

Unit D: Production of Field Crops

Lesson 5: Growing Sugar Crops

Terms

- Furrow
- Brown sugar
- Taproot
- Beet hook
- Purified



I. Sugar Cane

A. Sugar cane is a member of the grass family.



Sugar Cane

- B. Sugar cane is grown from sections of stalk, not seed. These sections are called sets and are planted in ***furrows***, which are long, narrow, shallow trench made in the ground.
1. Stalks are cut into sections that range from 45-91 centimeters long. These are laid end to end in a furrow and covered with soil 5-8 centimeters deep. The nodes then grow tiny shoots that develop into mature stalks. Roots also grow this way.

Sugar Cane

- C. As a tropical climate crop the stalk may grow 2-4.5 meters tall.
- D. Inside the stem is a white pulp where the sugar is stored.
- E. Harvested after two years, sugar cane can be harvested after only seven months, though the yield is not as high.

Sugar Cane

- F. At maturity it will produce seeds in tropical climates, so the cane is usually harvested by then, or the seeds are infertile
- G. 101-127 centimeters of rainfall or irrigation during growing season.

Sugar Cane

H. Common ways to harvest around the world:

1. Sugar cane may be harvested by hand, using a machete knife



Sugar Cane

- Harvesting Continued
 2. Field is burned to remove leaves before cutting, and then stalks are raked into piles.
 3. Mechanical Harvester- cuts stalks, removes leaves and loads stalks.



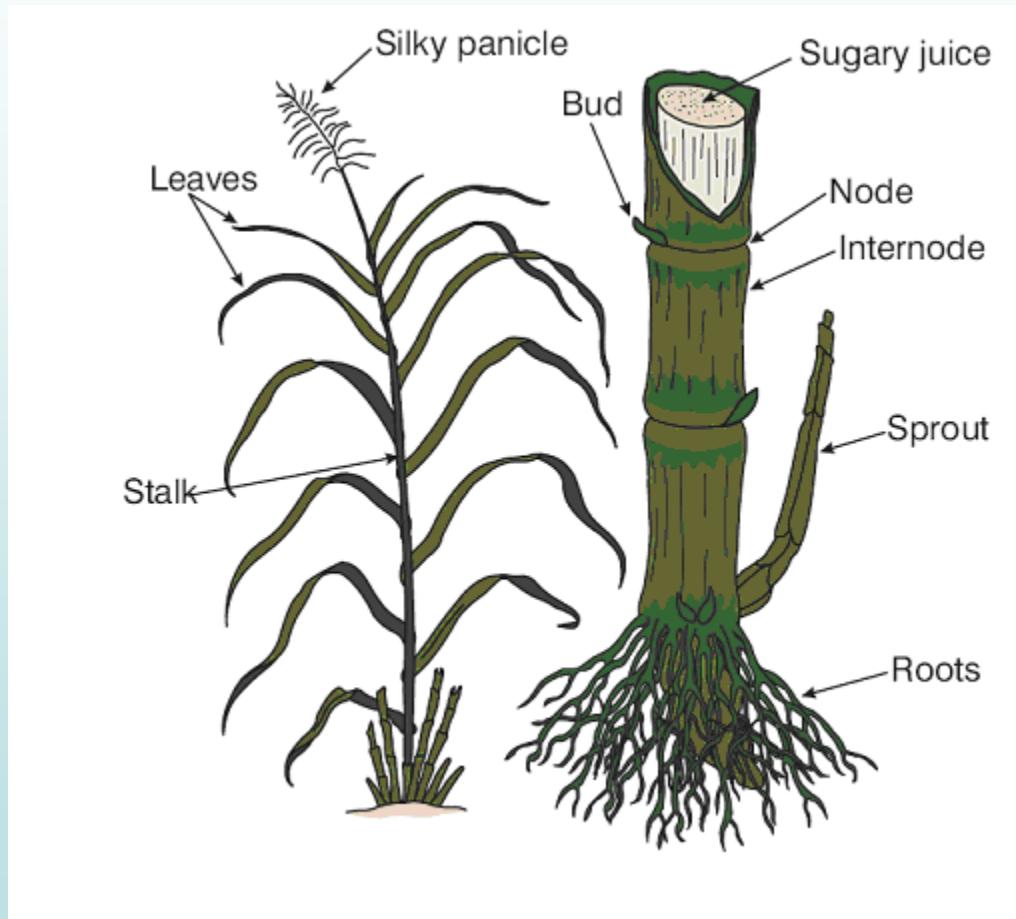
Sugar Cane

- I. After being cut, sugar cane must be processed quickly because it begins to lose its sweetness as soon as it is cut.
- J. To process, the cane is crushed to remove a brown liquid. This liquid is boiled and impurities are removed. The juice thickens as water evaporates. Brown crystals appear and are then melted down and cleaned to result in white crystals.

Sugar Cane

- K. The same sugar cane field may be harvested several times before it needs to be replanted.
- L. Sugar cane is the major source for molasses.
- M. ***Brown sugar*** is processed white sugar with some molasses added back in.

STRUCTURE OF A SUGAR CANE STALK



II. Sugar Beets

A. Sugar beet is a hardy biennial vegetable that can be grown commercially in a wide variety of temperate climates.



Sugar Beets

B. During its first growing season, it produces a large (1–2 kg) storage root whose dry mass is 15–20% sucrose by weight. If not harvested, during its second growing season, the nutrients in this root are consumed to produce the plant's flowers and seeds.

Sugar Beets

C. Seed production and sugar production need to take place in different locations because frost resistance is poor, but plants need a cold shock to flower and produce seed. Requires a deep well drained stone free soil that is not acid.

Sugar Beets

- D. Sugar beets are grown from seeds.
- E. Sugars accumulate in the ***taproot***, the large main root that grows downward in a taproot system.
- F. Sugar formation increases rapidly in late summer as nights get cooler and nitrogen sources are diminished in the soil.

Sugar Beets

- G. Harvesting is delayed as long as possible in the growing season to assure maximum sugar content.
- H. The growing season for sugar beets is approximately five months.

Sugar Beets

I. Harvesting

1. In parts of the world sugar beets are harvested by a machine that cuts off the tops and lifts the beets from the soil.



- 2. If harvested by hand, it can be highly labor-intensive. Weed control is managed by densely planting the crop, which then it has to be manually thinned with a hoe two or even three times during the growing season.



Sugar Beets

Harvesting also requires many workers. Although the roots can be lifted by a plough-like device which could be pulled by a horse team, the rest of the preparation is done by hand. One laborer will grab the beets by their leaves, knock them together to shake free loose soil, and then will lay them in a row, root to one side, greens to the other.

Sugar Beets

A second worker equipped with a ***beet hook*** (a short handled tool something between a billhook and a sickle) will follow behind, and lifts the beet and swiftly chops the crown and leaves from the root with a single action. Working this way, would leave a row of beet that could then be forked into the back of a cart.



Sugar Beets

- J. To process sugar beets, they must be washed, sliced, and soaked in hot water to separate the juice from the beet fiber. The juice is then **purified** (to free from anything that debases, pollutes, adulterates, or contaminate the crop) filtered, concentrated, and dried.
- K. The tops and beet pulp residue of sugar beets can be used for livestock feed.

MAJOR PARTS OF A SUGAR BEET PLANT

