

The Snap Beans

1. DESCRIPTION OF PLANT

Snap Beans (green or wax) are a member of the Leguminosae (legume family). The species *Phaseolus vulgaris* are also dried beans which are harvested for baking beans. There are over 200 different types of beans originating in various parts of Central America which have been cultivated for over 7000 years.



introduced.

The plant may be a bush, a half runner or a pole bean. This crop is botanically described as an annual twining vine. Bean flowers are self pollinated. Snap bean cultivars differ from dry bean cultivars by having thicker walled pods. These vary in color with green, yellow and purple being the ones most commonly grown. Commercial cultivars are mostly determinate (non-climbing). Flowers appear simultaneously and pods tend to mature together an advantage for mechanical harvesting and where single heavy pickings are required for the fresh market. Some cultivars tend toward multiple branching and vining causing flowers and pods to develop over a period of time, allowing for several pickings. In 1894 the first stringless bean was

2. ORIGIN AND MAJOR TYPES

Snap beans, like kidney beans, white beans, pinto beans, and cranberry beans are members of the common bean species, all of which trace their origins to the Western Hemisphere. Although remains of common beans from Central American sites have been carbon dated to 7000B.C., the original subspecies have not been identified. Indigenous peoples of South and Central America and American Indians crossed the beans to create many subspecies and varieties.

Common beans, including the snap bean, were brought to Europe by Columbus and other 15th and 16th-century explorers. Today, many varieties of snap beans are grown throughout the world. The growth habit of snap beans is used to divide them into two varieties: Bush beans and pole beans (which must be trained to a pole or trellis). Both are warm-weather vegetables that must be planted after the danger of frost has passed. The beans are harvested when they are rapidly growing, about 8 to 10 days after flowering. At this stage, the color is bright and the pod is fleshy with small, green

seeds. Leaving the pods on the plants too long decreases plant yield and results in tough, dull-colored pods.

3. PRODUCTION TRENDS

Snap beans or known as “Baguio Beans” are successfully grown in cooler places like in Mt. Province. However, highlands of other regions are also producing these crops in commercial scale like in Ilocos, Cavite and Bukidnon.

The major producers of snap beans are the Cordillera Administrative Region (CAR) and Cagayan Valley. In 2006, 13,493 tons were produced higher by 12% in 2005's production by 12,049 tons. A total of 3,356 hectares are being planted with snapbeans. Organic snap beans are being produced but in limited quantities.

4. PROPERTIES (NUTRITIONAL VALUES)

Snap bean locally known as ‘green beans’ or ‘habitchuelas’ is an annual legume grown for its tender green pods or seeds. . Snap beans are rich sources of beta-carotene, fiber, potassium, calcium, and phosphorus, but are very low in calories and contain no fat, sodium, or cholesterol.

5. USES (CULINARY, MEDICINAL...ETC)

Snap bean is one of the popular legumes in the Philippines. It is known for it's richness in protein which can is a good substitute for meat specially in places where there is inadequate supply of animal protein. Green pods can also be eaten as a side dish or mixed in a stew with meat, fish and other vegetables in so many variations.

6. VARIETIES

There are two types of snap beans:

1. **Bush Type** - There are two basic types of snap beans: green-podded and yellow-podded or wax beans, and they come in different shapes: long, short, flat, round, broad.
 - a. Variety Blue Lake 274 so called “sitting” beans is a bush type which does not require trellis.
 - b. Labrador
 - c. Matador
2. **Pole Type** - This type requires poles or trellis for support. Pole beans have a more distinct and nuttier taste than bush types, and 'Kentucky Wonder' and

'Romano Italian' are probably the two most popular pole bean varieties. Other varieties to try include 'Kentucky Blue' and 'Kentucky Wonder Wax'.

- a. Baguio Beans (BSU 1)
- b. Alno or Black Valentine
- c. Norman
- d. Redford
- e. Burik
- f. Gemmy
- g. Black Kentucky
- h. Black Gonder
- i. Kentucky Gonder
- j. Mayabong
- k. Stringless Blue Lake S-7
- l. Patig
- m. Kaki/Kanaya
- n. B-21
- o. Taichung #1

7. CULTIVATION

Snap beans are grown in many kinds of soils, from sandy to clay loam. However, thrives best in well-drained, clay loam soil, rich in organic matter with pH ranging from 5.5 to 7.5. Snap bean is best grown under cool climatic conditions like Baguio City, Benguet and Mt. Province with temperatures of 18-29oC. It is usually planted during October and November to achieve higher percentage of pod set.

Snap beans can be grown in low elevation areas during the cool, dry months, but the yields tend to be lower; and the pods, more fibrous

- A. **Land Preparation.** Plow the field two times with alternate harrowing with the use of hoe. Raised the beds or plots 1 meter width and level to a depth of 15 cm. for good drainage.
- B. **Time of planting.** In places where the climate is cool throughout the year like Benguet, snap beans are planted at any time. In other places, they are planted during the cool month usually from November to January. Better yields at low elevation have been obtained with bush and pole type of snap beans from November plantings than from those planted in February.

- C. **Planting.** Beans seeds should be planted at a depth not exceeding 2.5 cm. to provide



sufficient moisture for uninterrupted germination. In some cases, to obtain enough moisture, it is necessary to furrow out to a depth of 10cm to 15 cm between hills and 35 cm between rows. For double row method of planting, 2 seeds are set per hill, spaced at a distance of planting from 25 cm between hills and 25 cm between rows. Planting rate depends on the relative seed size of the cultivar but it is

approximately 40 kilograms/ha for the bush type and 35 kilograms/ha. for the pole type is recommended.

- D. **Fertilizer Application.** Three (3) tons per hectare or 100 sacks chicken dung is incorporated in the soil during land preparation to improve soil condition and to provide organic nutrients. Inorganic fertilizer in the amount of 100-100-100 kilograms NPK/ha 04 14 bags of T-14 is recommended or could be adjusted depending on the native soil fertility of the soil. Inorganic fertilizer could be applied in two doses. Half dose will be applied at planting and other half is applied as side dress one month after planting. For small scale production, the general recommendation is 1 tbsp of complete fertilizer (14-14-14 NPK) plus a handful of chicken dung per hill at planting. Another 1 tbsp of T14 is side dressed during hilling up.
- E. **Irrigation.** Good crops of beans are produced when sufficient moisture is maintained throughout the growing season. It is especially desirable to supply sufficient moisture at blooming time to induce a better pod set. The attainment of a maximum yields and quality depend essentially on the maintenance of available moisture during the period of flowering and pod development. No particular method is recommended, however, on flat land, the furrow method is most commonly practiced while on hilly land where the surface soil is shallow, sprinklers are used.
- F. **Cultivation and Weeding.** Shallow cultivation is required for weed control. Hand weeding is necessary to destroy/eliminate weeds growing between plants.
- G. **Supporting the Vines (Trellising).** Poles of 2.4-2.7 meters in length are usually set in the ground to a sufficient depth between the rows in the plot. Inclined at about 60° along the plot and are interlaced in order to make a firm and continuous net of poles extending throughout the plot.

8. CROP PROTECTION

Pest Management

1. **Bean fly (*Agromyza phaseoli*)**. It is the most damaging pest of snap beans. Adults are minute jet-blade fly. Maggots are colored yellowish to reddish. Young plants are very susceptible to infestation. It attacks the young plants and stem causes wilting and eventually dies.

Management

- a. Crop rotation
 - b. Rouging of infested plants is a good practice.
 - c. Spraying with contact or systemic insecticide is a practical control.
2. **Bean Pod borer (*Maruca vitrata*)**. The larvae are whitish at first and about 1.25 mm long. Later, it turns to creamy white color and attain a length of 14-16 mm. Damaged flowers have petals with holes and are discolored. Damaged flower buds may also fall so the plant will have lesser pods. Damaged pods show small entry holes on the surface and if the pod is opened the young seeds are consumed. The leaves and pods may also be webbed together by the larvae.

Management

- a. Trap the adults with light during night
 - b. Proper cultural management practices
 - c. Spraying with contact or systemic insecticide at recommended rate on the label is strictly followed.
3. **Aphids (*Myzus persicae* S.)**. This sucking insects and adults are about 1.5 to 2 mm long, shiny black, soft bodied and colorless wings. They are usually found in groups underneath young leaves, shoots and pods. They sucked the sap of the plants causing it to curl having abnormal growth and becomes dwarf and unproductive.

Management

- a. They are controlled by some predatory insects like lady beetles
 - b. Rouging of infested plants could be practiced.
 - c. Use of yellow traps
 - d. Spraying could also be practical control measure.
4. **Rust (*Uromyces phaseoli* var. *Typica* Art.)**. The disease is caused by fungus that attacks all the plant parts above the ground but the lower surface of the leaves are most favored. The initial symptom is seen as small, whitish, slightly raised

spot. Within a few days, the spots produce reddish to brownish powdery like structure. The leaves turn yellow and dries up.

Management

- a. Using disease resistant cultivars
- b. Using fungicides
- c. Crop rotation,
- d. Removal of volunteer plants,
- e. Deep plowing to remove bean debris from the soil surface and encourage rotting
- f. Planting time.

5. **Anthrachnose (*Colletotrichum lindemthianum*)**. The fungus infects young stems, pods and leaves. Brown depressed areas which later become black on young stems while infected pods appear black with brownish center.

Management

- a. Plant disease free seeds
- b. Plow crop residues under
- c. Spray with fungicides between bloom and pod fill stages
- d. Rotate with non-host crops.

6. **Fusarium Root Rot (*Fusarium phaseoli*)**. The disease is caused by fungus that occurs on the root parts. Discoloration of the stem and yellowing of leaves. Internally, the tap root turns reddish to brown, dries up and eventually breaks.

Management

- a. Plant disease free seeds
- b. Plow crop residues under
- c. Spray with fungicides between bloom and pod fill stages
- d. Rotate with non-host crops.
- e. Broadcast fungicide in the soil at planting at the rate of 15 to 30 kg/ha.

9. HARVESTING

Generally, snap beans can be harvested from 45 to 80 days after planting depending upon the variety and on the purpose, whether green pods or dry beans.

Green pods are usually ready for harvesting when the seeds are partly developed but hardly or not at all evident from the outside of the pod. They are never allowed to mature because they become fibrous with age, these green pods are ready for harvest about 10 to 15 days after flowering or 45 to 60 days after planting, picking should be done every 3 to 4 days. When the crops are intended for dry

bean production, they are harvested when the majority of the pods turns yellow and beginning to dry up. At this stage pods are usually well filled with matured seeds.

10. POST HARVEST

- a. **Fresh beans.** Retailers classify beans according to the following grades: First grade- long properly unblemished and tender and Second grade- consist of pods that are neither short but immature nor over mature nor dark spots appear on not more than 20 percent of the harvest.
- b. **Packing-** Pods are immediately packed after harvesting. They are packed in baskets intended for wholesalers while local retailers packed in plastic bags.
- c. **Drying.** Matured pods harvested for beans seed production will be spread in a drying pan and be put out under the sun or in room temperature.
- d. **Threshing/Shelling.** Removal of the pod shell and final drying will be done before packing and seed treatment.
- e. **Storing.** Store in a cool dry place.

11. COST OF PRODUCTION AND ROI FOR A ONE-HECTARE LAND

COST AND RETURN PER HECTARE

A. LABOR COST

	Man-Day (P250/day)	Value (P)
1. Land Preparation		
Cleaning the area	40	10,000.00
Digging & Plot Preparation	50	12,500.00
Making holes/furrows	20	5,000.00
Fertilizer application	20	5,000.00
Mixing fertilizer	20	5,000.00
2. Planting & COVERING	25	6,250.00
3. Care & Maintenance		
Irrigation (9 times)	10	22,500.00
Crop Protection (9 times)	10	22,500.00
Weeding	25	6,250.00
Side-dressing and hilling-up	40	10,000.00
Trelessing	30	7,500.00
Rouging (3x)	3	2,250.00
4. Harvesting & HAULING (3 times)	5	3,750.00
5. Seed drying (3 times)	3	2,250.00
6. Threshing (3 times)	5	3,750.00
7. Pods/Seed Cleaning (3 times)	5	3,750.00
8. Seed packing (3 times)	3	2,250.00
Sub-total		130,500.00
	130,500.00 (Seeds)	122,250.00 (Pods)

B. MATERIAL COST

FARM SUPPLIES	QUANTITY	UNIT PRICE (P)	VALUE (P)
1. Seeds	35 kgs	500/kgs	17,500.00
2. Fertilizers			
* Chicken dung	100 sacks	120/sack	12,000.00
* Triple 14	17 bags	1200/bag	20,400.00
3. Insecticide	10 liters	1000/liter	10,000.00
4. Fungicide	10 kg	800/liter	8,000.00
5. Rono sticks <u>1/</u>	66,000	1.30/pc	28,600.00
Sub-total			96,500.00

1/ - to be used for 3

x cropping

a - value of rono sticks in just one (1) cropping

C. FIXED COST

1. Land rent	
- P300/m ²	30,000.00
2. Depreciation on tools & equipment	985.00
Sub-total	30,985.00

D. MISCELLANEOUS

1. Transportation	10,000.00
2. Seed drying and packing materials	
5,000.00	
Sub-total	15,000.00

TOTAL COST OF PRODUCTION**260,735.00**260,735.00
(Seeds)**259,735.00**
(Pods)**E1. GROSS INCOME(Fresh pods)**

YIELD LEVEL	Average Yield/hectare (kg)	Prices (P)	VALUE (P)
a. Level 1	15,000.00	20.00	300,000.00
b. Level 2	15,000.00	25.00	375,000.00
c. Level 3	15,000.00	30.00	450,000.00

E2. NET INCOME

YIELD LEVEL	Gross Income (P)	Production Cost (P)	VALUE (P)
a. Level 1	300,000.00	259,735.00	40,265.00
b. Level 2	375,000.00	259,735.00	115,265.00
c. Level 3	450,000.00	259,735.00	190,265.00

F1. GROSS INCOME(Seeds)

YIELD LEVEL	Average Yield/hectare (kg)	Prices (P)	VALUE (P)
a. Level 1	2,000.00	180.00	360,000.00
b. Level 2	2,000.00	250.00	500,000.00
c. Level 3	2,000.00	500.00	1,000,000.00

F1. NET INCOME

YIELD LEVEL	Gross Income (P)	Production Cost (P)	VALUE (P)
a. Level 1	360,000.00	272,985.00	87,015.00
b. Level 2	500,000.00	272,985.00	227,015.00
c. Level 3	1,000,000.00	272,985.00	727,015.00

12. REFERENCES

AVRDC.1990. Vegetable production training manual. Asian Vegetable Research and Development Center. Shanhua, Tainan.44p.

George, R.A. 1984. Vegetable Seed Production. University of Bath, London, England

Knot,J.E. and J. R. Deanon Jr. 1967. Vegetable production in Sout East Asia. UPCA.

Mariano, Pepito P. et al. 2007. BNCRDC Technoguide of Snap Bean. Series No. 03-07.BPI,Baguio City.

PCARRD-DOST Portal. 2007. Snap beans: Industry Status

<http://www.pafarm.com/pdf/Commodity/SnapBeans.pdf>

http://schoolgardenweekly.com/wp-content/uploads/2009/06/snap_beans.jpg

http://pics.davesgarden.com/pics/2004/06/16/Big_Red/b13b6d.jpg