

Grain

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Grains are small, hard, dry seeds, with or without attached hulls or fruit layers, harvested for human or animal consumption.^[1]

Agronomists also call the plants producing such seeds "grain crops". The two main types of commercial grain crops are cereals such as wheat and rye, and legumes such as beans and soybeans. Ubiquity of grain as a food source encouraged use of the term to describe other particles with volume or mass similar to an individual seed.



Food grains at a market

After being harvested, dry grains are more durable than other staple foods, such as starchy fruits (plantains, breadfruit, etc.) and tubers (sweet potatoes, cassava, and more). This durability has made grains well suited to industrial agriculture, since they can be mechanically harvested, transported by rail or ship, stored for long periods in silos, and milled for flour or pressed for oil. Thus, major global commodity markets exist for canola, maize, rice, soybeans, wheat, and other grains but not for tubers, vegetables, or other crops.

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Grains and cereals

In botany, grains and cereals are synonymous with caryopses, the fruits of the grass family. In agronomy and commerce, seeds or fruits from other plant families are called grains if they resemble caryopses. For example, amaranth is sold as "grain amaranth", and amaranth products may be described as "whole grains". The pre-Hispanic civilizations of the Andes had grain-based food systems but, at the higher elevations, none of the grains was a cereal. All three grains native to the Andes (kaniwa, kiwicha, and quinoa) are broad-leafed plants rather than grasses such as corn, rice, and wheat.^[2]

Classification

Cereal grains

All cereal crops are members of the grass family (Poaceae).^[3] Cereal grains contain a substantial amount of starch,^[4] a carbohydrate that provides dietary energy.

Warm-season cereals

- finger millet
- fonio

- foxtail millet
- Japanese millet
- Job's tears
- kodo millet
- maize (corn)
- millet
- pearl millet
- proso millet
- sorghum



Cereal grain seeds from left to right: wheat, spelt, barley, oat.

Cool-season cereals

- barley
- oats
- rice
- rye
- spelt
- teff
- triticale
- wheat
- wild rice



Barley



Rye grains



Rice grains by the IRRI

Pseudocereal grains

Starchy grains from broadleaf (dicot) plant families:

- amaranth (Amaranth family)
- buckwheat (Smartweed family)
- chia (Mint family)
- quinoa (Amaranth family, formerly classified as Goosefoot family)

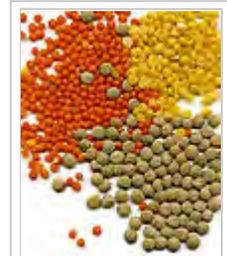
Pulses

Pulses or grain legumes, members of the pea family, have a higher protein content than most other plant foods, at around 20%, while soybeans have as much as 35%. Proteins in pulses are typically incomplete, as they do not contain all the essential amino acids.^[5] Pulses may also contain starches or fats. Common pulses include:

- chickpeas
- common beans
- common peas (garden peas)
- fava beans
- lentils
- lima beans
- lupins
- mung beans
- peanuts
- pigeon peas
- runner beans
- soybeans



Buckwheat



Lentil

Oilseeds

Oilseed grains are grown primarily for the extraction of their edible oil.

Vegetable oils provide dietary energy and some essential fatty acids.^[6] They are also used as fuel or lubricants.

Mustard family

- black mustard
- India mustard
- rapeseed (including canola)



Rapeseed

Aster family

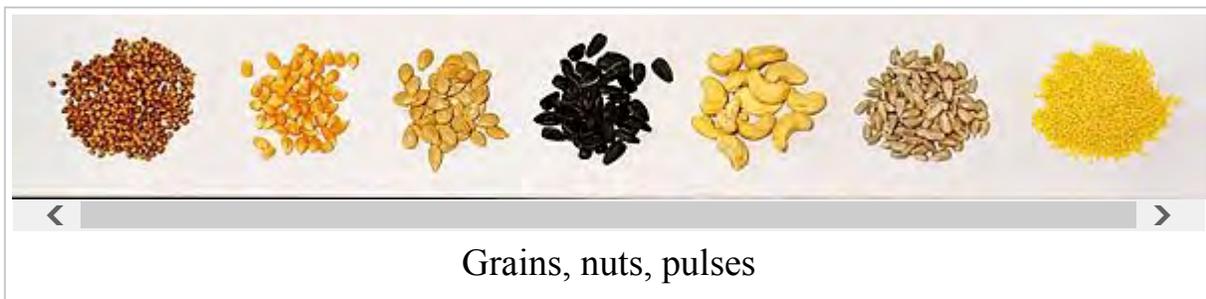
- safflower
- sunflower seed



Sunflower seeds

Other families

- flax seed (Flax family)
- hemp seed (Hemp family)
- poppy seed (Poppy family)



Historical impact of grain agriculture

Because grains are small, hard and dry, they can be stored, measured, and transported more readily than can other kinds of food crops such as fresh fruits, roots and tubers. The development of grain agriculture allowed excess food to be produced and stored easily which could have led to the creation of the first permanent settlements and the division of society into classes.^[7]

Occupational safety and health

Those who handle grain at grain facilities may encounter numerous occupational hazards and exposures. Risks include grain entrapment, where workers are submerged in the grain and unable to remove themselves,^[8] explosions caused by fine particles of grain dust,^[9] and falls.

See also

- Cereals
- Domestication
- Grain drying
- Legume
- List of dried foods
- Mycoestrogen
- Perennial grain
- Staple foods
- Vegetable fats and oils

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