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THE FRENCH NUTRITION SYSTEM FOR RUMINANTS



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Beijing
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INRA: French National Institute for Agricultural Research

- INRA is a “targeted” research institute with 3 working areas: Agriculture, Environment and Food
- 3 main missions: **to produce** and **disseminate** scientific knowledge and innovation;
to contribute to training and scientific culture;
to support decision-making by public and private sectors through its expertise
- The leading agricultural research institute in Europe, 2nd largest in the world (*nb publications*)
- 8 500 permanent staff in 17 regional centers; 13 scientific divisions and 200 research units

Herbivores Joint Research Unit

(Inra – VetAgro Sup)



- Located in Auvergne (*mid-mountain area in the center of France*)
- 150 permanent staff and 100 temporary staff (*PhD students, post-doctoral fellows...*), 7 research teams
- Research on ruminants from genomic to economic (*through digestive processes, production efficiency, milk and meat quality, animal welfare, sustainable systems...*)
- Contributes to develop the French system for ruminants feeding and works on the evolution of feeding recommendations

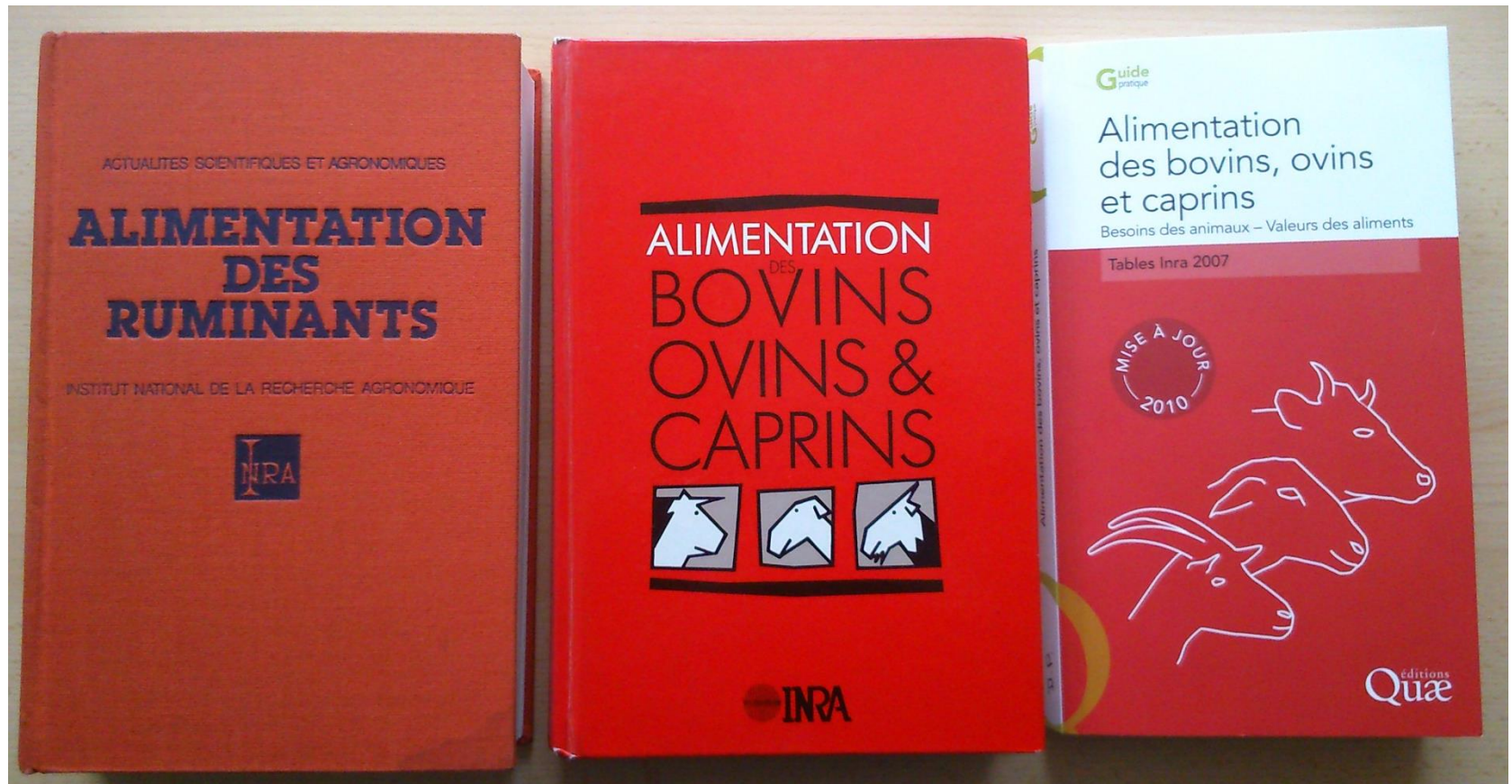
The specifics of the French system for ruminants feeding

- Published in 1978, in constant evolution with the improvement of knowledge
- Not 1 but 4 systems: Feed Unit system (*energy*), Fill Unit system (*feed intake capacity*), PDI system (*nitrogen*), $Ca_{abs} - P_{abs}$ system
- A coherent system (*same units*): needs of animals + values of food → formulating rations
- A universal system: all ruminant species, all productions, all types of food



The INRA « Red book »

The reference for French ruminant nutrition system



1978 / 1980

1988

2007 / 2010

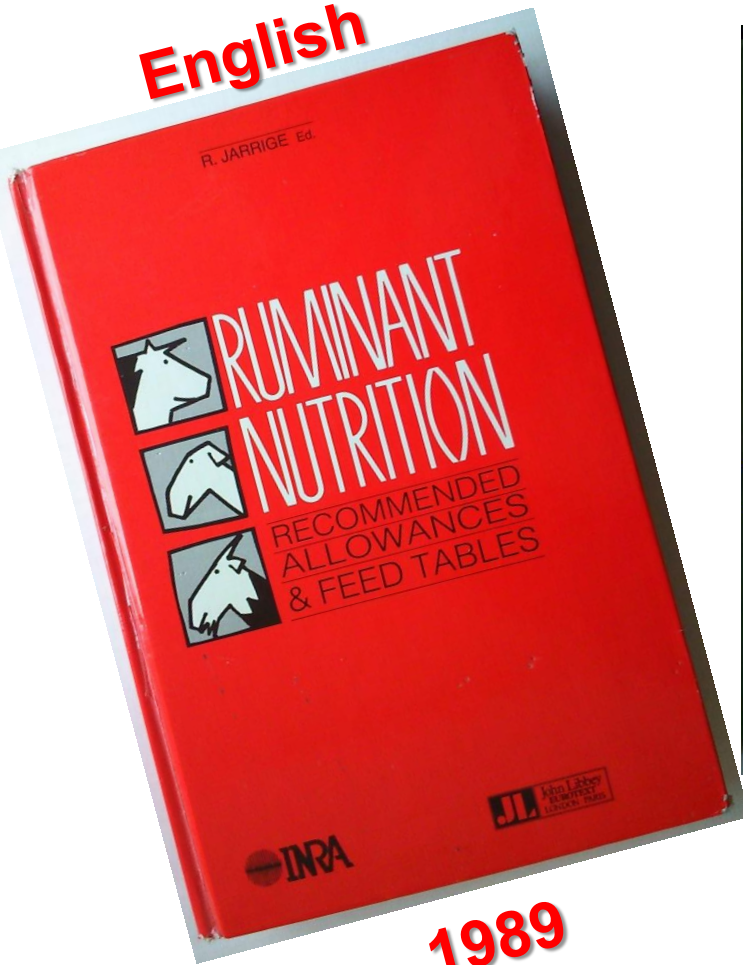
The INRA « Red book »

Translated in many languages

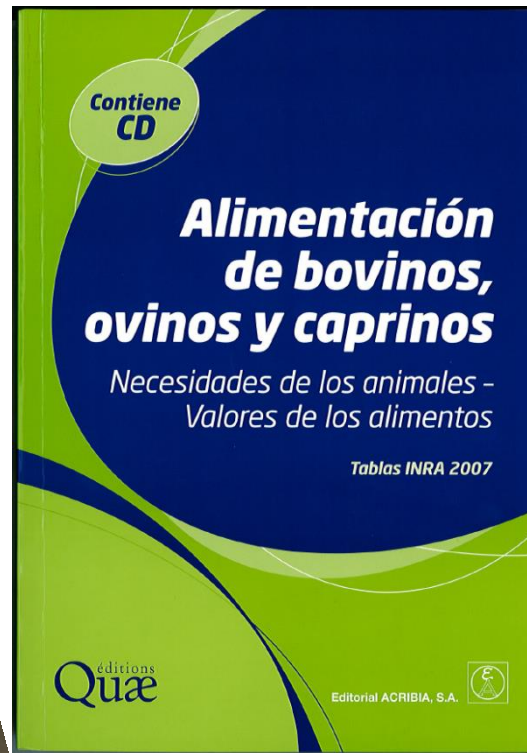
Spanish

中文

English



1989



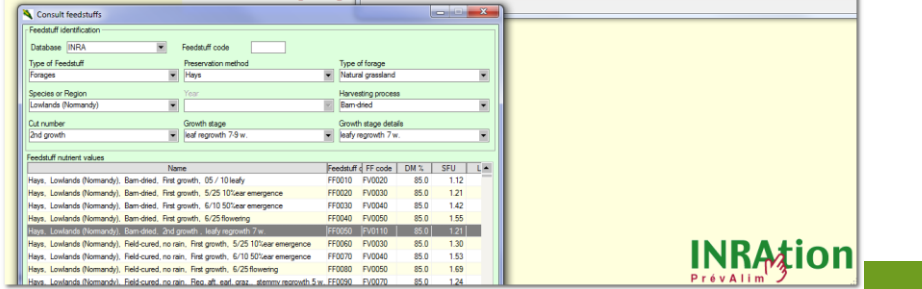
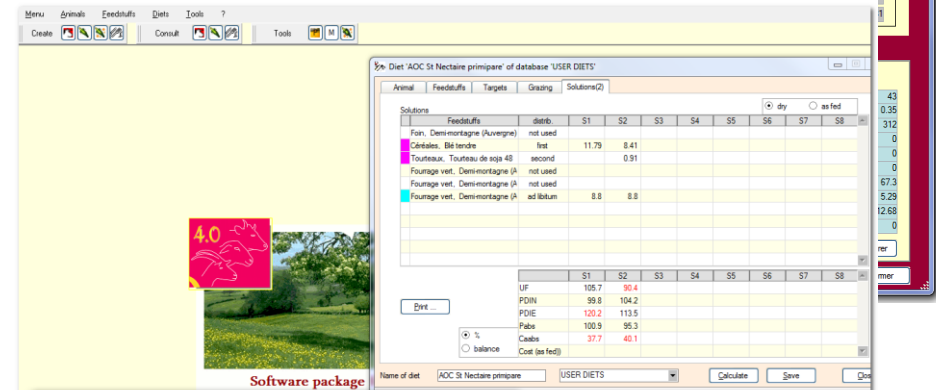
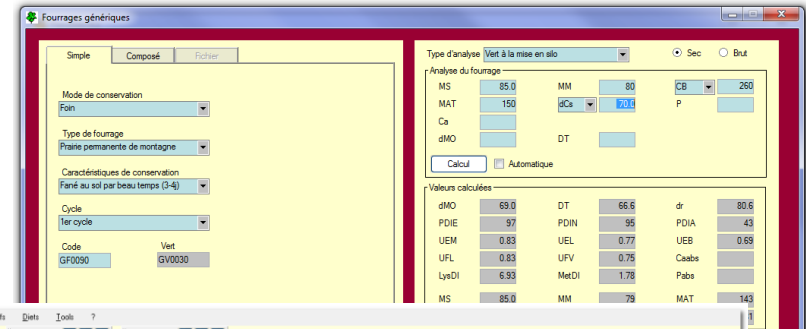
2010



2013

Three associated tools for computers

- **INRAlim**: INRA feed tables on a CD (feed value of 1250 forages and 200 concentrates on 50 criteria)
- **PrévAlim**: software to predict feed values of forage and concentrates
- **INRAtion**: software to formulate rations for cattle, sheep and goats



A training course in Beijing

- 25-26 November 2013, organised by CSFB
(中法肉牛研究与发展中心)
- 105 participants
(87 enterprisers and professors)
- To diffuse in China a new concept and technics about French nutrition requirements and diet formulation
- To promote a deep cooperation in ruminant production field between France and China

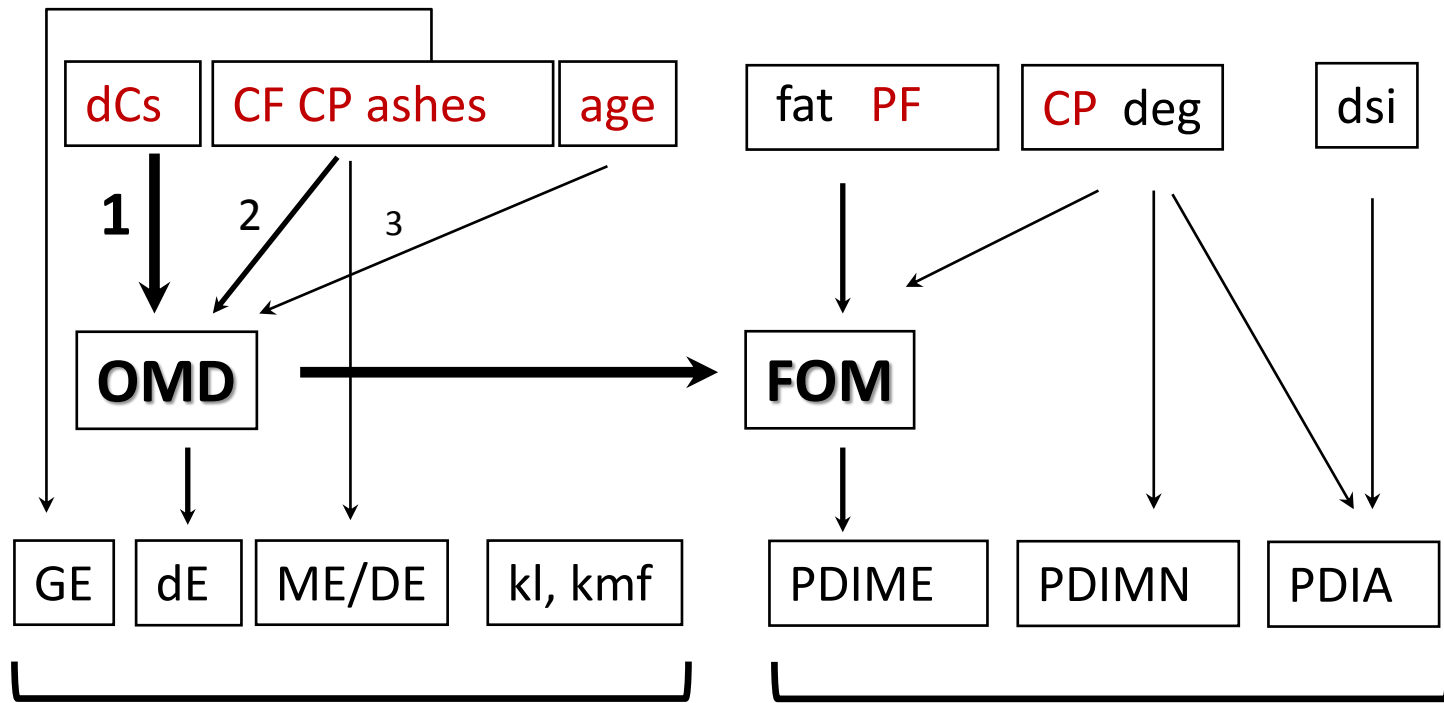


A system based on the physiology of ruminants

- The Feed Unit system: energy value of the food in net energy (*according to the animal use: maintenance, lactation, fattening...*)
- The Fill Unit system: to predict the forage fill value and the feed intake capacity
- The PDI system: nitrogenous value of feeds that takes into account their transformation in the rumen (*concept of microbial nitrogen*)
- Ca - P system: different absorption of minerals from one food to another (*despite the same content*)

Prediction of the nutritive value of forages

Criteria **measured** or read in the INRA Tables



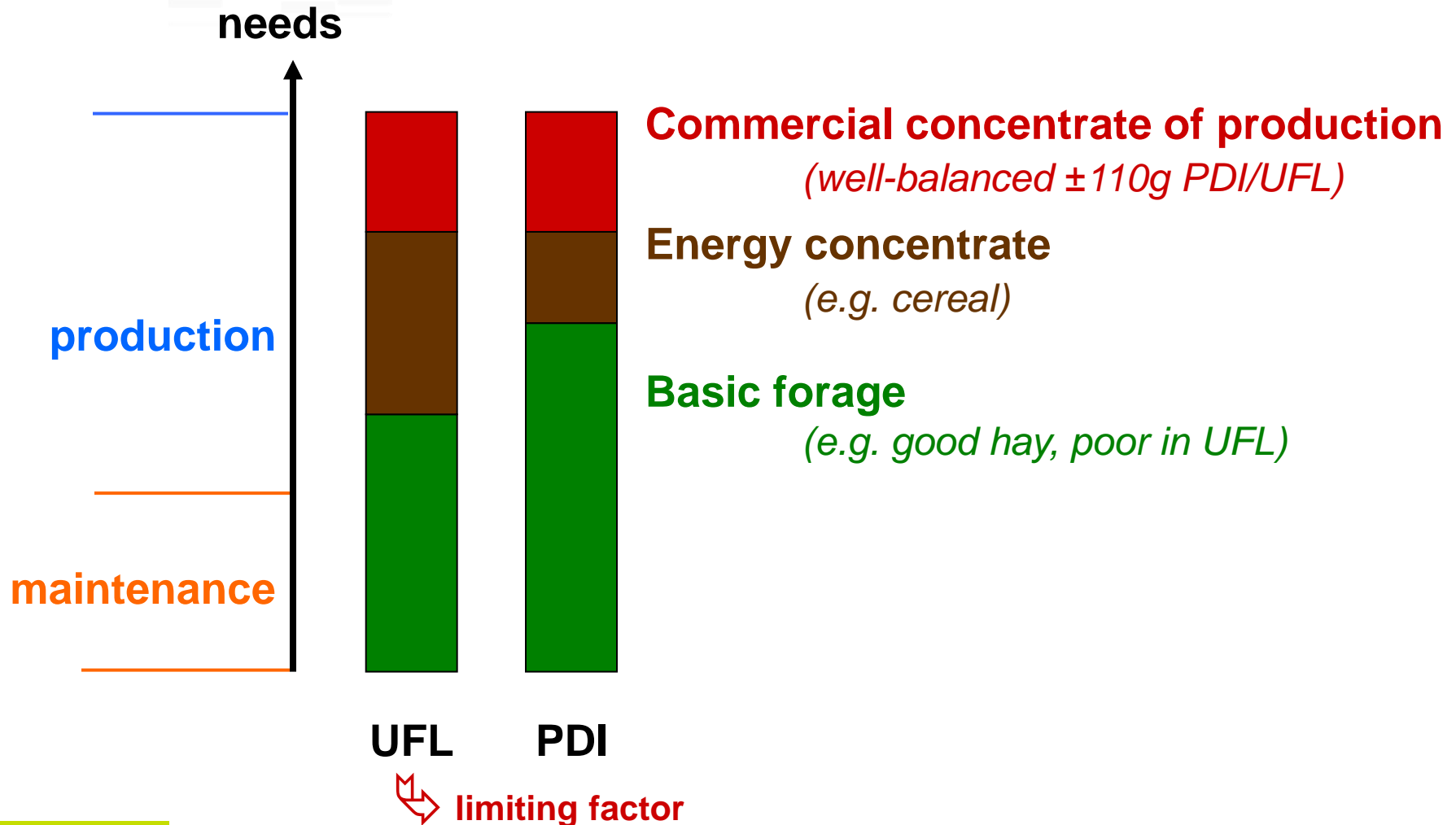
Nutritive values

UFL, UFV

PDIE, PDIN

1, 2, 3 : priority order to estimate the OMD

Rationing exemple (energy corrector + concentrate of production)



Interest of the INRA system for the Chinese ruminant sector

- A flexible system, adapted to all types of geographic areas (*including mountain grassland areas*)
- A system that maximizes the use of forages (*the most economical resource, which is not in competition with Human food*)
- A system that can integrate new forages and industrial by-products (*with a minimum of chemical analysis*)
- A system that can cover many types of ruminants (*beef and dairy cattle, sheep and goats*)

Thank you for your attention

