

PHASEOLUS
LESSON TWO
The Genus *PHASEOLUS* and How to Grow Beans

In this lesson we will continue our study of the LEGUME family by concentrating on the GENUS *Phaseolus*, We will study some of the different SPECIES in the GENUS *Phaseolus*. We will also study about growing beans.

For this lesson to be complete you must:

- _____ do everything in bold print;
- _____ answer the questions at the end of the lesson;
- _____ learn to identify the different beans (use the study materials at www.geauga4h.org); and
- _____ complete one of the projects at the end of the lesson.

Parts of the lesson are underlined and/or in a different print. These sections include reference to past Plant Masters projects. Try your best to answer using your old project books or your memory. Younger members and new members can ignore these sections. Parts of the lesson are underlined. Younger members can ignore these parts. WORDS PRINTED IN ALL CAPITAL LETTERS may be new vocabulary words. For help, see the glossary at the end of the lesson.

INTRODUCTION TO THE *Phaseolus*

***Phaseolus* - Bean Group**

The word “bean” is used for plants and FRUITS of many different GENERA. Originally it was used for the broad bean, or *Vicia faba*. However, when other bean-type FRUITS came from other parts of the world, the word was extended to the plants in several other GENERA. It is even used for the FRUITS of plants which are not “beans” at all. However, the FRUITS of these plants resemble beans, for example coffee beans, cocoa beans, and vanilla beans. The beans we are familiar with in chili and our gardens, belong to the *Phaseolus* GENUS. Just a few members of the GENUS *Phaseolus* are green beans, wax beans, dry beans and Lima beans.

The GENUS *Phaseolus* has about fifty SPECIES. They are all native to the Americas. At least four SPECIES were DOMESTICATED before Columbus came to the Americas. The most important member of this GENUS is *Phaseolus vulgaris*. It is grown all over the world, in the tropics, semi-tropics, and temperate climates.

We will be studying three of the members of this GENUS in depth. These members are:

1. *Phaseolus lunatus* (also known as *Phaseolus limensis*) – Lima bean
2. *Phaseolus coccineus* (also known as *Phaseolus multiflorus*) – scarlet runner bean

And the most important SPECIES,

3. *Phaseolus vulgaris* – the common bean (French bean, snap bean, bush bean, pole bean, kidney bean, pinto bean ...)

Genus Portrait of the *Phaseolus* - Members of the Genus

Below the three SPECIES are described in detail. Use this information to help you choose which beans to grow. For each SPECIES there is an illustration. These types of illustrations are important parts of TAXONOMY books. Many of the drawings will show the leaves, flowers and fruits of the plant. REMEMBER, you will be required to make an illustration of the bean you grow this summer.


1. *Phaseolus lunatus* – Lima bean



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 <p>Phaseolus lunatus "Haba" "Wild lima bean"</p> <p>From <i>The Flora Borinqueña</i> Digital Herbarium and Library New York Botanical Garden</p>	<p>Habit: HERB, VINE Life Cycle: PERENNIAL Leaves: palmate trifoliate compound Flower: PAPILIONACEOUS Fruit: LEGUME</p>
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Phaseolus lunatus is the Lima bean. It is also known as the as butter or sugar bean. It is thought that the Lima bean was DOMESTICATED in both the Andes and Central America. This DOMESTICATED took place about 2000 B.C

Lima beans are PERENNIALS grown as ANNUALS. They have a very extensive root system. Each year the plants grow back from these root systems in areas with out freezes. They are WARM SEASON plants. Lima beans prefer warm temperatures but can be grown in temperate zones as ANNUALS. They can grow where it is wet and also tolerates drought.

Some VARIETIES are bushy while others are VINES. VINES grow to be 1 to 4 meters long. The bush VARIETIES mature sooner than the VINE VARIETIES.

The FRUIT are LEGUMES (pods). Pods can be up to 15 cm long. Young pods can be steamed and the whole pod can be eaten. Even the leaves of the plant are eaten.

Lima beans are usually grown for their SEEDS. SEEDS are either large, called Lima type, or small called Sieva type. Mature SEEDS are 1 to 3 cm long. They are oval or kidney shaped. Most SEEDS are flat. However, there are VARIETIES that are call "potato" VARIETIES. These have SEEDS which are round.

Lima bean SEEDS are the most commonly white, but there are also black, red, orange and mottled SEEDS. The immature SEEDS that many of us eat are green. The SEEDS of Lima beans are eaten as a fresh vegetable when the SEEDS are immature. Immature Lima beans are the main ingredient of succotash. Succotash is a food made of Lima beans and corn. It became very popular during the Great Depression. It is a traditional dish for Thanksgiving. The word comes from the Narraganset language. What other word for a plant

comes from the Narraganset language?

The green SEEDS can also be used like peas in soups and stews.

SEEDS are also eaten as a dried PULSE. Mature SEEDS are dried and stored for later use. Raw mature seeds are poisonous. The poison is destroyed by cooking. It is best to soak seeds for 12 hours before cooking. Sprouted SEEDS are cooked and used in Chinese cooking. Dried SEEDS can also be ground into a powder. The powder is used in soup or stew as a thickener. The powder can also be used with flour to make bread.

If you grew Lima beans, what part of the plant would be the most important to you?

2. *Phaseolus coccineus* – scarlet runner bean



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Habit: HERB, VINE
Life Cycle: PERENNIAL
Leaves: PALMATE palmate trifoliate compound
Flower: PAPILIONACEOUS
Fruit: legume

Prof. Dr. Otto Wilhelm Thomé
Flora von Deutschland Österreich und der Schweiz. 1885, Gera, Germany

Phaseolus coccineus (also known as *Phaseolus multiflorus*) is the scarlet runner bean. This SPECIES of *Phaseolus* originated in the mountains of Central America. It was domesticated at least 3500 years ago and spread south to modern day Columbia. Scarlet runner bean is very popular in Europe but not grown widely in the U.S. It is the favorite garden bean in England. See *Plants for a Future: Data Base Research Results* (at the end of the lesson or <http://www.pfaf.org/database/plants.php?Phaseolus+coccineus>) for scarlet runner bean CULTIVAR information and how to grow. They can even be grown in pots and with other climbers, like morning glories.

Scarlet runner bean is a PERRENIAL grown as an ANNUAL. It has a TUBEROUS root. The roots are very rich in starch. People in Central America eat the roots too. It is a very vigorous VINE growing 12 to 15 feet long. There are new VARIETITES which are short and do not climb. The roots can be dug up in the fall and put away for the next season. The VINE will flower sooner than if grown from SEED.

Scarlet runner bean has beautiful FLOWERS. The original color of the FLOWERS was red or purple. Today, most plants have red FLOWERS. But, there are VARIETIES with orange, white and mauve FLOWERS. The FLOWERS are 1 inch wide. It gets its name from its red FLOWERS and SEEDS. Many people grow the VINE for the FLOWERS and bright green leaves, never eating the pods or SEEDS. The plant flowers from mid summer to the first frosts. The FLOWERS can be eaten. Hummingbirds, butterflies, moths, and bees love the FLOWERS.

The FRUITS are sometimes eaten when they are young. But, the pods become tough as they mature, even cooking does not make them tender. Pods are 6 to 20 inches long.

SEEDS are the important crop. SEEDS are usually multicolored though they are sometimes white. The SEEDS can be shiny black, violet-black to mottled deep red. SEEDS are eaten fresh or dried. The SEEDS are very rich in protein and have a mild flavor. Immature SEEDS are used as a vegetable or in salads, soups, or stews.

If you grew scarlet runner beans, what part of the plant would be the most important to you?



Photo: Charles Mann courtesy of Santa Re Permaculture.

Make a Scarlet Runner Teepee!

Arrange poles in a circle. Lean the tops of the poles together towards the middle. Leave an opening on the north side of the circle. Plant 2 or 3 beans on the outside of the poles. The bean plants will fill in the spaces between the poles.

What other plant do you see in this photo that Native Americans grew?

3. *Phaseolus vulgaris*- common bean



Agriculture Research Service, United States Department of Agriculture



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The Probert Encyclopaedia

Habit: HERB, VINE
Life Cycle: ANNUAL
Leaves: palmate trifoliate compound
Flower: PAPILIONACEOUS
Fruit: LEGUME



Walter Knittel, Beanpoles at the Freilichmuseum
Neuhausen ob Eck

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The common bean, *Phaseolus vulgaris*, comes from the Americas, from Central America and the Andes. *Phaseolus vulgaris* is an ANNUAL HERB. Some types are VINES growing 2 to 3 meters long. Other bean VARIETIES are bushy growing only 20-60 cm tall.

Flowers are about 1 cm long and are white, pink or purple.

The whole FRUITS are eaten from green or wax beans. They are also known as snap beans. PODS can be green, yellow, black or purple from 8 to 20 centimeters long. The PODS have 4 to 6 SEEDS. Pods can be flat, round, broad or narrow. There are over 130 VARIETIES of 'green beans'.

The SEEDS of *Phaseolus vulgaris* can be eaten when they are immature, called shell beans. There are 37 types of shell beans. SEEDS can also be eaten when they are mature, these are known as dried beans.

There are many different types of dried beans. They come in a rainbow of colors. The pinto bean is the most common dried bean in the United States. It is mottled in color, like the pinto horse. It is the bean used in Mexican foods. White beans, like the navy bean, are the most popular beans in England. White beans are used in English-American dishes like Boston baked beans. Kidney beans have a dark red skin. They are used in chili and Cajun cooking. Black beans, for example the black turtle bean, are used in Latin American cooking. There are also pink and yellow beans. These beans have different flavors and textures.

Bean Vocabulary

There may be no garden vegetable that has as many words used with it as bean. There are string beans, snap beans, butter beans, *etc.* Before choosing SEEDS from a catalogue, it is important for you to know what these words mean.

Broad bean – The fruits are broad and flat. Also called Italian beans, they have a special flavor.

Bush bean – Plants are short and do not need support. Keep them picked and they will provide FRUIT for a few weeks. Plant two crops, about 2-3 weeks apart, for a longer picking season.

Dried bean – Seeds are matures and used in cooking.

Fillet bean – Fruits are eaten when young. These varieties have thin fruits and are also known as French beans and haricots vert.

French bean – The fruits are thin, also known as fillet beans and haricots vert.

Green bean – Fruits are eaten, not used for the seeds as dry beans.

Halfrunner – Plants are half way between bush and vine, about 3 feet long.

Haricot verts bean – The fruits are thin, also known as fillet beans and haricots vert.

Italian bean – The fruits are broad and flat.

Pole bean – Plants are long vines and need support. They will not weave themselves between horizontal supports. They produce FRUIT for a longer time than bush beans.

Purple bean – FRUIT are purple when raw, but turn green when cooked.

Shelled bean – Immature seeds of beans. These seeds are used in cooking.

Snap bean – The important crop is the fruit, not the seed.

String bean – Fruit of bean plants. These pods have a “string”. The “string” is usually removed when preparing the beans for eating.

Stringless bean – The “string” has been breed out. The pods do not have the “string”.

Sugar bean – These are Lima beans.

Wax bean – These are *Phaseolus vulgaris* with yellow fruit.

Projects

1. Make a poster showing different varieties of beans. Label the beans with species name and variety.
2. Make a table showing the different varieties of bean. Include the variety name, days to harvest, and special traits. Include whether fruit are used as snap, shell, or dry bean.

GLOSSARY FOR LESSON ONE

annuals - *plant which completes its life cycle in one year.*

domestication – *wild biological organism is habituated to survive in the company of, or by the labour of, human beings (Wikipedia)*

flower – *the reproductive unit of some plants (angiosperms). Parts of the flower include petals, sepals, ovary (the female reproductive organs), and stamens (the male reproductive organs).*

fruit – *the plant structure that develops from the ovary, usually after fertilization by pollen; mature ovary of a seed plant which contains the seed(s)*

genus (pl. genera) – *a group of plants (or other living things) between a family and a species. A genus has one or more species which have certain*

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characteristics in common. The italicized names are the scientific names of plants. Plants can have many common names, but they each have only one scientific name. The genus (first part of the scientific name) is always capitalized and the species (second part of the scientific name) is not capitalized unless the plant is named after a person.

habit – *general appearance of a plant, for example tree, herb, vine*

herb – *plant that does not form wood*

legume – “The common name for plant species in the Family **Fabaceae** (or Leguminosae); or The name of a type of **fruit**, characteristic of leguminous plants:

A legume is a simple dry fruit which develops from a simple **carpel** and usually dehisces (opens along a seam) on two sides. A common name for this type of fruit is a "pod," (Wikipedia)

perennial - *a plant whose life cycle lasts for three or more seasons; lasting year after year*

pulse – *annual legume yielding 1 to 12 seeds or grains inside a pod*

seed - *Contains the plant embryo*

species – *a group of similar organisms which breed only among themselves, see genus above.*

taxonomy - *The classification of organisms based on genetic similarities*

variety - *a plant which retains most of the characteristics of the species, but differs in some way such as flower or leaf color, size of mature plant, etc. A*

variety is added to the specific binomial and preceded by "var.," such as saxatilis in the epithet *Juniperus communis* var. *saxatilis*.

vine - a plant that trails, clings, or twines; it requires support to grow vertically.