



Advanced Course

# Alternative and emerging feed and forage resources in the Mediterranean region

Zaragoza (Spain) • 8-12 May 2023



CIHEAM  
ZARAGOZA



Food and Agriculture  
Organization of the  
United Nations



## Objective

Most livestock farms in the Mediterranean region rely on conventional resources such as cereals (i.e. corn, barley, wheat) and legumes (i.e. soybean) to feed their animals. These conventional feeds are often imported, with supply chains and prices subject to global geopolitical and economic circumstances that may condition the viability of the livestock industry in importing countries. To avoid this, both policy-makers and the livestock industry are increasingly promoting feed self-sufficiency. This strategy implies feeding animals with emerging alternative and local feed resources that could partially or fully replace the conventional imported feeds. These resources include forages, cereals and legumes fit to grow under local climatic conditions, or by-products from the food, fibre and fuel industry.

Relying on emerging, alternative and local feed resources has several advantages when compared to conventional feedstuffs. For instance, emerging, alternative and local feed resources offer a flexible and low-cost option to farmers; locally adapted forage varieties increase agricultural biodiversity (i.e. emerging species) are more resilient to the uncertainties linked to climate change, have lower carbon and water footprints; and feeding animals with by-products reinforces bio-circularity by reducing waste from the food, fibre and fuel industry. However, they can also be challenging for farmers and the feed industry. Firstly, there is little knowledge about the nutritional value of these feedstuffs, which often varies seasonally and between batches, compromising the optimal formulation of diets. Besides, there may be toxicity or other sanitary issues related to the use of industry by-products; and technical difficulties may arise when processing uncommon feed resources.

Considering the current circumstances that affect feed markets and logistics at the global level, the increasing awareness on climate change, promotion of resilient livestock farming systems, and adoption of European policies to achieve protein self-sufficiency, it is of utmost importance that professionals working in the livestock and feed industries are aware of the potential feed resources in the Mediterranean region, as well as the trade-offs in using them.

This course aims to provide participants with science-based advances and applied knowledge regarding the use of alternative and emerging feed and forage resources in the Mediterranean region. This will be achieved through

interactive lectures and case studies showing innovative experiences on how alternative and emerging feeds could be used to solve practical problems related with animal feeding.

By the end of the course participants will:

- know the general characteristics and trade-offs of alternative and emerging forage crops, pastures, by-products and concentrates in Mediterranean regions;
- better understand the concepts of circular economy, integration of industries and feed self-sufficiency;
- have a critical perspective of the agro-ecological aspects associated to production of alternative and emerging forages and feeds;
- have a greater understanding of safety issues and the legal framework;
- have acquired knowledge on feed technology and conservation methods for concentrates and by-products.

## Organization

The course is jointly organized by the International Centre for Advanced Mediterranean Agronomic Studies (CIHEAM), through the Mediterranean Agronomic Institute of Zaragoza (CIHEAM Zaragoza), and the Food and Agriculture Organization of the United Nations (FAO). This course counts on the collaboration of the FAO-CIHEAM Networks on Pastures and Forages (Mediterranean subnetwork) and on Sheep and Goats (Nutrition subnetwork).

The course will be given by well-qualified lecturers from international and national research centres and universities of different countries and will be held at CIHEAM Zaragoza over a period of one week, from 8 to 12 May 2023, in morning and afternoon sessions. There are two participation options: a) face-to-face (30 hours) with access to lectures, case studies and a technical visit or b) online (29 hours) with access to lectures and case studies via live streaming.

The course will be taught in English and Spanish through a combination of lectures, case studies and a technical visit, and the Organization will provide simultaneous interpretation according to need.

The course requires personal work and interaction among participants and with lecturers. The international characteristics of the course favour the exchange of experiences and points of view.

# Programme

1. Opening session and presentation of the course (1 hour)
2. Context on alternative and emerging feed and forages (3 hours)
  - 2.1. Definition of alternative and emerging feeds
  - 2.2. Importance of circular economy in livestock production
  - 2.3. Feed, fuel, fibre and food competition, and integration of related industries
  - 2.4. New considerations on evaluating alternative and emerging feeds (carbon footprint, water footprint, availability, and alternative uses)
3. Utilization of temporary grasslands: grass, legumes, forbs and mixtures (6 hours)
  - 3.1. Characteristics, nutritive aspects, trade-offs
  - 3.2. Irrigated forage production in dry areas
  - 3.3. Bioactive compounds to improve forage quality and decrease emissions
  - 3.4. Emerging conservation methods and safety issues
  - 3.5. Utilization of forage crops in monogastrics and ruminants
4. Permanent pastures, shrubs and trees (5 hours)
  - 4.1. Characteristics, nutritive aspects, and trade-offs
  - 4.2. Establishment and persistence of legume-based pastures
  - 4.3. Use of fodder shrubs and trees and alley cropping
  - 4.4. Concurrent land use and ecosystem services
  - 4.5. Pastoral seed collection and micro-nurseries
5. Concentrates: energy and protein sources (4 hours)
  - 5.1. Characteristics, nutritive aspects, and trade-offs
  - 5.2. Anti-nutritional factors in concentrates
  - 5.3. Production of hydroponic barley
  - 5.4. Alternative concentrate resources
6. By-products: agro-industry, energy, food industry (5 hours)
  - 6.1. Characteristics, nutritive aspects, and trade-offs
  - 6.2. Legal basis of food waste, food losses, former foodstuffs and selected safety issues
  - 6.3. Seasonality and logistics of different by-products
  - 6.4. By-products for reducing environmental impact
  - 6.5. Oasis by-products in animal feeding
7. Other emerging feed resources such as insects and algae. General overview, characteristics, and trade-offs (2 hours)
8. Feed technology implications on using alternative and emerging feeds (2 hours)
9. Round table discussion on Mediterranean feeds: a route to 2050 (2 hours)

## Guest lecturers

Álvarez, Javier - Univ. de Lleida (Spain)  
Blanco, Mireia - CITA-GA (Spain)  
Borreani, Giorgio - Univ. degli Studi di Torino (Italy)  
Casasús, Isabel - CITA-GA (Spain)  
Gutiérrez Toral, Pablo - CSIC-IGM (Spain)  
Hurtado, Ana - CESFAC (Spain)  
Joy, Margalida - CITA-GA (Spain)  
Pinotti, Luciano - Univ. degli Studi di Milano (Italy)  
Yáñez, David - CSIC-EEZ (Spain)



## Admission

The course is designed for professionals with a university degree, and oriented towards public and private planners and decision-makers, technical advisors, livestock producers, R&D, industry and other professionals involved in the innovation of animal feeding and forage resource management.

- 25 places will be available for face-to-face participation (lectures, case studies, and a technical visit).
- 30 places will be available for online participation (lectures and case studies).

## Registration

- Candidates may apply online at the following address: <http://www.admission.iamz.ciheam.org/en/>
- Applications must include the curriculum vitae and a copy of the support documents most related to the subject of the course.
- Applications are open from 17 January to 5 February 2023.
- Applications from candidates requiring authorization to attend the course may be accepted provisionally.
- Registration fees for the course amount to 500 euro for face-to-face participation and 350 euro for online participation. This sum covers tuition fees only.

## Scholarships

Candidates from Mediterranean CIHEAM member countries and FAO member countries from the Middle East and North Africa can apply for scholarships covering registration fees. In some cases scholarships may cover the cost of travel and full board accommodation. If you wish to request a scholarship, please, complete the relevant section when you make your application online to participate in the course.

Candidates from other countries who require financial support should apply directly to other national or international institutions.

## Insurance

It is compulsory for participants who will be attending the course face-to-face to have medical insurance valid for Spain. Proof of insurance cover must be given at the beginning of the course. Those who so wish may participate in a collective insurance policy taken out by the Organization, upon payment of the stipulated sum.

**Contact:** Schlageter, Andrés  
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**More info:**

