

# GRAIN SOYBEAN

Soyabean, Shoyu, Soybean

*Glycine max*

Fabaceae

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## ECHO® PLANT INFORMATION SHEET

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### Description

Grain soybean cultivation probably originated in northeastern China, a region where wild soybeans exist. This crop produces more protein and oil per unit of land than most other known crops.

### Uses

Grain soybean seeds are dry roasted and used directly as a snack or as a coffee substitute. The seed is also milled into flour and mixed with maize meal to serve as a relief food during famine. The flour is used as a component of bread or mixed with maize flour to make a fortified porridge ('ugali', 'sadza'). In West Africa Grain Soybean flour is used to thicken soup and to replace a traditional flour that is made from the seed of egusi melon (*Citrullus lanatus*). 'Okara' is the pulp and bran left over from making soymilk; this cake is used in almost all the same ways as Grain Soybean flour. In Asia, Grain Soybean is used in the preparation of a variety of fresh, fermented and dried food products like milk, tofu, tempeh, miso, yuba, soy sauce and bean sprouts. The dried, crushed material left after the oil from the seed is extracted, known as soybean meal, is a high protein supplement added to cattle feed. The oil is used in the production of many commercial foods and non-food items. Soy-based food products represent a significant addition to grain-based diets consisting solely of wheat, corn or rice because they complete the daily protein requirements for adults and children. As a nitrogen-fixing legume, Grain Soybeans improve the yield of crops that follow it because of the extra nitrogen left in the soil, erosion prevention from its dense leaf canopy and improved tilth (loosening of soil particles due to root growth).

### Common Names

### Cultivation

- Elevation: 0-2000 m (6500 ft)
- Rainfall: needs at least 500 mm (20 in) during growth
- Temperature: 15-30° C (60-85° F)
- Soil: grows well on most soils, except very coarse sands
- Light: the response to photoperiod interacts strongly with temperature, and given the relatively small variation in daylength in the tropics, temperature is the major factor influencing the rate of phenological development. The photoperiod sensitivity means that types brought directly into tropical Africa from North America will often flower and set seed before they have fully developed, restricting their yields. Plant seeds in moist soil, 2.5 cm (1 in) deep.

Though Grain Soybeans can withstand periods of drought, there must be good soil moisture during germination and pod growth though. Before seeds are planted, they should be inoculated with a rhizobial bacteria (*Bradyrhizobium japonicum*) to enhance nitrogen fixation. These bacteria will stay active in the soil for several years so other legume crops may be planted without inoculation. {For more information about inoculants, refer to EDN 101.} Allow a spacing of at least 2.5 cm (1 in) between seeds as the production of foliage depends upon available light.

### Harvesting and Seed Production

Grain soybean seeds have a hard seed coat but nevertheless should be harvested with care to prevent splitting which will lessen storage time. Seeds should be harvested when 50% of the plant's leaves have yellowed and dropped off and the stems are dry. Seeds stored in an area of 13% moisture with air movement will last for a year or more.

### Pests and Diseases

Numerous pests such as leaf-eating beetles, caterpillars, and leaf-hoppers feed on Grain Soybean plants.

### Cooking and Nutrition

Grain soybean seeds for human consumption require long soaking (18 hrs.) and cooking. Soy flour, soy milk, textured soy protein, and fermented soy, have long been popular in eastern Asia. Nutritionally, Grain soybeans are one of the least expensive sources of protein available for human consumption, containing twice as much protein as beef or milk, as well as iron, calcium, A and B-group vitamins. Yield of Grain soybean meal from the seed is 80% and oil comprises 18%. The meal contains about 50% protein.