



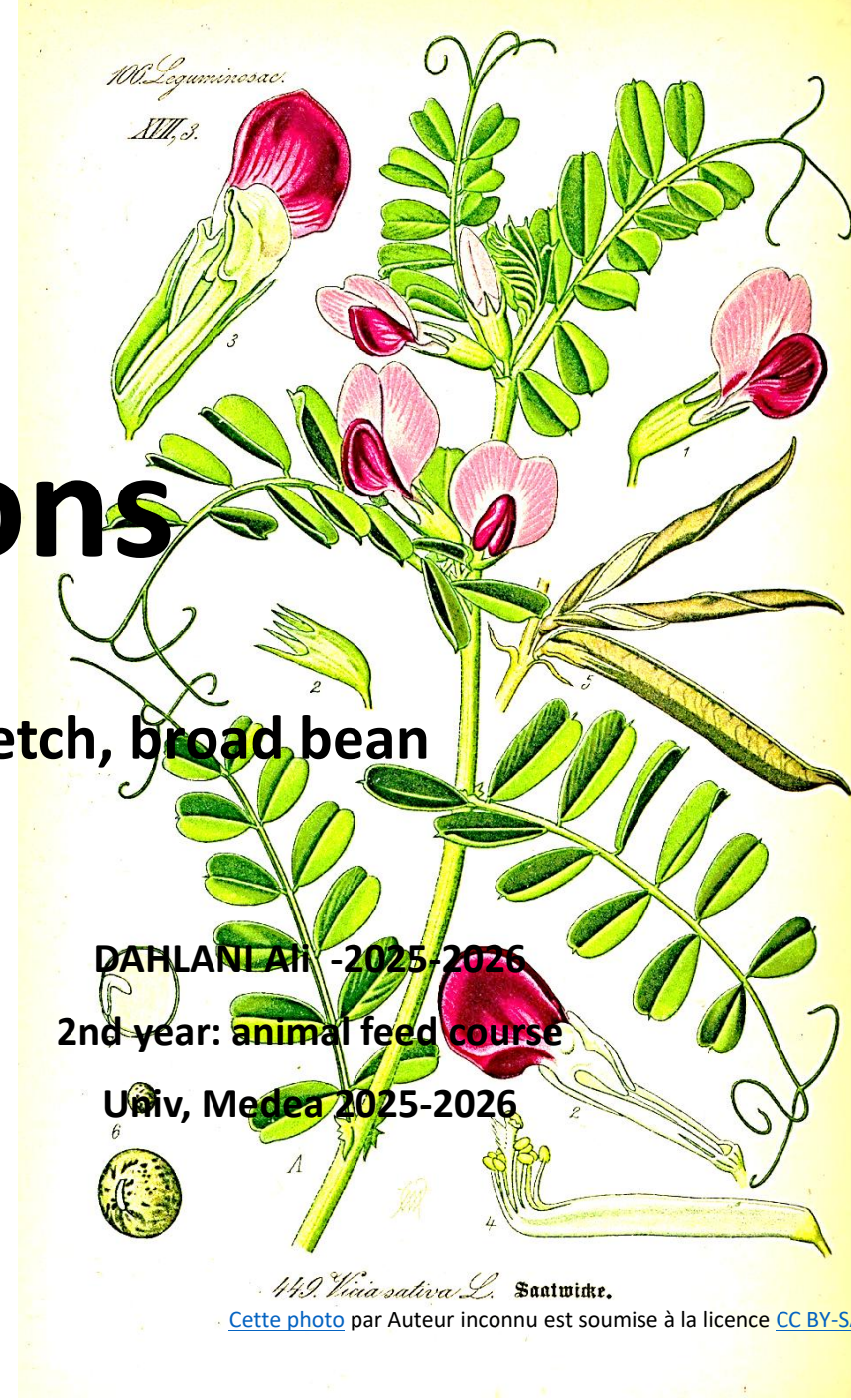
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4_Les cotyledons

Dicotyledons: alfalfa, soybean, clover, peas, vetch, broad bean



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Leguminosae.
XVII, 3.

DAHLANLIH -2025-2026

2nd year: animal feed course

Univ, Medea 2025-2026

Vicia sativa L. Saatwike.

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Introduction

- Broadleaf weeds are used in livestock feed, especially legumes such as soybeans, alfalfa or clover, which are rich in essential proteins and minerals.
- However, some broadleaf weeds can be toxic or indigestible "weeds" for certain animals, such as horses that prefer grasses.

. Fabaceae in the broad sense are herbaceous plants, shrubs, trees or lianas. It is a family with a cosmopolitan distribution, present in all continents (except Antarctica), from cold to tropical zones. The chlorophyll function is sometimes transferred to the stems

Dicotyledons are plants whose seedlings resulting from the germination of a seed present, even before it comes out into the open air, two leaves called cotyledons or preleaves or eophylls.



- many species, mainly in the Faboideae and Mimosoideae, have the particularity of drawing nitrogen both from the soil and from the air.
- They are characterized by a symbiotic activity of atmospheric nitrogen fixation due to bacteria of the genus *Rhizobium*, which produce nodules on the roots and allow nitrogen exchanges with the soil.
- The farmer exploits this natural peculiarity by alternating the cultivation of Faboideae with that of monocots

- The so-called pulses of certain species such as pea, broad beans, lentils and peas are among the first species cultivated by man in the "Fertile Crescent".
- Thanks to their ability to form symbiotic relationships with nitrogen-fixing bacteria, many legumes are rich in protein (17 to 27% content), two to three times more than the seeds of major cereals)

- *The Fabaceae, represent an important family of flowering plants, after the Asteraceae.*
- *Economically and nutritionally, Fabaceae are the second largest family after Poaceae (monocotyledons-cereals) and are an essential source of vegetable protein for human and animal food*
- *I quote: Beans, peas, chickpeas, lentils, broad beans, lupins, peas, soybeans, peanuts, sweet clover, alfalfa, clover, some beets (forage).*
- *and other trees, fruit and fodder belonging to the broadleaf leaf,*
- *other broadleaf weeds can be harmful weeds*

- Specific nuisances of weedy broadleaf weeds
- Competition:
 - Broadleaf plants can become so dense that they prevent the growth of the main crop competing for light, water, and nutrients.
- Harvesting problems:
 - Some, such as bedstraw or lamb's-quarters, anise, wild carrot can stuff combine harvesters.
- Toxicity or poor quality:
 - Broadleaf seeds such as nightshade, lamb's-quarters are poisonous, and others can alter the taste of agricultural products such as straw or hay.
- Impact on animal health:
 - The presence of certain plants such as ranunculus or colchicum in the forage can be dangerous for livestock, even if they are not eaten directly.

Renoncule/renoncule



Black nightshade/Morelle noire



Lamb's-quarters/chenopode



Alfalfa:

- is a forage rich in protein and fibre, used for feeding cattle and sheep in the form of hay, silage, or dehydrated pellets.
- It improves the protein balance of rations, supports milk production and promotes the growth of young animals.
- However, alfalfa pasture must be managed with care because of the risk of bloat (bloat).)

Nutritional benefits

- High in protein: Alfalfa is an excellent source of quality protein, making it ideal for animal development and production. High nutritional value: It is one of the richest sources of quality protein (15 to 25% depending on the stage of harvest), essential amino acids, vitamins (A, C, E), and minerals (calcium, phosphorus, magnesium, potassium).
- Fiber intake: Its high fiber content is beneficial for the digestive health of ruminants. High nutritional value:
- Improved rations: It reduces concentrate intake, balances protein intake, and supports milk production.

Benefits of Alfalfa

- High nutritional value: It is one of the richest sources of quality protein (15 to 25% depending on the stage of harvest), essential amino acids, vitamins (A, C, E), and minerals (calcium, phosphorus, magnesium, potassium).
- Ration security: The use of dehydrated alfalfa in pellets or long strands guarantees a regular supply of quality proteins throughout the year, especially for dairy cows and ewes.

Modes of use

- Hay: Alfalfa hay is a common method of preservation. Its nutritional quality depends on the harvest.
- Silage: Alfalfa can be ensiled as another method of storing and distributing it.
- Dehydrated pellets: Dehydrating alfalfa allows for better preservation and its transformation into pellets facilitates its integration into rations.

Precautions and management

- Risk of bloat: Grazing alfalfa, especially young or frozen plants, can cause fatal bloat in cattle and sheep. To reduce this risk, fibrous forage should be fed before going out to pasture and hungry animals should not be allowed to graze on fresh alfalfa.
- The use of dehydrated alfalfa in pellets or long strands ensures a regular supply of quality protein throughout the year, especially for dairy cows and ewes.
- Grazing management: It is recommended not to let animals graze on the same plot for too long and to watch for young volunteers which are richer in saponins. Wait 45 to 50 days between two cuts to maximize production without weakening the plant. Let alfalfa bloom once a year to ensure the sustainability of the crop.
- Establishment: Alfalfa requires careful soil preparation and inoculation of the seeds with specific bacteria for nitrogen fixation.

Alfalfa



Production improvements:

Cattle: Alfalfa can increase milk production and growth of young calves.

Sheep: It balances the ration for milk production and accelerates the growth of the lambs.

Agronomic qualities: Alfalfa enriches the soil with nitrogen through symbiosis with bacteria, making it an excellent cultural precedent. Its deep root system makes it drought resistant.

- Sheep feeding: Alfalfa, often in the form of hay or haylage, supplements the diet of lactating ewes to optimize milk production.
- Lamb fattening: Adding dehydrated alfalfa helps to accelerate the growth rate of lambs.
- Winter ration: Alfalfa-based mixtures (hay, pellets) can be used to compensate for deficiencies in winter pastures.

- Precautions and disadvantages
- Risk of bloat: Alfalfa grazing, especially when it is very young and high in saponins, can cause rumen bloat, especially in cattle. It is crucial to adapt the ration by adding more forages and to make a gradual dietary transition.
- Reproductive disorders: In the event of contamination with certain fungi, alfalfa may contain too much coumestrol, an estrogenic substance that can cause reproductive problems in sheep and cattle.
- Grazing management: The soil of an alfalfa field is less healthy than that of a meadow, so pasture must be managed rigorously (rotational grazing, frequent movement of animals) to avoid excessive trampling, especially in cattle.
- Harvest stage: For optimal quality, the cut should be done at the bud stage, before flowering.



cérience
L'AGRONOME SEMENCIER

Soy/Soja

- Soybeans are a legume native to Asia, grown for their seeds rich in protein and oil. It is used in a wide variety of human foods and animals
- Soybeans can be used in ruminant feed, mainly as a protein-rich supplement.
- Scientists suggest processing methods (such as roasting) to increase non-degradable proteins, and recommended dosages for optimal integration. Roasting soybeans is a method to improve their nutritional value by increasing non-degradable proteins in the rumen.

- Soybeans are a valuable ingredient in ruminant feed, mainly for their high protein content.
- It is generally used in the form of a meal,
- But whole seeds can also be incorporated into rations.
- However, its use requires specific preparation and good management due to the presence of anti-nutritional factors.

Using Whole Soybeans

Whole soybeans are an excellent source of protein and energy for ruminants.

Nutritional Value: Whole soybeans contain a similar amino acid profile to meal, but their protein content is diluted by the presence of 18% fat.

Preparation: For better digestibility and to prevent the animal from eliminating the whole seeds, it is recommended to roll or grind them coarsely.

Anti-nutritional factors: Raw soybeans contain a trypsin inhibitor that limits the animal's ability to use protein. Heat treatment, such as roasting (toasting) or extrusion, destroys this inhibitor and increases the proportion of non-degradable proteins in the rumen (PNDR).

Intake limits: The high fat content of whole soybeans imposes an intake limit in the total diet, which should not exceed 5% for ruminants to prevent digestive problems. For lambs, the incorporation of raw seeds should be limited to 20% of the farm mix.



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Soybean meal

- The meal is the by-product of soybeans after the oil has been extracted. It is the most common form used in animal feed.
- High protein content: Soybean meal is recognized worldwide as a major source of protein for livestock.
- Use: It is incorporated into concentrates to supplement the protein requirements of ruminant rations, especially dairy cows.
- Differences: Soybean meal and whole soybeans offer different nutritional benefits depending on their method of preparation (raw, roasted, extruded) and their specific use in the ration.

Alternatives to soy

- Due to concerns related to soybean imports and protein self-sufficiency, several local alternatives are being studied and used for ruminant feed:
- Rapeseed meal: This is a recognized alternative to soybean meal.
- Alfalfa and red clover: These forage legumes can produce two to three times more protein per hectare than soybeans.
- Other legumes: Crops such as peas, lentils, lupin and fava beans can also be used.
- Treated cereals: Solutions can be used to add value to cereals produced on the farm by increasing their protein content and digestibility.

Clovers

- In Algeria, clover is an essential fodder plant for livestock feed, particularly Alexandria clover, locally known as bersim. This legume is grown for its nutrient richness and its ability to improve soil fertility

Alexandrian clover (bersim)

- Use in fodder: Alexandria clover is widely used in Algeria, especially in regions with a sub-humid Mediterranean climate such as the Mitidja. It is used for green feeding, i.e. cut directly and distributed to animals, mainly in late winter and spring.
- Cultivation: Studies have examined the production and forage quality of Alexandrian clover as a function of water supply in regions such as Mitidja, highlighting its importance in Algerian agriculture.

Role of clover in animal nutrition

- High in protein: Clover, like alfalfa, is a high-quality source of protein for livestock, such as dairy cows, heifers, and horses. It can reduce dependence on imported protein supplements, such as soybeans, and contribute to the protein self-sufficiency of farms.
- Source of fiber and energy: In addition to its protein, clover also provides energy and fiber, contributing to a balanced diet for livestock.
- Various forms of use:
- Pasture: It is often used in interseeding with grasses to create mixed grasslands.
- Silage: It can also be ensiled, which allows it to be stored and used throughout the year.



Alexandrian clover (bersim)/Trèfle d'Alexandrie (bersim)

Feed peas / Pois fourrager

Feed peas are an excellent feed for cattle and sheep, providing high-quality protein, energy and fibre, and can be used fresh in pasture, silage, haylage or dried. It increases the food autonomy of herds and reduces dependence on purchased feed such as soybean meal. However, it is important to harvest and store it properly to avoid sanitary problems.

Benefits of Feed Peas

- Protein richness: Forage peas, especially common vetch (*Vicia sativa*), are known for their high content of protein, minerals and fibre, which are essential for the growth and production of ruminants.
- Source of energy and nitrogen: It provides a good amount of energy and is an important source of nitrogen for animals. This is because it can be used to produce a balanced concentrate.
- Improvement of protein autonomy: The use of field peas reduces dependence on the purchase of protein supplements, thus improving the autonomy of farms.
- Various forms of use: It can be used in several forms to adapt to the needs of the farm:
 - Silage: In a mixture with cereals (meslin), it produces quality silage.
 - Hay: Pea straw, which is richer than cereal straw, can be used in rations.
 - Green fodder: It can be grazed directly in summer.

Considerations for ruminant feeding

- **Ruminal biodegradability:** Feed pea proteins are rapidly and largely degraded in the rumen.
- **Be careful with mixtures:** Avoid combining it in large quantities with feeds already rich in soluble nitrogen, such as grass silage, to avoid dietary imbalances.
- **Amino acid deficiency:** Peas are generally deficient in certain sulfur amino acids, such as methionine and cystine. Other feed sources must be added to the ration to make up for this shortfall, especially in the most demanding animals such as young cattle.
- **Species-specification:** The amount of field peas to be included in the ration depends on the specific needs of each species and the production objective (meat or milk).

Cultivation and harvesting

- Association with cereals: Peas are often grown in association with a cereal (meslin), which serves as a support. This results in a more balanced forage mix.
- Agronomic factors:
- Soil type: Peas like well-aerated soil and avoid soils that are too heavy or superficial.
- Weed susceptibility: Plot cleanliness is important because peas are susceptible to weed competition.
- Soil enrichment: As a legume, it enriches the soil with nitrogen through symbiotic fixation of atmospheric nitrogen.

Vetch /Vesce

- Vetch can be used in cattle and sheep feed as a source of protein,
- often combined with cereals such as oats or rye to form hay or meslin.
- It can be grazed in autumn or
- harvested in hay of varying quality, particularly rich in protein, to supplement the basic diet of ruminants.
- Oatmeal vetch hay can be fortified with urea to improve its nutritional value.

- Use as green fodder or hay
- Association with cereals: Vetch is well grown in combination with cereals (oats, rye, triticale) to produce hay or for grazing.
- Hay quality: Cereal vetch hay is often high in protein, but its cellulose content can be high, sometimes requiring additional treatment, such as the addition of urea, to improve its digestibility and feed value for ruminants.
- Autumn grazing: Autumn sowing allows you to graze at the end of the year, before the rye develops.

Benefits and precautions

- Benefits:
- High in protein: It is an important source of protein for ruminants, especially for lactating dairy cows.
- Nitrogen fixation: As a legume, it fixes nitrogen from the air, which enriches the soil for subsequent crops.
- Manage weeds: Vetch is a vigorous plant that can help control weeds.
- Precautions:
- Seed toxicity: Hairy vetch seeds may have some toxicity. It is crucial to harvest early enough to avoid problems, especially for the ewes, reminds Produire Bio.
- Variable quality: The quality of the forage can vary. An analysis of the composition is necessary to properly balance the ration.

Fève

- A plant with its pods, the bean (*Vicia faba*) is widely cultivated for both human and animal feed.
- Food
- Beans are consumed by humans in different forms:
- Fresh: Young immature beans are appreciated as a spring vegetable, often eaten shelled or sometimes in whole pods.
- Dry: Mature and dried, broad beans are used as pulses in many traditional dishes (such as fowl in the Middle East).
- Processed: They are rich in vegetable protein and fibre, and can be made into flour for various food preparations.
- Animal feed



- Animal feed
- Fava beans are also an important forage crop, especially the *Vicia faba* var. minor variety, often referred to as faba beans.
- Fava beans are rich in protein (about 30%) and starch, which makes them an excellent source of energy and protein in the composition of livestock feed (rabbits, poultry, etc.).
- It can be used as an alternative to soybean meal in animal feed.
- The whole plant can also be used as fodder.
- In summary, the bean is a versatile crop that plays an important role in agricultural systems for its nutritional qualities for humans and animals.



Thank you