	0.47	4	0.43	3.6	0.24	2.00
Magnesium, Mg	mg	44	12	40	10.9	22.00	6.00
Phosphorus, P	mg	59	8	54	7.3	29.50	4.00
Potassium, K	mg	240	5	218	4.6	120.00	2.50
Sodium, Na	mg	4		4	0.0	2.00	0.00
Zinc, Zn	mg	0.37	4	0.34	3.6	0.19	2.00
Copper, Cu	mg	0.048		0.044	0.0	0.02	0.00
Manganese, Mn	mg	0.205	10	0.187	9.1	0.10	5.00
Selenium, Se	µg	1.5		1.4	0.0	0.75	0.00
Vitamins							
Vitamin C, total ascorbic acid	mg	18.8	23	17.1	20.9	9.40	11.50
Thiamin	mg	0.107	9	0.097	8.2	0.05	4.50
Riboflavin	mg	0.11	9	0.1	8.2	0.06	4.50
Niacin	mg	0.41	3	0.373	2.7	0.21	1.50
Pantothenic acid	mg	0.055	11	0.05	10.0	0.03	5.50
Vitamin B-6	mg	0.024	2	0.022	1.8	0.01	1.00
Folate, total	µg	62	16	56	14.6	31.00	8.00
Vitamin B-12	µg						
Vitamin A, (Retinol Activity Equivalents)	µg	43	5	39	4.6	21.50	2.50
Retinol	µg	0	0	0		0.00	
Vitamin A, IU	IU	865		787		432.50	
Vitamin D (D2 + D3)	µg	0		0		0.00	
Vitamin D	IU	0		0		0.00	
Lipids							
Fatty acids, total saturated	mg	105		96		52.50	
Fatty acids, total monounsaturated	mg	36		33		18.00	
16:1 undifferentiated	mg	1		1		0.50	
18:1 undifferentiated	mg	21		19		10.50	
22:1 undifferentiated	mg	13		12		6.50	
Fatty acids, total polyunsaturated	mg	169		154		84.50	
18:2 undifferentiated	mg	96		87		48.00	
18:3 undifferentiated	mg	70		64		35.00	
Cholesterol	mg	0		0		0.00	

Amino Acids						
Tryptophan	mg	32		29		16.00
Threonine	mg	104		95		52.00
Isoleucine	mg	150		136		75.00
Leucine	mg	200		182		100.00
Lysine	mg	184		167		92.00
Methionine	mg	40		36		20.00
Cystine	mg	42		38		21.00
Phenylalanine	mg	154		140		77.00
Tyrosine	mg	115		105		57.50
Valine	mg	162		147		81.00
Arginine	mg	196		178		98.00
Histidine	mg	90		82		45