[thumb|upright=90%|A selection of various legumes](/wiki/File:Various_legumes.jpg" \o "File:Various legumes.jpg)

A **legume** ([Template:IPAc-en](/wiki/Template:IPAc-en) or [Template:IPAc-en](/wiki/Template:IPAc-en)) is a [plant](/wiki/Plant) in the family [Fabaceae](/wiki/Fabaceae) (or Leguminosae), or the [fruit](/wiki/Fruit) or [seed](/wiki/Seed) of such a plant. Legumes are grown agriculturally, primarily for their [grain](/wiki/Grain) seed called **pulse**, for [livestock](/wiki/Livestock) [forage](/wiki/Forage) and [silage](/wiki/Silage), and as soil-enhancing [green manure](/wiki/Green_manure). Well-known legumes include [alfalfa](/wiki/Alfalfa), [clover](/wiki/Clover), [peas](/wiki/Pea), [beans](/wiki/Bean), [lentils](/wiki/Lentil), [lupins](/wiki/Lupin), [mesquite](/wiki/Mesquite), [carob](/wiki/Carob), [soybeans](/wiki/Soybean), [peanuts](/wiki/Peanut), and [tamarind](/wiki/Tamarind).

A legume fruit is a [simple dry fruit](/wiki/Fruit#Simple_fruit) that develops from a simple [carpel](/wiki/Carpel) and usually [dehisces](/wiki/Dehiscence_(botany)) (opens along a seam) on two sides. A common name for this type of fruit is a *pod*, although the term "pod" is also applied to a few other fruit types, such as that of [vanilla](/wiki/Vanilla) (a [capsule](/wiki/Capsule_(botany))) and of [radish](/wiki/Radish) (a [silique](/wiki/Silique)).

Legumes are notable in that most of them have symbiotic [nitrogen-fixing](/wiki/Nitrogen_fixation) bacteria in structures called [root nodules](/wiki/Root_nodule). For that reason, they play a key role in [crop rotation](/wiki/Crop_rotation).

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## Terminology[[edit](/index.php?title=(none)&action=edit&section=1)]

[Template:See also](/wiki/Template:See_also) The term "pulse", as used by the [United Nations'](/wiki/United_Nations) [Food and Agriculture Organization](/wiki/Food_and_Agriculture_Organization) (FAO), is reserved for [crops](/wiki/Crop) harvested solely for the dry seed.[[1]](#cite_note-1) This excludes [green beans](/wiki/Green_bean) and green peas, which are considered [vegetable](/wiki/Vegetable) crops. Also excluded are seeds that are mainly grown for [oil](/wiki/Vegetable_oil) extraction ([oilseeds](/wiki/Oilseed) like [soybeans](/wiki/Soybean) and [peanuts](/wiki/Peanut)), and seeds which are used exclusively for sowing [forage](/wiki/Forage) ([clovers](/wiki/Clover), [alfalfa](/wiki/Alfalfa)). However, in common [usage](/wiki/Usage), these distinctions are not always clearly made, and many of the varieties used for dried pulses are also used for green vegetables, with their beans in pods while young.

Some Fabaceae, such as [Scotch broom](/wiki/Cytisus_scoparius) and other [Genisteae](/wiki/Genisteae), are leguminous but are usually not called legumes by farmers, who tend to restrict that term to food crops.

## Uses[[edit](/index.php?title=(none)&action=edit&section=2)]

Farmed legumes can belong to many agricultural classes, including [forage](/wiki/Forage), [grain](/wiki/Cereal), blooms, pharmaceutical/industrial, fallow/green manure, and timber species. Most commercially farmed species fill two or more roles simultaneously, depending upon their degree of maturity when harvested.

## Human consumption[[edit](/index.php?title=(none)&action=edit&section=3)]

[thumb|Freshly dug](/wiki/File:Peanut_9417.jpg) [peanuts](/wiki/Peanut) (*Arachis hypogaea*), [indehiscent](/wiki/Indehiscent) legume fruits

Grain legumes are cultivated for their seeds. The seeds are used for human and animal consumption or for the production of oils for industrial uses. Grain legumes include [beans](/wiki/Bean), [lentils](/wiki/Lentil), [lupins](/wiki/Lupin), [peas](/wiki/Pea), and [peanuts](/wiki/Peanut).[[2]](#cite_note-2)

### Nutritional value[[edit](/index.php?title=(none)&action=edit&section=4)]

Legumes are a significant source of [protein](/wiki/Protein_(nutrient)), [dietary fiber](/wiki/Dietary_fiber), [carbohydrates](/wiki/Carbohydrate) and [dietary minerals](/wiki/Dietary_minerals); for example, a 100 gram serving of cooked [chickpeas](/wiki/Chickpea) contains 18% of the [Daily Value](/wiki/Daily_Value) (DV) for protein, 30% DV for dietary fiber, 43% DV for [folate](/wiki/Folate) and 52% DV for [manganese](/wiki/Manganese).[[3]](#cite_note-3) Like other plant-based foods, pulses contain no [cholesterol](/wiki/Dietary_cholesterol) and little fat or sodium.[[3]](#cite_note-3) Legumes are also an excellent source of [resistant starch](/wiki/Resistant_starch) which is broken down by [bacteria](/wiki/Gut_flora) in the [large intestine](/wiki/Large_intestine) to produce [short-chain fatty acids](/wiki/Short-chain_fatty_acid) used by intestinal cells for [food energy](/wiki/Food_energy).[[4]](#cite_note-4) Preliminary studies in humans include the potential for regular consumption of legumes in a [vegetarian diet](/wiki/Plant-based_diet) to affect [metabolic syndrome](/wiki/Metabolic_syndrome).[[5]](#cite_note-5) There is evidence that a portion of pulses (roughly one cup daily) in a diet may help lower blood pressure and reduce [LDL cholesterol](/wiki/LDL_cholesterol) levels, though there is a concern about the quality of the supporting data.<ref name=Jayalath2014>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>[[6]](#cite_note-6)

### Classification[[edit](/index.php?title=(none)&action=edit&section=5)]

[right|thumb|Depending on the variety,](/wiki/File:Phaseolus_vulgaris_seed.jpg) [*Phaseolus vulgaris*](/wiki/Phaseolus_vulgaris) (a **pulse**) may be called "common bean", "kidney bean", "haricot bean", "pinto bean", "navy bean", among other names.

FAO recognizes 11 primary pulses.

1. Dry beans ([*Phaseolus*](/wiki/Phaseolus) *spp.* including several species now in *Vigna*)
   * [Kidney bean](/wiki/Kidney_bean), [navy bean](/wiki/Navy_bean), [pinto bean](/wiki/Pinto_bean), haricot bean (*Phaseolus vulgaris*)
   * [Lima bean](/wiki/Lima_bean), butter bean (*Phaseolus lunatus*)
   * [Adzuki bean](/wiki/Adzuki_bean), azuki bean (*Vigna angularis*)
   * [Mung bean](/wiki/Mung_bean), golden gram, green gram (*Vigna radiata*)
   * [Black gram](/wiki/Urad_(bean)), urad (*Vigna mungo*)
   * [Scarlet runner bean](/wiki/Scarlet_runner_bean) (*Phaseolus coccineus*)
   * [Ricebean](/wiki/Ricebean) (*Vigna umbellata*)
   * [Moth bean](/wiki/Moth_bean) (*Vigna aconitifolia*)
   * [Tepary bean](/wiki/Tepary_bean) (*Phaseolus acutifolius*)
2. Dry [broad beans](/wiki/Vicia_faba) (*Vicia faba*)
   * Horse bean (*Vicia faba equina*)
   * Broad bean (*Vicia faba*)
   * Field bean (*Vicia faba*)
3. Dry peas (*Pisum spp.*)
   * [Garden pea](/wiki/Pea) (*Pisum sativum* var. *sativum*)
   * Protein pea (*Pisum sativum* var. *arvense*)
4. [Chickpea](/wiki/Chickpea), garbanzo, Bengal gram (*Cicer arietinum*)
5. Dry [cowpea](/wiki/Cowpea), [black-eyed pea](/wiki/Black-eyed_pea), blackeye bean (*Vigna unguiculata* )
6. [Pigeon pea](/wiki/Pigeon_pea), Arhar/Toor, cajan pea, Congo bean, gandules (*Cajanus cajan*)
7. [Lentil](/wiki/Lentil) (*Lens culinaris*)
8. [Bambara groundnut](/wiki/Bambara_groundnut), earth pea (*Vigna subterranea*)
9. [Vetch](/wiki/Vetch), common vetch (*Vicia sativa*)
10. [Lupins](/wiki/Lupin) (*Lupinus spp.*)
11. Minor pulses, including:
    * Lablab, hyacinth bean ([*Lablab purpureus*](/wiki/Lablab_purpureus))
    * Jack bean ([*Canavalia ensiformis*](/wiki/Canavalia_ensiformis)), sword bean ([*Canavalia gladiata*](/wiki/Canavalia_gladiata))
    * Winged bean ([*Psophocarpus tetragonolobus*](/wiki/Psophocarpus_tetragonolobus))
    * Velvet bean, cowitch ([*Mucuna pruriens*](/wiki/Mucuna_pruriens) *var. utilis*)
    * Yam bean ([*Pachyrhizus erosus*](/wiki/Pachyrhizus_erosus))

## Forage[[edit](/index.php?title=(none)&action=edit&section=6)]

[thumb|White](/wiki/File:TrifoliumRepensFlowers.jpg) [clover](/wiki/Clover), a forage crop

Forage legumes are of two broad types. Some, like [alfalfa](/wiki/Alfalfa), [clover](/wiki/Clover), vetch ([*Vicia*](/wiki/Vicia)), stylo ([*Stylosanthes*](/wiki/Stylosanthes)), or [*Arachis*](/wiki/Arachis), are sown in [pasture](/wiki/Pasture) and grazed by livestock. Other forage legumes such as [*Leucaena*](/wiki/Leucaena) or [*Albizia*](/wiki/Albizia) are woody shrub or tree species that are either broken down by livestock or regularly cut by humans to provide livestock feed.

## Other uses[[edit](/index.php?title=(none)&action=edit&section=7)]

[thumb|left|](/wiki/File:Flower_garden_in_Ushuaia_(5542996965).jpg)[Lupin](/wiki/Lupin) flower garden Legume species grown for their flowers include [lupins](/wiki/Lupin), which are farmed commercially for their blooms as well as being popular in gardens worldwide.[Template:Citation needed](/wiki/Template:Citation_needed) Industrially farmed legumes include [*Indigofera*](/wiki/Indigofera) and [*Acacia*](/wiki/Acacia) species, which are cultivated for [dye](/wiki/Dye) and [natural gum](/wiki/Natural_gum) production, respectively.[Template:Citation needed](/wiki/Template:Citation_needed) Fallow/green manure legume species are cultivated to be tilled back into the soil in order to exploit the high levels of captured atmospheric nitrogen found in the roots of most legumes. Numerous legumes farmed for this purpose include *Leucaena*, [*Cyamopsis*](/wiki/Cyamopsis), and [*Sesbania*](/wiki/Sesbania) species. Various legume species are farmed for timber production worldwide, including numerous *Acacia* species and [*Castanospermum australe*](/wiki/Castanospermum_australe).[Template:Citation needed](/wiki/Template:Citation_needed)

Legume trees like the locust trees ([*Gleditsia*](/wiki/Gleditsia), [*Robinia*](/wiki/Robinia)) or the [Kentucky coffeetree](/wiki/Kentucky_coffeetree) (*Gymnocladus dioicus*) can be used in [permaculture](/wiki/Permaculture) [food forests](/wiki/Food_forest). Other legume trees like [laburnum](/wiki/Laburnum#Description) and the woody climbing vine [wisteria](/wiki/Wisteria#Description) are [poisonous](/wiki/Poison).

## Nitrogen fixation[[edit](/index.php?title=(none)&action=edit&section=8)]

[Template:Main](/wiki/Template:Main) [thumb|Root nodules on a](/wiki/File:Soil_fertility_-_nitrogen_fixation_by_root_nodules_on_Wistaria_roots,_with_hazelnut_to_show_size.JPG) [*Wisteria*](/wiki/Wisteria) plant (a hazelnut pictured for comparison)

Many legumes contain [symbiotic](/wiki/Symbiosis) bacteria called [*Rhizobia*](/wiki/Rhizobia) within [root nodules](/wiki/Root_nodule) of their [root systems](/wiki/Root). (Plants belonging to the genus [Styphnolobium](/wiki/Styphnolobium) are one exception to this rule.) These bacteria have the special ability of [fixing nitrogen](/wiki/Nitrogen_fixation) from atmospheric, molecular nitrogen (N2) into [ammonia](/wiki/Ammonia) (NH3).[[7]](#cite_note-7) The chemical reaction is:

N2 + 8H+ + 8e- → 2NH3 + H2

Ammonia is then converted to another form, [ammonium](/wiki/Ammonium) (NH4+), usable by (some) plants by the following reaction:

NH3 + H+ → NH4+

This arrangement means that the root nodules are sources of nitrogen for legumes, making them relatively rich in [plant proteins](/wiki/Plant_proteins). All proteins contain nitrogenous [amino acids](/wiki/Amino_acid). Nitrogen is therefore a necessary [ingredient](/wiki/Ingredient) in the production of proteins. Hence, legumes are among the best sources of plant protein.

When a legume plant dies in the field, for example following the [harvest](/wiki/Harvest), all of its remaining nitrogen, incorporated into [amino acids](/wiki/Amino_acid) inside the remaining plant parts, is released back into the soil. In the soil, the amino acids are converted to nitrate (NO3−), making the nitrogen available to other plants, thereby serving as fertilizer for future crops.[[8]](#cite_note-8)[[9]](#cite_note-9) In many traditional and organic farming practices, [crop rotation](/wiki/Crop_rotation) involving legumes is common. By alternating between legumes and nonlegumes, sometimes planting nonlegumes two times in a row and then a legume, the field usually receives a sufficient amount of nitrogenous compounds to produce a good result, even when the crop is nonleguminous. Legumes are sometimes referred to as "[green manure](/wiki/Green_manure)".

## History[[edit](/index.php?title=(none)&action=edit&section=9)]

Archaeologists have discovered traces of pulse production around [Ravi River](/wiki/Ravi_River) ([Punjab](/wiki/Punjab_(region))), the seat of the [Indus Valley Civilisation](/wiki/Indus_Valley_Civilisation), dating circa 3300 BC. Meanwhile, evidence of lentil cultivation has also been found in Egyptian pyramids and dry pea seeds have been discovered in a Swiss village that are believed to date back to the Stone Age. Archaeological evidence suggests that these peas must have been grown in the eastern Mediterranean and [Mesopotamia](/wiki/Mesopotamia) regions at least 5,000 years ago and in Britain as early as the 11th century.<ref name=b1>Mat Chaudhry *Green Gold: Value-added pulses* Quantum Media ISBN 1-61364-696-8</ref>

## World economy[[edit](/index.php?title=(none)&action=edit&section=10)]

India is the world's largest producer and the largest consumer of pulses. Pakistan, Canada, [Myanmar](/wiki/Myanmar), Australia and the United States, in that order, are significant exporters and are India's most significant suppliers. The global pulse market is estimated at 60 million tonnes.<ref name=b1/>

## International Year of Pulses[[edit](/index.php?title=(none)&action=edit&section=11)]

[Template:Main](/wiki/Template:Main)

[thumb|right|Logo of International Year of Pulses 2016|alt=Logo of International Year of Pulses 2016](/wiki/File:Logo_of_International_Year_of_Pulses_2016.jpg) The International Year of Pulses 2016 (IYP 2016) was declared by the [Sixty-eighth session of the United Nations General Assembly](/wiki/Sixty-eighth_session_of_the_United_Nations_General_Assembly).[[10]](#cite_note-10) The [Food and Agriculture Organization of the United Nations](/wiki/Food_and_Agriculture_Organization_of_the_United_Nations) has been nominated to facilitate the implementation of IYP 2016 in collaboration with governments, relevant organizations, non-governmental organizations and other relevant stakeholders. Its aim is to heighten public awareness of the nutritional benefits of pulses as part of sustainable food production aimed towards [food security](/wiki/Food_security) and [nutrition](/wiki/Nutrition). IYP 2016 will create an opportunity to encourage connections throughout the food chain that would better utilize pulse-based proteins, further global production of pulses, better utilize crop rotations and address challenges in the global trade of pulses.[[11]](#cite_note-11)

## See also[[edit](/index.php?title=(none)&action=edit&section=12)]

* [List of dried foods](/wiki/List_of_dried_foods)
* [List of legume dishes](/wiki/List_of_legume_dishes)

## Further reading[[edit](/index.php?title=(none)&action=edit&section=13)]

* [Template:Cite web](/wiki/Template:Cite_web)
* [Template:Cite journal](/wiki/Template:Cite_journal)

## References[[edit](/index.php?title=(none)&action=edit&section=14)]

[Template:Reflist](/wiki/Template:Reflist)

## External links[[edit](/index.php?title=(none)&action=edit&section=15)]

[Template:Wiktionary](/wiki/Template:Wiktionary) [Template:Commons category-inline](/wiki/Template:Commons_category-inline)

[Template:Fruits](/wiki/Template:Fruits) [Template:Vegetarianism](/wiki/Template:Vegetarianism)

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