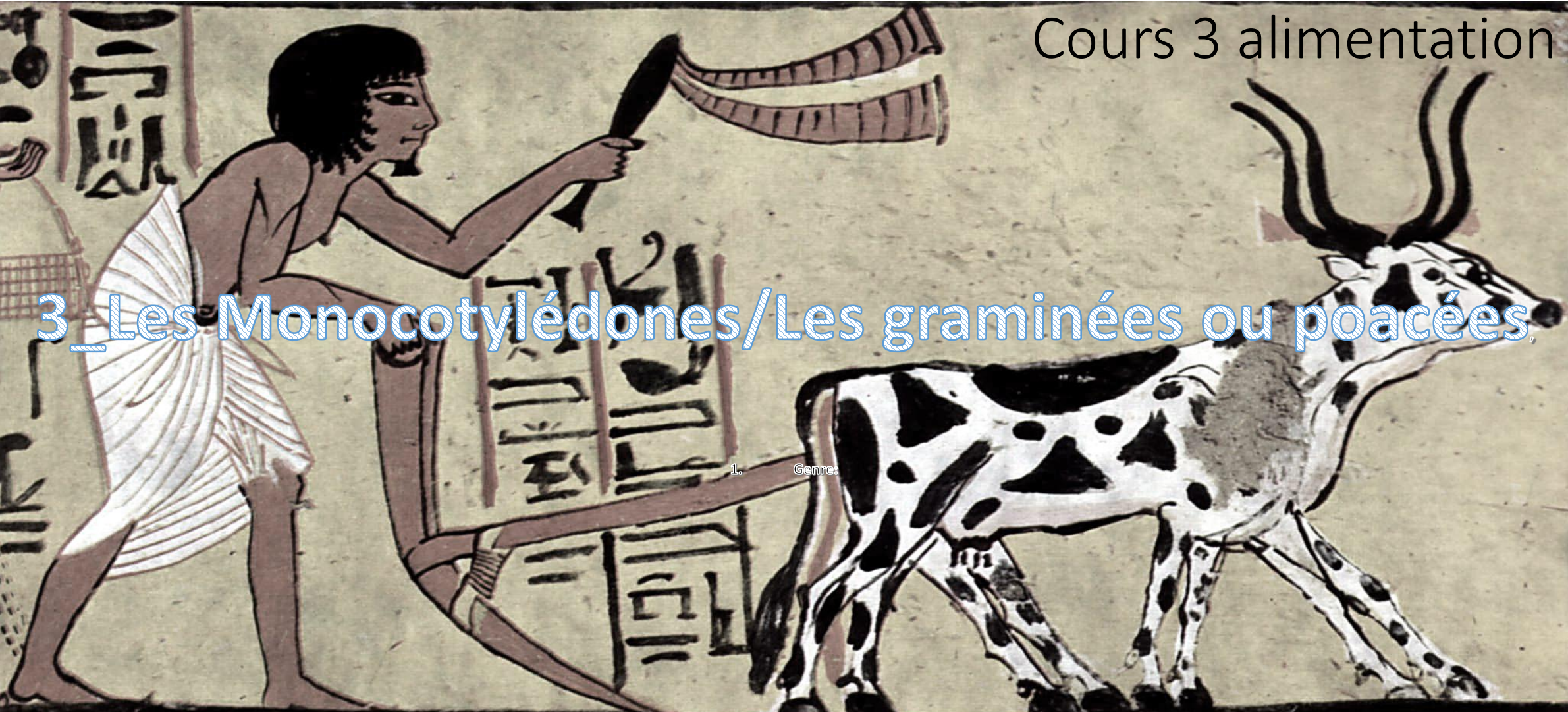


3_ Les Monocotylédones/ Les graminées ou poacées



1. Genre:

(Oriza/Secale/Hordeum/Festuca/Sorghum/Dactylis/Zea/Lolium/Avena/Phleum/Triticum,

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MCA

INTRODUCTION

- .Monocots are plants characterized by a single cotyledon in the seed.
- .leaves with parallel veins,
- .a fascicled (non-pivoting) root system,
- .three floral parts.
- .Most of these plants are herbaceous,
- .with vascular tissues scattered throughout the stem
- .absence of secondary cambium, which prevents the formation of a woody trunk

Morphological characteristics

- **Seed:** a single cotyledon
- **Leaves:** simple, with a sheathing base that surrounds the stem. Their veins are parallel, along their entire length.
- **Root system:** It is fasciculated, (adventitious roots that start from the stem) and fibrous. The vascular bundles are arranged in a circle around a central medulla
- **Flowers:** They are often trimerous, (their floral parts: petals, sepals, stamens, are organized in multiples of three).
- **Sepals and petals :** often of the same colour (**tepals**).
- **Stem:** unbranched, no secondary growth, presence of nodes and internodes
The sieve vascular bundles (transport of raw sap and elaborate sap) are randomly dispersed in the stem.
- **Absence of cambium,** which prevents the formation of wood and prevents growth in thickness (no wood trunk),

Exemples de plantes Monocotylédone

Many common species - The main cereals grown in North Africa:

Wheat, Barley, Rye, Maize, Millet, Sorghum, Oats





Millet (Millet)



Sorghum

The main cereals used in animal nutrition are:

- Corn, Barley, Wheat, Sorghum, Rye, and others,,,
- L'orge et l'avoine sont souvent utilisées pour leur teneur en fibres, tandis que le maïs et le blé sont principalement utilisés pour leur apport énergétique.
- D'autres céréales comme le Riz, le Mil et le Millet, le Triticale sont également utilisées,

The most common cereals

Corn:

- A cereal with a high energy value, widely used in livestock feed, especially poultry, cattle, sheep and fish. Its good digestibility by ruminants makes it a basic ingredient.



- Corn is crucial in animal feed, is a concentrated source of energy, essential for growth and the production of meat, milk or eggs. It is rich in starch and digestible fiber, making it effective for ruminants and poultry. In addition, its nutritional composition is often supplemented with other foods to meet all the needs of animals.
- For more information, visit : <https://inspection.canada.ca/fr/sante-animaux/aliments-du-betail/documents-incorporer-renvoi/tableau-canadien-ingredients-aliments-du-betail>

Benefits of Corn in Livestock Feed

- Source of energy: Corn is rich in starch, a carbohydrate that slowly degrades in the rumen and provides long-lasting energy, promoting fattening and milk production.

Excellent digestibility: Its good digestibility makes it more efficient and economical than other sources of raw feed for livestock operations.

Quality improvement: It helps to improve the quality of products like meat, milk, and eggs. The high carotene content of yellow maize, for example, improves egg yolk pigmentation in laying hens.

- Ration base: Corn silage is often a high-quality ration base, especially in winter.
- Nutritional limitations and supplements
- Low protein: Corn is low in protein, which requires a protein supplement such as alfalfa or soybean meal, especially for ruminants (or urea)
- Mineral and vitamin supplementation: Its diet must be supplemented with minerals and vitamins to cover all the animals' needs.
- **Careful**
- Mycotoxins: ensure that maize does not contain mycotoxins, which is dangerous to animal health and performance
- **Datura** seeds: toxic if doses exceed the standards

Maize: beware of mycotoxins



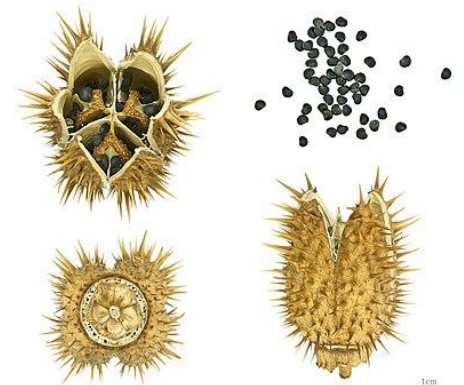
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Datura: plant, fruits, seeds, leaves, roots, and smoke = are all toxic

Nutritional value of maize (per 100g of dry yellow maize),

| Nutriments | Quantité |
|-------------------------|-----------------|
| Énergie | 365 kcal |
| Protéines | 9,42 g |
| Glucides | 74,26 g |
| Matières grasses | 4,74 g |
| Fibres | 7,3 g |
| Sucres | 0,64 g |
| Eau | 10,37 g |

Durum wheat and soft wheat-(blé dure et blé tendre-)

Used in animal feed, although much of it is intended for human consumption. It is an energy cereal suitable for various species, including poultry, cattle and sheep. Wheat grains, like corn grains, are often crushed mainly for young animals.





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- the genus "Triticum", of the grass family, is cultivated in many countries. The word "wheat" also refers to the "grain" (caryopsis) produced by these plants.
- Wheat is one of the three major cereals along with maize and rice.
- In Western civilization, in North Africa, the Middle East, and northern China, wheat was a central component of the human diet.

- The varieties of soft or durum wheat offered today are well suited to industrial cereal production characterized by the intensive use of chemical inputs and strong mechanization, and to mass consumption, // "rustic wheat" such as einkorn or spelt.
- Two species of wheat, einkorn and emmer, were domesticated in the Near East from two wild wheats and cultivated from 8500 BC. in the Jordan Valley, northern Syria, southern Anatolia and western Iran in the Fertile Crescent region

Énergie : (328-344) kcal

Glucides : (61-75) g (a large part of the starch) Protéines :
(10-15) g

Fibres : environ (11) g

Matières grasses : (1,4-3,9) g

Nutritional composition per 100g of dry wheat (average values))

Barley (Orge)

This cereal is frequently used as fodder and for animal feed, especially sheep and cattle.

Winter barley (scourgeon) is particularly popular in animal feed.



- Characteristics of barley
- Appearance: the ear of the barley is "hairy" while the grain is more rounded and it adheres to its husk, unlike the wheat grain.
- Hardiness: It is a plant very adapted to various climates, capable of growing in different conditions, including at high altitudes.
- Protection: Growing barley requires protection against various pests and diseases, depending on the stages of development of the plant.
- Harvesting: Harvesting is done when the straws are dry to avoid complications related to humidity.

Barley is an annual plant (grass family - Poaceae),
cultivated since ancient times for its grains, which are used for
human food and animals,
as well as for the manufacture of malt for beer,
Barley is a good source of fiber (especially beta-glucans), B vitamins,
minerals such as iron, phosphorus and zinc, rich in magnesium
It has a low glycemic index but is richer in fiber than wheat
It is used as fodder for livestock.

Nutritional values /100g

| Nutriments | Quantité |
|-------------------|-----------------|
| Calories | 348 kcal |
| Glucides | 72 g |
| Protéines | 9.7 g |
| Fibres | 4.6 g |
| Lipides | 2.3 g |

Oats (*Avena sativa*)(Avoine)

Source of protein and energy,

it is used in the diet of different species,

although its culture is in decline in many countries.

Oats are a cereal grown for animal feed,

Appreciated for its richness in energy (starch) and fiber, which promotes digestion and muscle development.

It can be used whole, as fodder (often mixed with legumes such as vetch to improve protein content),

or processed for farm animals such as horses, ruminants.

Oat Farming

- Types of varieties: There are winter and spring varieties of oats, as well as different colors of grains (white, yellow, black), black oats very popular for equine diet.
- Production regions: The main producing countries are located in Central and Northern Europe, as well as in North America. Oat production in North Africa was weak



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Animal feed

Energy requirements: Oats are an important source of calories (about 223 to 350 kcalories/100 g oats for farm animals).

Composition: Its composition is rich in starch and fiber, which makes it easy for animals to digest.



Specific use per animal:

Horses: Once renowned for its "exciting" effect, it is now used for its nutritional qualities.

Ruminants: As fodder before heading, it is a good feed for ruminants.

Poultry: It can be included in the hens' diet for its protein content.

Precautions: Sudden overconsumption of oat grains should be avoided, which can lead to serious digestive problems (**acidosis**) or even fatality.

• **Composition**

- Glucides 66,27 g
- Protéines 16,89 g
- Lipides 6,9 g
- Fibres 10,6 g
- Énergie 381 kcal

Rye (Seigle)

Used both as a bread cereal and as fodder, it is well suited to ruminants. Its content of non-starch polysaccharides is higher than that of wheat, which can affect its digestibility in certain species, such as poultry.

Rye is a versatile crop, grown for animal consumption, whether in green (pasture, haylage, silage) or grains. It is particularly popular with ruminants and horses, and it can also be used as a green manure. Hybrid ryes offer high yields, both for forage and grain, with good energy and protein value

Rye Crop

- Adaptability and hardiness: Rye is very cold hardy, making it an ideal winter crop, with the ability to germinate at low temperatures. It adapts to infertile land and requires less nitrogen than other cereals.
- Sowing: It can be sown in the fall or, more rarely, in the spring, depending on the needs. Sowing is often done at a depth of 2 cm.
- Green manure: It is used as a plant cover to improve soils, especially in organic farming, and can help suppress weeds thanks to its vigour. It is often sown before spring legumes, as it does not affect their nitrogen fixation.

Usage

- Rye can be used in different ways:
- **Green:** Animals, including oxen, cows and horses, can graze it at the early stage.
- **In silage or haylage:** It can be mowed before maturity to be preserved.
- **Wrapping and silage:** It can be ensiled or wrapped for livestock feed.



- The harvest for silage is done at the milky stage of the grain, from the end of April to the end of May, to obtain a high fiber content.
- Dry matter yield can be as high (about 4-6 t/ha).
- **Grains:** Grains can be distributed, although their nutritional quality is usually a little lower than wheat.

Benefits

- Nutritional potential: Hybrid rye is particularly interesting for animals because it is very rich in lysine, digestible phosphorus
- Economic interest: The lower cost of hybrid rye can reduce the total cost of animal rations,
- Straw quality: It produces a large volume of good quality straw for livestock feed.



Animal feed

- **Precautions**
- **Straw:** Rye should be harvested before the end of April-May, so that the straw does not become too hard for animal feed
- **Ergot:** Special vigilance is required when harvested in wet conditions, as rye can be contaminated with mycotoxins, such as ergot, which can be dangerous to food and feed,.



Rye (Seigle)

- Protéines: 14.76 g
- Lipides : 2.5 g
- Glucides: 69.76 g
- Cendres :2.02 g
- Energie (kCal) : 335 kCal



Triticale (Triticale)

It is a hybrid cereal resulting from the cross between wheat and rye. It is valued in animal feed for its good protein content.

Triticale is a great option for cattle feed, as it is high in protein, digestible, and offers high yields as a forage or grain. It can be used for dairy cows, beef cows and dairy heifers.

Caution: Given in sprouted form may cause ruminal acidosis.

Use of triticale in cattle feed

As a forage: Triticale is particularly suitable as a forage for dairy cows at the kicking stage and for beef cows and dairy heifers at the soft cheese stage.

As a grain: It can be included in cereal concentrates for cattle, alongside other cereals and cakes.

In a ration: It fits easily into a balanced feed ration, which usually includes a combination of grass, corn silage, cereals, cakes and mineral and vitamin supplements.

Kicking stage

Definition: Late gestation period, usually 90 days before calving.

Background for beef cows: This is the phase when lactation is stopped so that the cow can focus on the growth of the fetus and prepare her body condition for calving.

Role: To allow the cow to recover, gain weight and prepare for calving.

Soft Dough Stage

Definition: The initial phase of lactation, between calving and peak milk production.

Background for dairy heifers: This is the period when milk production increases rapidly after the calf is born.

Role: Milk production is at its peak during this phase, and the heifer requires a significant amount of nutrition to support this production.

Points to consider

- Digestibility and nutritional value:
Triticale is a good source of protein and is easily digestible by ruminants.
- **Risk of acidosis:** When grain is sprouted, it can be broken down more quickly in the rumen, which can increase the risk of acidosis if precautions are not taken.



Céréale hybride (croisement Blé –Seigle)

- Composition nutritionnelle (pour 100 g)
- Calories : (338) kcal
- Glucides : (60,6) g
- Protéines : (11) % (en moyenne, variable)
- Matières grasses : (2,) g
- Fibres alimentaires : (11,5) g
- Amidon : Environ (58,8) %

Sorghum : Sorgho)

- Sorghum is a cereal used in animal feed, particularly for its energy and protein value.
- Sorghum is a versatile cereal used in food and feed. For humans, it is a source of protein, rich in fiber and carbohydrates, and can be consumed in grains, gluten-free flours (for gluten-free and diabetic diets), or processed into alcohol and sugar. For animal feed, it is used for poultry, pigs, cattle and fish, due to its energy value and protein content, although its use depends on its quality and price.

- **Animal feed**

- Versatility: It is used in a variety of livestock sectors, including cattle (dairy and meat), poultry and fish farming.
- Nutritional value: Sorghum has a comparable or slightly higher energy and protein content than maize, depending on the variety.
- Grain sorghum: Used for pigs (energy, digestibility), poultry (energy, protein), and ruminants, with a profile similar to forage maize.
- Forage sorghum: Used as fodder for cattle, especially dairy cows. Single-cut varieties, rich in sugars and digestible fibres, are particularly valued.
- Pros: It is resistant to pests, which can reduce the need for pesticides.

- Common sorghum (*Sorghum bicolor*):
- Advantages: Less water requirements than corn, good for silage and forage. Often used as a subsistence crop, its crop residues are an important source of fodder.
- Disadvantages: Less drought resistant than pearl millet.



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Millet, millet fodder plant(mil)

Millet is a versatile forage plant, used to pasture, hay, silage, for fodder use.

Pearl millet (*Pennisetum glaucum*) is the most widely cultivated species,

highly resistant to drought and

Appreciated for its high dry matter yield.

- **Benefits:**

- Very high height (up to 3-4 m) and abundant dry matter production (up to 6-10 t/ha). Highly resistant to drought and poor soils, ideal for arid areas.
- Excellent for soil improvement and carbon sequestration.

- **Disadvantages:**

- Requires intense heat for growth and should be sown after the soil warms.

- For Soil Improvement
- Pearl millet (*Pennisetum glaucum*):
- Benefits: Its powerful root system restructures the soil, improving its long-term health. Helps reduce the penetration of harmful nitrates into the soil.
- Cons: Can be heat demanding.



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