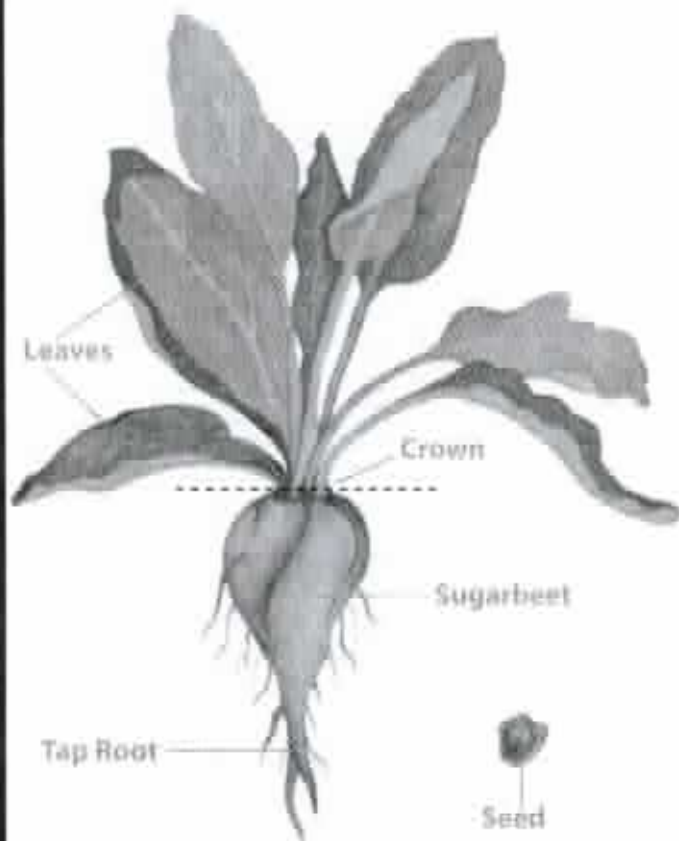


# SUGARBEETS

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# SUGARBEETS



**Top Ten Minnesota Counties  
Producing Sugarbeets in 2007:**  
Polk, Norman, Clay, Marshall, Wilkin, Itasca,  
Chippewa, Kittson, Kandiyohi and Becker

## On The Front

### A. Sugarbeet Plant

The sugarbeet plant is a root crop that grows underground. At the end of the first year, a sugarbeet weighs 2 to 5 pounds and produces 70 to 120 grams, or about 1/3 to 1/2 cup of sugar.

### B. Sugarbeet Seed

The sugarbeet seed is tiny. It is about half the size of a grain of rice. It is a rough, bumpy seed. Most seeds for sugarbeet plants are produced in Willamette Valley, Oregon, the destination point of the historic Oregon Trail. It takes two years to produce sugarbeet seeds.

## Sugarbeets

Sugarbeets are planted in early spring. The plants are grown in over twenty counties in Minnesota, mostly in the Red River Valley. Minnesota leads the nation in sugarbeet production. The combination of cool nights and warm days provide ideal conditions for beets to produce a high amount of sugar. The growing season is from April until October.

The sugarbeet plant produces sugar in its leaves by a process called photosynthesis. In photosynthesis, the plant combines water with carbon dioxide from the air and energy from the sun to produce sugar. The sugar is then stored inside the beet.

## Harvesting

During harvest in the fall, producers use a machine called a defoliator to cut off the tops of the beets that are left in the field. A sugarbeet lifter/loader then lifts the beets out of the soil onto a truck, and the beets are delivered to a receiving station at the sugarbeet processing plant. Harvested sugarbeets are very heavy. An average pile of beets weighs about 40,000 tons. The average yield is 20 tons per acre with 17-18% sugar content on average.

## The Factory Process

First, the beets are cleaned in a beet washer. Then, a machine called a slicer is used to cut the beets into long strips that look like shoestring potatoes or noodles. The beet noodles are sent through a machine called a diffuser or extractor. Hot water is mixed with the beets to dissolve and remove the sugar from the beet noodles.

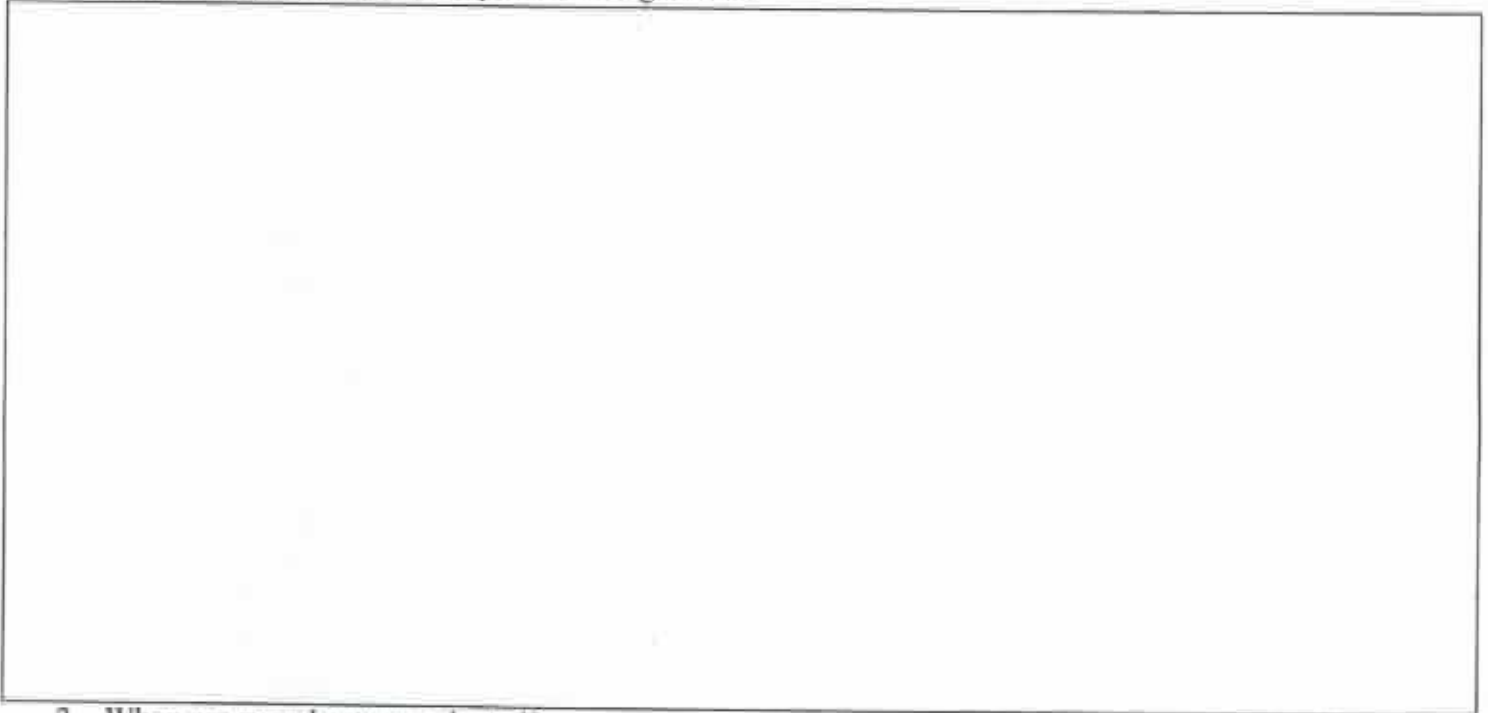
The water and sugar juice are saved and this solution is called "raw juice." The beet noodles, now free of most of their sugar, are dried into beet pulp for livestock feed. The raw juice is treated with lime and carbon dioxide gas to clean the mixture again. It is sent through a big, round filter to clean it and remove other non-sugars. The raw juice goes into a series of big tanks called evaporators where some of the water is boiled off. At this point, the mixture contains more sugar than water. It is a thick syrup and it is filtered again to make sure it is very clean.

## Crystallizes Into Sugar

The mixture passes through a big tank called a white pan that allows the thick juice to boil at a low temperature. As the water boils away, the sugar solution becomes a thick mass that is dropped into a centrifuge machine. The machine spins very fast to separate the sugar crystals which drop onto a conveyor belt for further drying and cooling. The finished sugar moves into bulk bins for storage or to the warehouse for packaging. The packaged sugar is distributed to grocery stores to be purchased by the consumer. Granulated sugar is by far the most common form of processed sugarbeets. Minnesota sugarbeet factories also process sugarbeets into brown, powdered and cube sugar.

## SUGARBEETS

1. In the box provided, draw a picture of sugarbeets.



2. When are sugarbeets are planted?

3. How much does an average pile of beets weigh?

4. Describe how sugar is made?

5. Using your map of Minnesota counties, create a symbol for sugarbeets and mark the top 10 counties where they were produced in 2007.