REGIONE AUTONOMA DELLA SARDEGNA

Measurement of palatability of 14 common ingredients used in feed mixes for lambs and ewes

A. Mereu[1,2], G. Molle[4], V. Giovanetti[3],

M. Acciaro[3], M. Decandia[3], A. Cannas[1]

[1]Dipartimento di Scienze Zootecniche, Università di Sassari, Italy
[2]LUCTA SA, Barcelona, Spain
[3]Agris Sardegna, DIRPA, Olmedo, Italy
[4]Agris Sardegna, DIRII, Ozieri, Italy

Introduction: Definition of Palatability

- **PALATABILITY**: **interrelationship between flavor and post-ingestive effects**, influenced by:
  - **feeds' chemical characteristics**
  - **animals' nutritional state**
  - **animals' past feeding experiences**

- Most research carried out on **forages**
- No much literature available on **concentrates**

Palatability of concentrates

- **Feed neophobia** often observed **with concentrates: e.g. in dairy sheep** the change of concentrate or the insertion of a new raw material in feed mixes often causes **feed refusals:**
  - **Concentrates** are supplied alone only during the two daily **milkings**
  - **Short time available to eat the concentrates** during milking
- **Economical damages** for **farmers** (milk losses, tendency of using the same concentrate) and **feed companies** (customers' complains, limited use of certain ingredients)

Objective

Evaluation of the **short term palatability** of 14 **concentrate** ingredientes on **naive** and **experienced** sheep

Materials and methods: animals

- **14 female Sarda lambs**

  Age: 72±9 d (32±8 d after weaning) **BW**: 16.9±1.3 kg

- **14 multiparous dry Sarda ewes**

  Age: 4±1 years **BW**: 50.6±3.1 kg **BCS**: 3.1 ± 0.2

PREVIOUS FEEDING EXPERIENCE

Lambs: from weaning to experiment (32 days): **alfalfa hay + pelleted feed** (barley, corn grains, and wheat grains; soybean meal, beet pulps, alfalfa dehydrated meal, wheat brans, molasses (DM 87.5%, CF 9.4%, CP 18.9%)

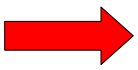
Ewes: **Pasture** + various types of **concentrates or concentrate mixes** **during milking time**

Material and Methods: palatability tests

- **Basal diet**: ryegrass hay and barley meal+urea

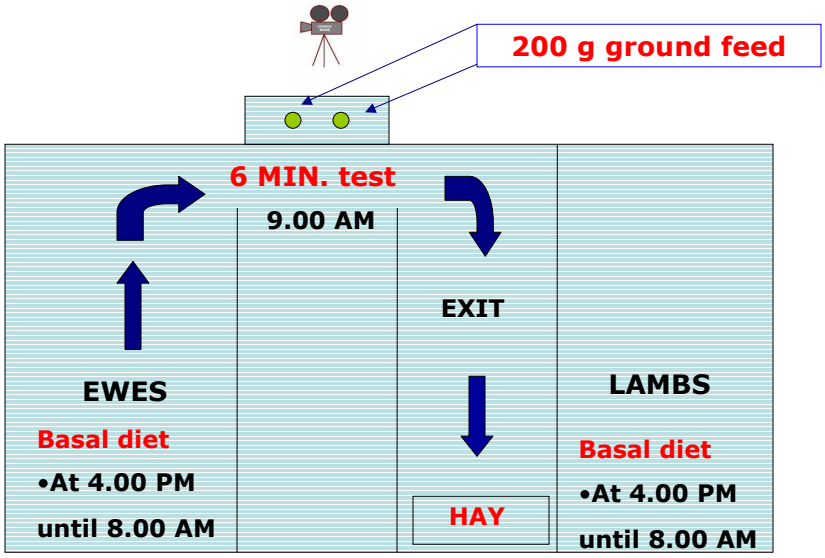
- **Training period** (9 d): 6 min palatability tests with barley meal

- **Experimental period** (14 d): 6 min palatabilty tests on 14 feeds
  - ground with 1 mm screen
  - same feed in 2 bowls



Alfalfa, dehyd.
Beet pulps
Corn gluten meal
Corn grains
Corn middlings
Oat grains
Pea grains
Canola meal
Soybean hulls
Soybean meal 44
Soybean meal 49
Sunflower meal
Wheat brans
Wheat grains

M & M - Palatability tests



Material and Methods

Experimental feed

Experimental design: two 14 x 14 Latin squares

DAY	ANIMAL 1		ANIMAL 2		ANIMAL 3		ANIMAL 4		ANIMAL 5		ANIMAL ...14	
	L	R	L	R	L	R	L	R	L	R	L	R
1	1	1	2	2	3	3	4	4	5	5	14	14
2	2	2	3	3	4	4	5	5	6	6	1	1
3	3	3	4	4	5	5	6	6	7	7	2	2
4	4	4	5	5	6	6	7	7	8	8	3	3
5	5	5	6	6	7	7	8	8	9	9	4	4
6	6	6	7	7	8	8	9	9	10	10	5	5
7	7	7	8	8	9	9	10	10	11	11	6	6
8	8	8	9	9	10	10	11	11	12	12	7	7
9	9	9	10	10	11	11	12	12	13	13	8	8
10	10	10	11	11	12	12	13	13	14	14	9	9
...14	...	...	...	...	...	...	...	...	...	...	...	...

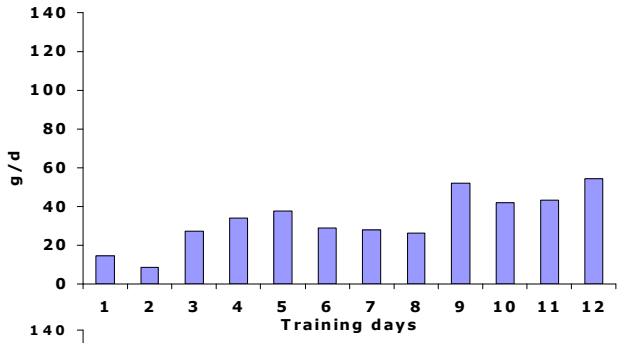
Statistical analysis

GLM for Latin square design and non parametric tests

Results: Training period

Lambs

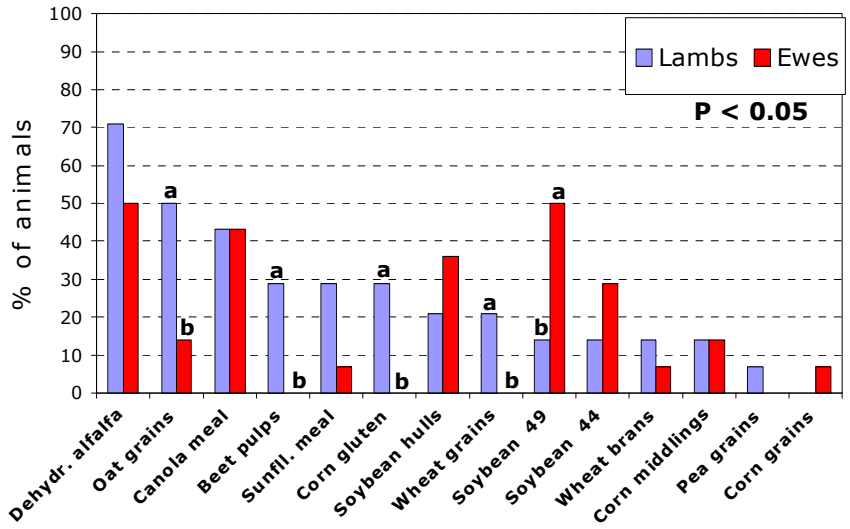
Barley DMI during training



Ewes

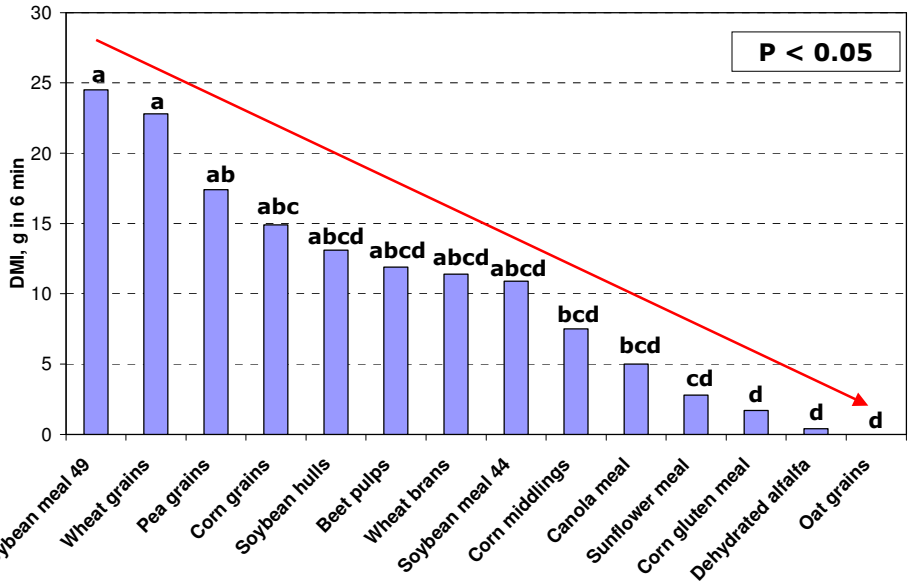
Barley DMI during training

Results: % of animal which didn't eat at all



Animals that did not eat: Lambs =26% , Ewes= 18%; *P* < 0.09

Results: DMI in 6 min by Lambs



Discussion: lambs

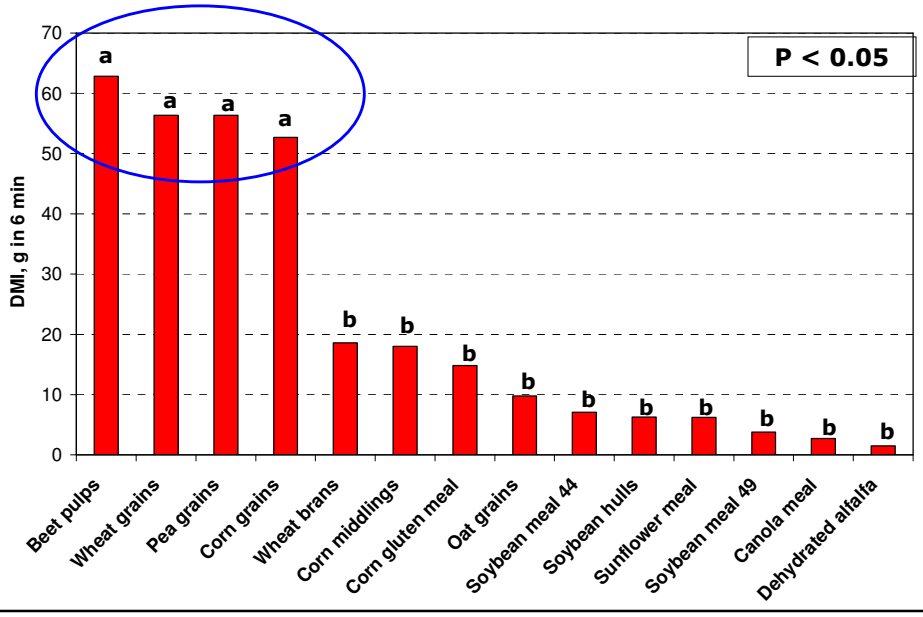
Intake of the experimental feeds **varied** from high to low values in a **continuum**, without clear cuts

- **lack of experience?**
- **sensorial properties?**

The lambs **refused** a **familiar feed** (**dehydrated alfalfa**)

- **off-flavours?**

Results: DMI in 6 min by Ewes



Discussion: Ewes

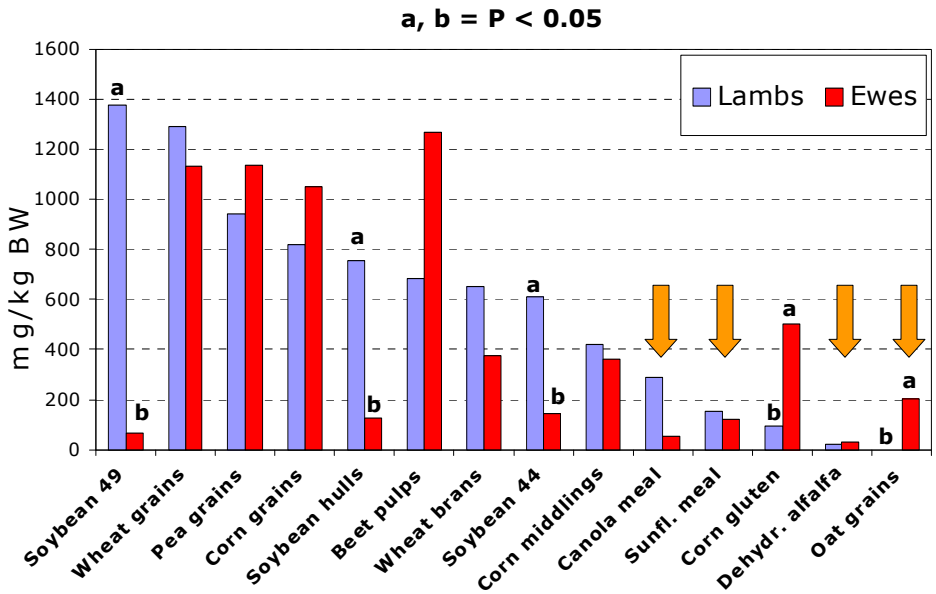
The ewes showed a **marked preference for 4 feeds** often supplied as **single feed during milking**

- beet pulps, wheat grains, pea, and corn grains

Low intake or almost total rejection for the **other feeds**, including several feeds commonly used for sheep feeding but rarely used as single ingredients

- **less prone than lambs to experience novel flavors**. **I eat what I know..**

Results: DMI level of intake in 6 min



Conclusions

- **What are the causes of the large differences in palatability?** Aroma? Taste? Texture? Experience?
  - We have measured volatile compounds to identify possible important molecules
- **Can we improve the intake of the low palatable concentrates?**
  - Mixes with palatable ingredients?
  - Proper training of the animals?
  - Fetal programming?
  - Feed enhancers? See our talk tomorrow (S.47) on "*Flavours affect feed reward in lambs and ewes fed canola meal*"