

Principles of Agronomy

CLASSIFICATION OF CROPS



Outlines =

Classifications based on:

- Agronomic type
- On-farm use
- Climatic adaptation
- Life cycle
- **Botanical**



Agronomic Classification

Category

- **Cereal**
- *Pulse*
- **Forage**
- Oil
- Sugar
- **Fiber**
- Drug
- Rubber
- **Root**
- Tuber
- Spice
- **Biofuel**

Agronomic Classification

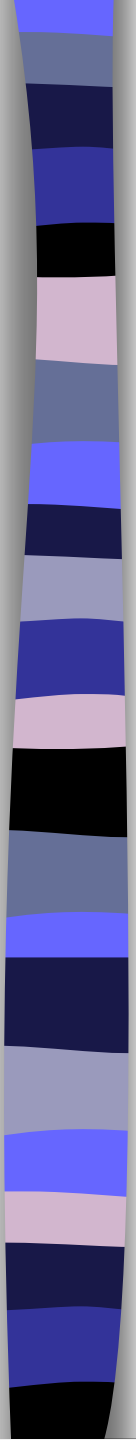
Category

- **Cereal** Cereal – grasses grown for their edible seeds (for human consumption)
- **Pulse**
- **Forage** Pulse – legumes grown for their edible seeds. Legumes can fix nitrogen (N) (by the symbiotic N-fixing bacteria in the nodules formed in their roots)
- **Oil**
- **Sugar**
- **Fiber**
- **Drug**
- **Rubber**
- **Root**
- **Tuber**
- **Spice**
- **Biofuel** Forage – for animal consumption, e.g., pasture for grazing or crops cut for hay or silage. Can be grasses, legumes, or other families

Forage:

vegetation used as feed; can be grasses, legumes, or other crops

- **Pasture:** ■ field of grass, legume, or other herbaceous forage plants for animals grazing
- **Fodder:** → ■ maize, sorghum, or other coarse grasses harvested when still green and dried for forage
- **Hay:** → ■ grasses or comparatively fine-stemmed plants cut when still green and dried for forage
- **Silage:** → ■ Forage preserved in a succulent condition by fermentation in an air-tight place





Nodules

Pulled-up chickpea plants



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Examples

- rice, wheat, maize
- soybeans, chickpeas
- alfalfa, **oat**, **vetch**
- sunflower, safflower

Spike of bread wheat

rachis





**Spike of
durum wheat**



Soybean

Alfalfa



Compound leaves
of alfalfa consist
of 3 leaflets



Safflower





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Examples

- rice, wheat, maize
- soybeans, chickpeas
- alfalfa, oat, vetch
- sunflower, safflower
- sugar beet, sugarcane
- cotton, flax (linseed)
- tobacco



Sugar beet

Fiber crop:

Flax (linseed)



Hemp, cannabis



Drug crop: tobacco





Agronomic Classification

Category

Examples

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 - **Biofuel**
- rice, wheat, maize
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 - alfalfa, oat, vetch
 - sunflower, safflower
 - sugar beet, sugarcane
 - cotton, flax (linseed)
 - tobacco
 - rubber
 - sweet potato, **sugar beet**
 - **potato**
 - **cumin**, saffron
 - **corn**

Rubber tree plantation in Asia



Sweet potato (= Tapioca)



Saffron



Flowers of saffron plants



Saffron
(= red
stigmas
of the
flowers)



Classification based on climatic adaptation

Tropical crops

- From warm climates
- Can be killed by temperature slightly below freezing, or even at above freezing if exposed for prolonged period.
- Most have a **short-day** response.
- Examples: maize, sorghum, sugarcane, peanut, cowpeas, soy beans.

Temperate crops

- From cool climates
- Grow best in relatively cool conditions with marked winter season. Usually can withstand cold up to flowering. May require a period of winter weather in order to flower.
- Most have a **long day** response.
- Examples: barley, wheat, rye, field peas.



Classification based on on-farm use

Cover, catch, trap, and companion crops

- ***Cover crops:***
- Provide a cover for the soil (erosion control).
- Usually has a second purpose, e.g., plow under while still green would be a green-manure crop.
- Legumes or legume/cereal mixture usually used.



Catch crops:

- They are used when the regular crop has failed or not been planted on time.
- Short season crops are used, e.g., spring barley planted when winter barley failed.



Trap crops:

- They are planted to attract insects or parasites.
- Will be plowed under once served their purposes, e.g., Orobanche control.



Companion (nurse) crops:

- Seeds of some crop species, e.g., medics, will not germinate in the first year of sowing (a condition called hard seediness).
- To secure a return from the land, a companion crop (e.g., cereal) is usually sown together in the first year.



Classification Based on Life Cycle

Annuals, biennials, & perennials

Annuals

- **(short-lived)**: complete entire life cycle from seed to seed in a single growing season and then die.
- Major crops of the world.
- Examples: rice, wheat.



Biennials

- normally take two complete growing seasons to complete life cycle.
- First year only vegetative growth and store food reserves in storage organ.
- Second year give flowers and fruits.
- Example: sugar beets





Perennials:

- Indefinite life-cycle.
- Some species may die back to the ground each winter, but revive from the roots the following spring, e.g., alfalfa.
- Some species, especially tropical forms, e.g., tomato & cotton, grown as perennials in the tropics, but temperate forms are usually annuals.

Botanical Classification

All field crops belong to **spermatophyte** division
(reproduction is carried on by seed)

Common crops belong to **Angiosperm** subdivision
(ovules enclosed in an ovary wall)

2 classes:

monocotyledons

all grasses: cereals, sugarcane

order

family

e.g. graminea

genus

Triticum

species

aestivum

dicotyledons

legumes & others

leguminosae

Binomial system of nomenclature: Genus and species
(in *italic* when typed or underlined in hand writing)
e.g., *Triticum aestivum* or Triticum aestivum



Summary

Classification:

- **Agronomic:** cereal, legume, forage, oil, sugar, fiber, drug, rubber, root, tuber, spice, etc.
- **On-farm use:** cover, catch, trap, & companion
- **Climatic adaptation:** tropical & temperate
- **Life cycle:** annual, biennial, & perennial
- **Botanical**