

THE SOLANACEAE

LESSON TWO

SOLANACEAE GENERA AND SPECIES

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In this lesson we will learn to identify several members of the Solanaceae. There are eight main groups of the Solanaceae family we will study. Parts of the lesson are underlined. Younger members can ignore these parts. **Make sure you do everything that is in bold print**, answer all the questions and do one of the projects at the end of the chapter. Bring the project to the next meeting. WORDS PRINTED IN ALL CAPITAL LETTERS may be new vocabulary words. For help, see the glossary at the end of the lesson.

INTRODUCTION

The Solanaceae is also known as the Nightshade Family. It is a very large group of plants, one of the largest of the plant families. There are about 90 GENERA with 3000 SPECIES. The Nightshade Family has plants with many different HABITS. There are HERBS, SHRUBS, VINES, and some TREES among the Solanaceae. Plants can be ANNUALS, BIENNIEALS, or PERENIALS. Some of our favorite plants, peppers for example, are PERENNIALS that we grow as ANNUALS. We will study these terms in Lesson 11. [You can review these terms by looking at Lesson Ten for the Cucurbit family.] Nightshades are found in the new and old worlds, in the tropics and the temperate regions.

Although we will concentrate on the potato, there are eight groups, GENERA, within the Solanaceae that we will work with over the next year. These are:

1. *Solanum* - potato, eggplant, climbing nightshades, and horse nettle
2. *Lycopersicon* - tomato
3. *Capsicum* - pepper
4. *Petunia* - petunia
5. *Nicotiana* - flowering tobacco and tobacco
1. *Brugmansia* - angel's trumpet
7. *Datura* – Jimsonweed and devils trumpet
8. *Physalis* – Chinese lantern and tomatillo

In this lesson we will talk about each GENUS. You will be expected to identify the different members of the Solanaceae. Broadly speaking, the first three groups (GENERA) are important because they provide food. The next groups are used as flowers or are important weeds.

Members of the Family

The focus of our study is the potato but we will also learn about other members of the family. Members of the different GENERA are listed below with a brief description of each GENUS. **Complete the map assignment and the table** (available at http://www.geauga4h.org/clubs/plantmasters_project.htm). **Use the Solanaceae Family Portrait (APPENDIX A) and the WEB** (<http://www.geauga4h.org/plants>) **site to help you learn the common and scientific names of the different groups of plants.**

A. *Solanum* - Potato, Eggplant and Climbing Nightshade and Horse Nettle Group

Solanum is the TYPE GENUS for the Nightshade family.

1. *Solanum tuberosum* is the potato. Potatoes are low, weak-stemmed PERENNIAL HERBS. They are grown as ANNUALS in many parts of the world. Underground stems are used to PROPAGATE potatoes. The potato's origins are in the Andes of South America. Flowers are white or lightly tinted. The FRUIT is a BERRY about 1 inch in diameter and usually green or yellow.

2. *Solanum melongena* is the eggplant. It is a spiny HERB or SHRUB which grows to about 3 feet. It is a PERENNIAL grown as an ANNUAL. It originated in India. The flowers are large (2 inches) and violet-purple. The FRUIT is usually a dark, shiny, purple, large BERRY. Plant breeders have bred plants with light colored and small FRUITS.

3. *Solanum dulcamara* is the climbing or bitter nightshade. It is a PERENNIAL. It is a twining VINE from Europe, North Africa and western Asia. In North America it has escaped into the wild and is a problem weed. The flowers are small and violet which develop into orange-red BERRIES. The bitter nightshade is famous because it is very poisonous.

4. *Solanum carolinense* is known as horse nettle or sand briar. It is a coarse, prickly weed found all over the United States. It originated in North America and is a PERENNIAL. It is poisonous. The stem has spines and the leaves have prickles. The flowers are small and come in many colors from white, pale yellow to pale purple. The fruit is a yellow BERRY.

B. *Lycopersicon* - Tomato Group

Lycopersicon are annuals and perennials. This group originated in Peru. The tomato is the most important member of this group. The tomato group used to be classified in the *Solanum* GENUS. You may see the tomato referred to as

Solanum lycopersicum L. var. *lycopersicum*. However we will use another scientific name for tomato, *Lycopersicon esculentum*.

Tomato plants produce a wonderful FRUIT which makes it the most popular vegetable garden plant in North America. The tomato is a PERENNIAL grown as an ANNUAL. The flowers are usually small and yellow. FRUITS vary in size and color and are BERRIES.

There are two VARIETIES of *Lycopersicon esculentum* which are important.

a. *Lycopersicon esculentum* var. *cerasiforme* is the cherry tomato. It has smaller flowers with miniature fruit which ripen earlier than most other varieties.

b. *Lycopersicon esculentum* var, *commune* is the common tomato.

C. *Capsicum* – Pepper Group

The members of the genus *Capsicum* are woody PERENNIAL plants from tropical America. Most of them come from Central and South America. They are grown in temperate climates as ANNUALS.

Capsicum annuum is the SPECIES which includes most of the peppers we eat. Some of these are the sweet peppers, others are hot peppers. Plants are about 18 inches high. Flowers are small, bell shaped, white to yellowish. Many VARIETIES have been bred from the wild members of this GENUS. There are three VARIETIES which we commonly use and grow.

- 1a. *Capsicum annuum* var. *grossum* is the bell or sweet pepper we grow commonly in the garden.
- 1b. *Capsicum annuum* var. *cerasiforme* is the cherry pepper. The fruits are yellow, small and round. They turn a purple-red.
- 1c. *Capsicum annuum* var. *longum* are long peppers which are red and fiery. This VARIETY includes the chili peppers.

Two other GENEAE of interest are:

2. *Capsicum chinense* include the habanero peppers.
3. *Capsicum frutescens* include the Tabasco peppers. It is also known as the red pepper, bird pepper, chili pepper, aji, and Cayenne pepper.

D. *Petunia* – Petunia Group

This genus is made up of ANNUALS and PERENNIALS from South America. Only one species is commonly grown, *Petunia x hybrid* in our part of the world.

Notice the name has an 'x hybrid'. This means it is a HYBRID, the result of crossing SPECIES. The common garden petunia is a result of crosses between *P. axillaris*, *P. inflata* and *P. violaceae*, all of which are wild species of petunia native to the more temperate regions of South America.

The common petunia is one of the two most popular ANNUALS grown in the United States. The zinnia is the other. Petunias come in a variety of plant sizes. Dwarf plants are less than 12 inches tall while bedding petunias can grow to 24 inches. Grandifloras have very large flowers while Multifloras have many, many flowers. Flowers can be single or double. Some flowers are 4 inches across. Petunias come in all colors, white, yellow, all the pinks, reds, oranges and purples.

E. *Nicotiana* – Tobacco Group

The GENUS *Nicotiana* includes the flowering tobaccos used in gardens as well as the tobaccos used in different ways, for example smoking and chewing. These members are used because they contain nicotine. Members are PERENNIALS grown as ANNUALS. They originated in Central and South America.

1. *Nicotiana rustica*, also called Aztec tobacco is one of the two wild tobaccos. The flowers are flaring and lime green. It is a PERENNIAL originating probably in Mexico.
2. *Nicotiana tabacum* is called common tobacco. It is the tobacco used in commercial smoking and chewing products.
3. *Nicotiana alata* is one of the SPECIES of flowering tobacco people love to grow in their gardens. It has its origin in Brazil and Argentina. It is a short lived PERENNIAL grown as an ANNUAL. Flowers are tubular and range from white to red. They are very fragrant and open at night. They are pollinated by moths. There are dwarf and tall plants.

F. *Datura* – Jimsonweed Group

This GENUS is made up of bushy ANNUALS, SHRUBS and small TREES. Most of them come from South America. Some do come from Asia. Many of them are poisonous. Flowers are usually large and trumpet shaped. Some of the SPECIES are grown as ANNUALS in gardens and green houses. They are described as being bold rather than beautiful.

1. The SPECIES of interest for us is the noxious weed, jimsonweed, *Datura stramonium*. It is also called thorn apple. The origin of jimsonweed is uncertain, it may be India or Central America. It has become a significant

pest SPECIES in North America. It is a PERENNIAL and can grow 2 to 5 feet tall. The plant has a foul smell and is poisonous. Flowers can be up to 4 inches long. The flowers open in the evening and close during the morning of the next day.

2. *Datura metel*, devil's trumpet, is a beautiful plant with large beautiful bell shaped flowers. Flowers come in many colors and are very fragrant. The plant is very poisonous. Origins are very uncertain. It is also called the devil's horn.

G. *Brugmansia* - Angel's Trumpet Group

Angel's trumpet's scientific name is *Brugmansia X hybrid*. Angel's trumpet used to be classified in the *Datura* GENUS as *Datura arborea*. Notice the name has an x hybrid. This means the SPECIES is a cross of other SPECIES. The plants are PERENNIAL SHRUBS originating in Peru. The flowers can be very large, more than 9 inches and are bell shaped. The flowers usually hang down. New varieties come in all sorts of colors, not just the original white. It is well known for being poisonous.

H. *Physalis* – Chinese Lantern and Tomatillo Group

This is a group of HERBACEOUS ANNUALS and PERENNIALS. They are grown for decoration or as an edible fruit. They are from Asia, Europe and North America. The flowers are about ½ inch and come in blue, yellow or white. This GENUS is special because of its FRUIT. The CALYX becomes enlarged as the BERRY grows. Eventually the CALYX encloses the BERRY in a husky covering. There are two species we will study. Many of the parts are poisonous.

1. *Physalis alkekengi* is Chinese lantern or winter-cherry. It is a PERENNIAL sometimes grown as an ANNUAL becoming about 2 feet high. It is native to Europe and Asia. The flowers are small and white. It has very bright orange-red "fruits" that look like small Chinese Lanterns. These bright lanterns make it a very popular plant to grow.
2. *Physalis ixocarpa* is the tomatillo or husk-tomato. This SPECIES is also known as *Physalis philadelphica*. This is a PERENNIAL grown as an ANNUAL. Its origins are in Central America. The ¾ inch flowers are bright yellow. The CALYX is purple, covering a BERRY. The BERRY takes up all the room in the CALYX and can be red to purple. This BERRY is used as a food and has a very tart taste. There is evidence that it was used as far back as 900 B.C. in Mexico. In Mexico it was preferred over the tomato. The word tomatillo comes from the Nahuatl language, "tomatl". This word is a generic one for globose FRUITS or BERRIES which have many SEEDS.

Is there another word which resembles the word ‘tomato’ used in English? _____

Why do you think we use it? _____

QUESTION FOR LESSON TWO

1. Can you explain why so many of the Solanaceae are PERENNIALS but we grow them as ANNUALS?

ASSIGNMENT FOR LESSON TWO

1. Using the information on the previous pages and in Appendix A, show where the different genera of Solanaceae originated on the map of the world at the end of the lesson. Also complete Table A.
2. **Study the common names, scientific names and origins using the exercises at the WEB site** (<http://www.geauga4h.org/plants>)

PROJECTS FOR LESSON TWO

Do one of the projects listed below.

1. Make a poster showing different members of the Solanaceae family. Use pictures from seed catalogues or draw pictures. Label the pictures with the scientific name and the variety name.
2. Choose one species from one of the genera and make a poster with pictures/photos of as many varieties as you can find. Label all the different varieties.
3. Make a table showing the different members of the Solanaceae family which are important as food sources. Include the scientific name, variety, size of fruit, and days to maturity. You can use a gardening book or a seed catalog. Pictures can be included.

GLOSSARY FOR LESSON TWO

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

berry - a type of fleshy fruit with seeds throughout the flesh

biennial - plant which completes its life cycle in two years

calyx – word for all the sepals

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 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

hybrid - crossbreed of two **species**, usually having some characteristics of each parent.

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

propagate - to produce new plants, either by vegetative means involving the rooting or grafting of pieces of a plant, or by sowing seeds

shrub – a woody perennial smaller than a **tree**, usually with several stems

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

taxonomy - The classification of organisms based on genetic similarities

tree - a woody self-supporting perennial plant usually with a single main stem and generally growing more than 20 feet tall.

type genus – the genus which typifies the plant family

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.

2. *Solanum melongena* is the eggplant. It is a PERENNIAL grown as an ANNUAL, originating in India.



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3. *Solanum dulcamara* is the climbing nightshade. It is a PERENNIAL vine, originating in Europe and North Africa.



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4. *Solanum carolinense* is the horse nettle. It is a PERENNIAL, originating in North America.



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- B. The GENUS *Lycopersicon* includes all the tomatoes. It is a PERENNIAL grown as an ANNUAL. It probably originated in Peru. *Lycopersicon esculentum* var. *cerasiforme* is the cherry tomato. *Lycopersicon esculentum* var. *commune* is the common tomato.



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C. The GENUS *Capsicum* includes all the peppers. It is a PERENNIAL grown as an ANNUAL. Its origins are in Central and South America.



Capsicum annuum var. *grossum* is the bell or sweet pepper



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Capsicum Chinese (Habanero)



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Capsicum frutescens (Tobasco)



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D. The GENUS *Petunia* includes all the petunias. It is an ANNUAL, originating in South America.



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E. The GENUS *Nicotiana* includes the flowering tobaccos and tobaccos used in commercial tobacco products. Its origins are in Central and South America and they are PERENNIALS.

1. *Nicotiana rustica*
probably originated in
Mexico.



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2. *Nicotiana tobaccum* is the SPECIES used in commercial tobacco products. It was bred from wild forms of the plant. It is a PERENNIAL grown as an ANNUAL.

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3. *Nicotiana alata* is one of the flowering tobacco in our gardens. Its origins are in Brazil and Argentina. It is a PERENNIAL often grown as an ANNUAL.



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F. The GENUS *Datura* includes Jimsonweed.

1. *Datura stramonium* is Jimsonweed. It is an ANNUAL, originating in India and Central America



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2. *Datura metel*, devil's trumpet, is a beautiful plant with large beautiful bell shaped flowers. Flowers come in many colors and are very fragrant. The plant is very poisonous. Origins are very uncertain. It is also called the devil's horn.



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G. The GENUS *Brugmansia* includes angel's trumpets. It is a PERENNIAL originating in Peru.



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H. The GENUS *Physalis* includes the Chinese lantern and tomatillo.

1. *Physalis alkekengi* is the Chinese lantern. It is a PERENNIAL, grown in many places as an ANNUAL, originating in Europe and Asia.



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2. *Physalis ixocarpa* is the tomatillo. It is a PERENNIAL, grown many places as an ANNUAL, originating in Central America.



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Please note: the map and table are in a separate document, available on the same web page where this document is located:
http://www.geauga4h.org/clubs/plantmasters_project.htm