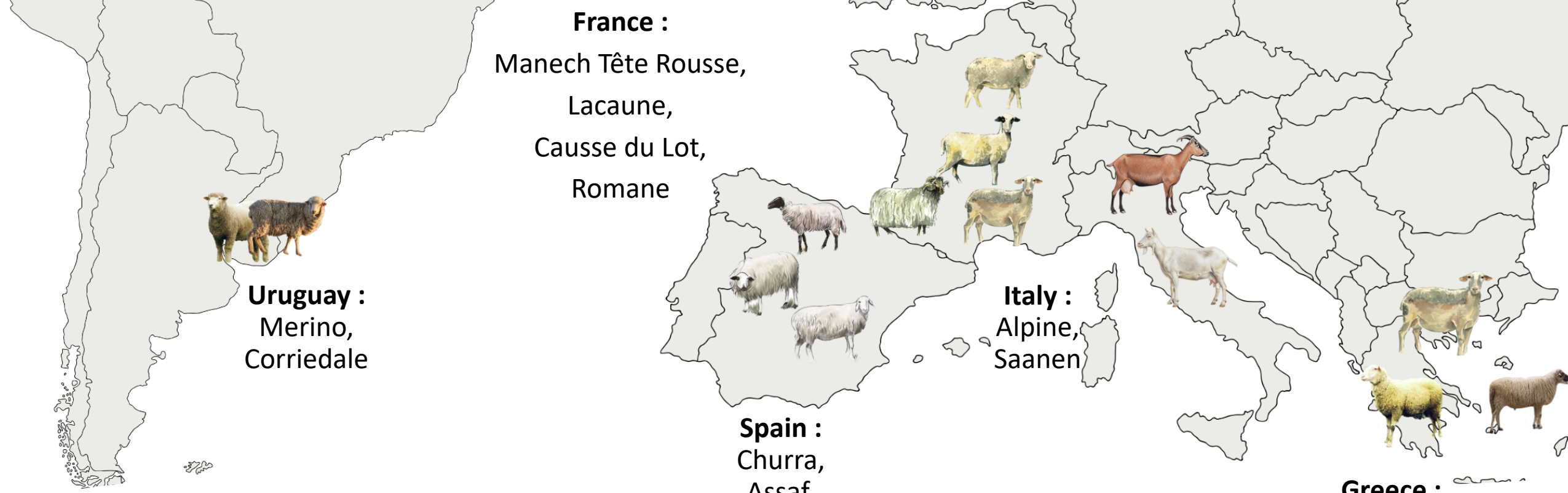
This project has received funding from the European Union's Horizon 2020 research and innovation program under the Grant Agreement n°772787

Resilient, healthy or efficient?

The ideal animal according to sheep and goat farmers in Europe and Uruguay

E. Janodet[1], C. Michelet[1,2], R. Baptista[3], I. De Barbieri[3], G. Arsenos[4], G. Bailo[5], S. Coppin[2], A. Theodoridis[4], S. Vouraki[4], Marion Sautier[1]

[1] GENPhySE, University of Toulouse, INRAE, INP-ENSAT, France
[2] IDELE, Institut de l'Elevage, France
[3] INIA Tacuarembó, Uruguay
[4] AUTH, Aristotle University of Thessaloniki, Greece
[5] ARAL, Associazione Regionale Allevatori della Lombardia, Italy



France :
Manech Tête Rousse,
Lacaune,
Causse du Lot,
Romane

Uruguay :
Merino,
Corriedale

Spain :
Churra,
Assaf,
Castellana

Italy :
Alpine,
Saanen

Greece :
Chios,
Lacaune,
Frizarta,
Assaf

Countries, production and breeds

- 5 partner countries
- 3 productions : milk, meat, wool
- 15 breeds: 13 sheep, 2 goat
- 775 farmers

Research objectives

Which genetic traits are prefered when thinking about the « ideal » animal ?

Are they production, health or efficiency traits?

according to small ruminant farmers

Help to include farmers' perpespectives in genetic selection

Provide information to agricultural development structures which build indexes for genetic selection

Methods

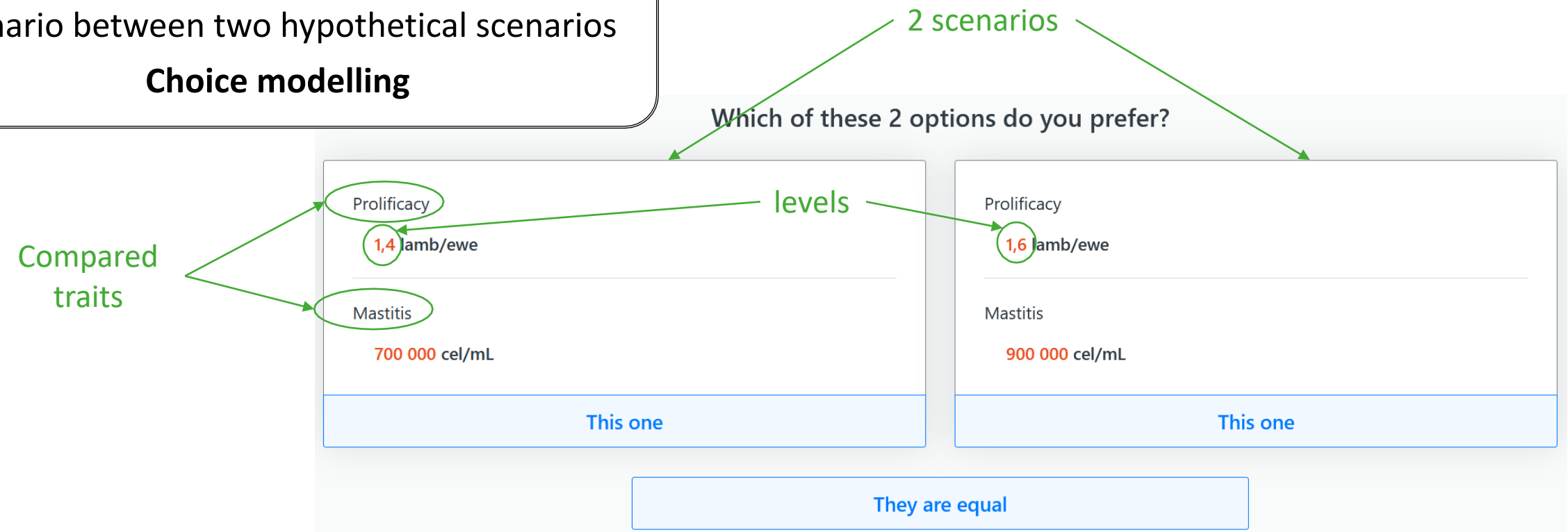
Preference survey

ask respondents their willingness to pay for hypothetical scenarios

Contingent valuation

respondents repeatedly choose their preferred scenario between two hypothetical scenarios

Choice modelling



Preference survey

ask respondents their willingness to pay for hypothetical scenarios

Contingent valuation

respondents repeatedly choose their preferred scenario between two hypothetical scenarios

Choice modelling

Hierarchy among traits = **ranks**

+

Relative importance of traits = **utility** (i.e. worth of the service provided by the trait)

Survey design

Traits to compare

\+ levels for each traits

\+ units for each traits

\+ sociodemographic questions

Tailored to each country and breed

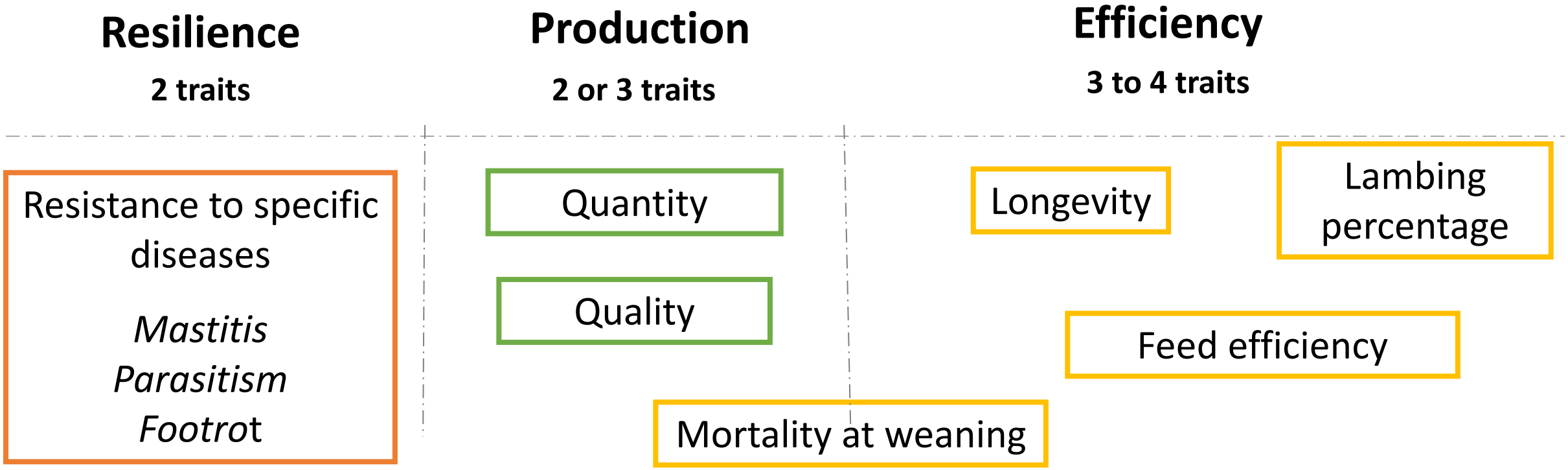
Online

1000minds software

612 farmers, 15 breeds

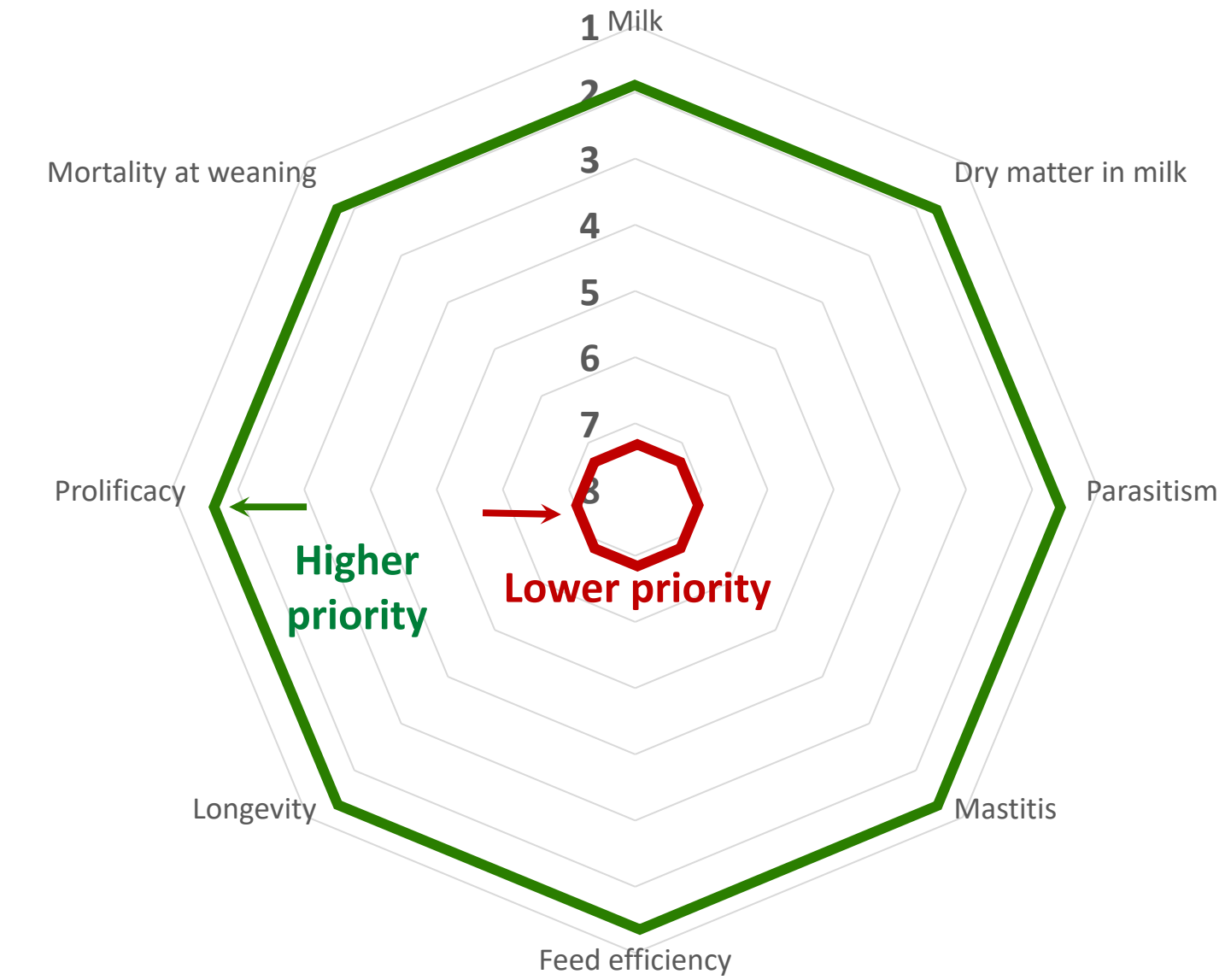
n=[5;112] farmers per breed

The 8 traits included in the survey



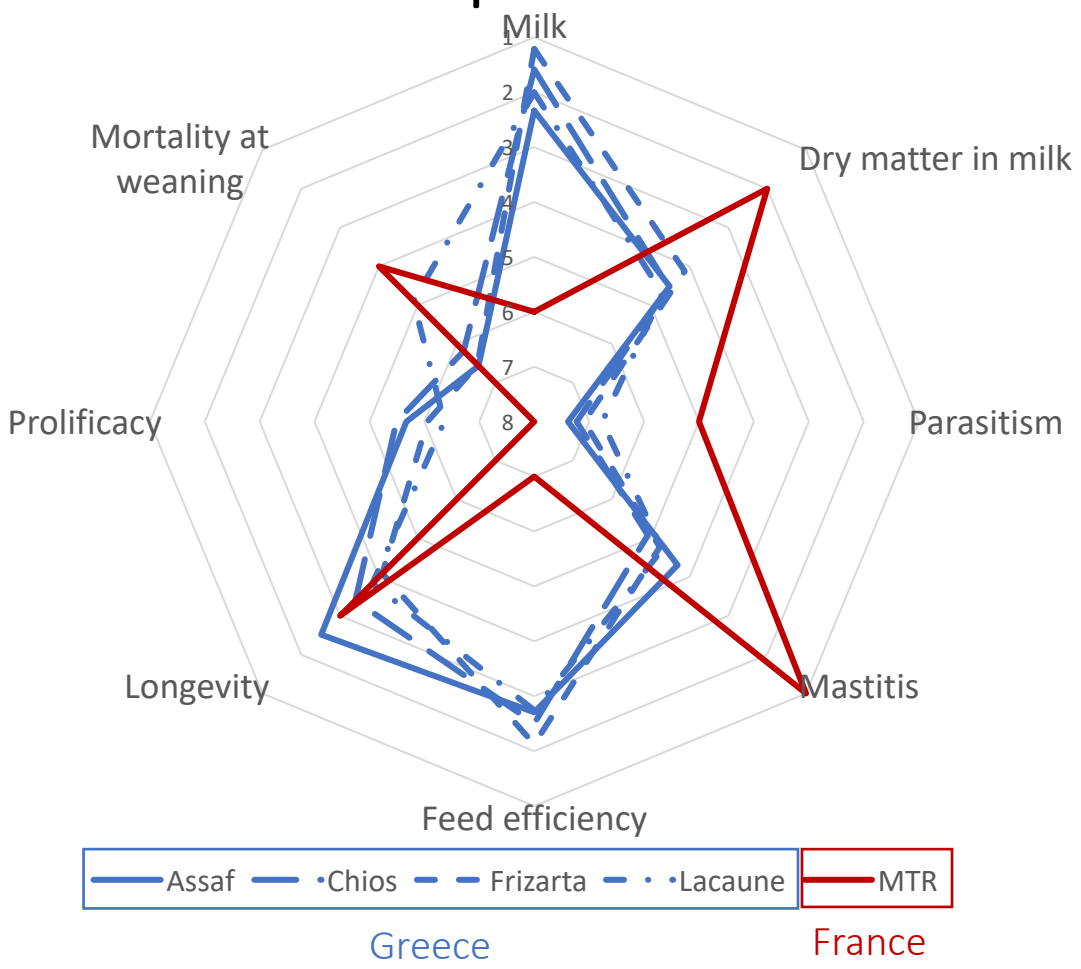
Selected based on literrature review + other WP + experts

Results:
All breeds

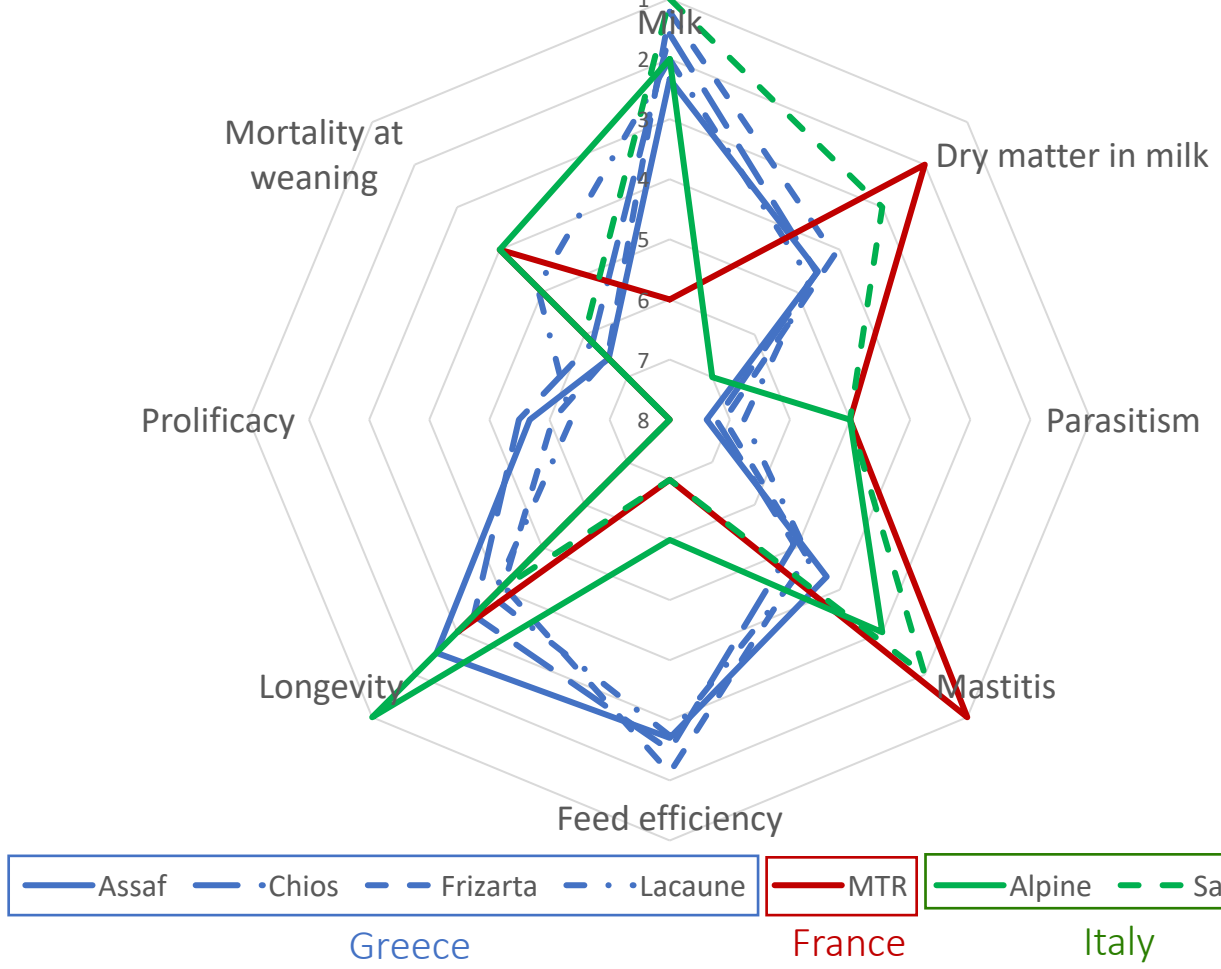


Dairy breeds

Sheep breeds



Sheep and goat breeds

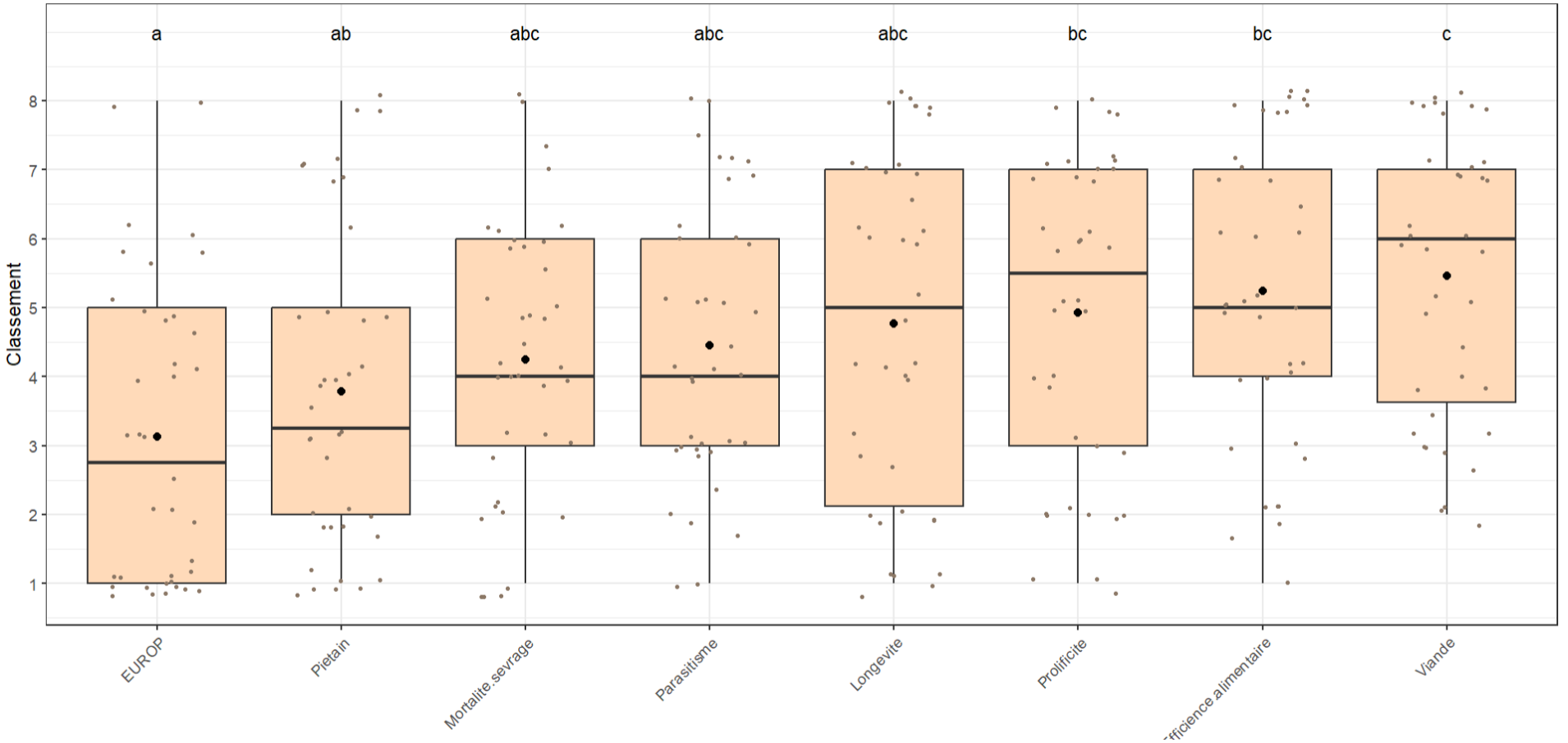


Results: Romane Breed

Farmers' preferences

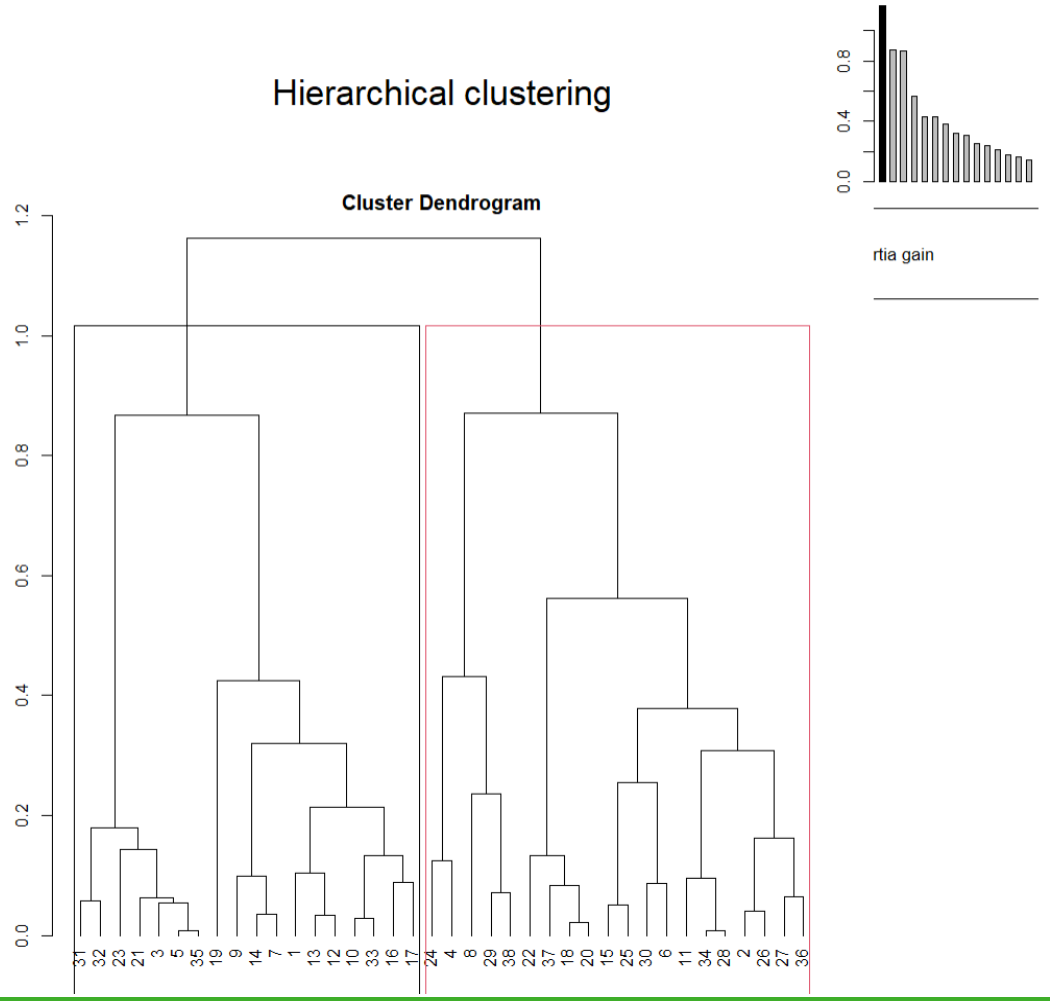
Lower priority

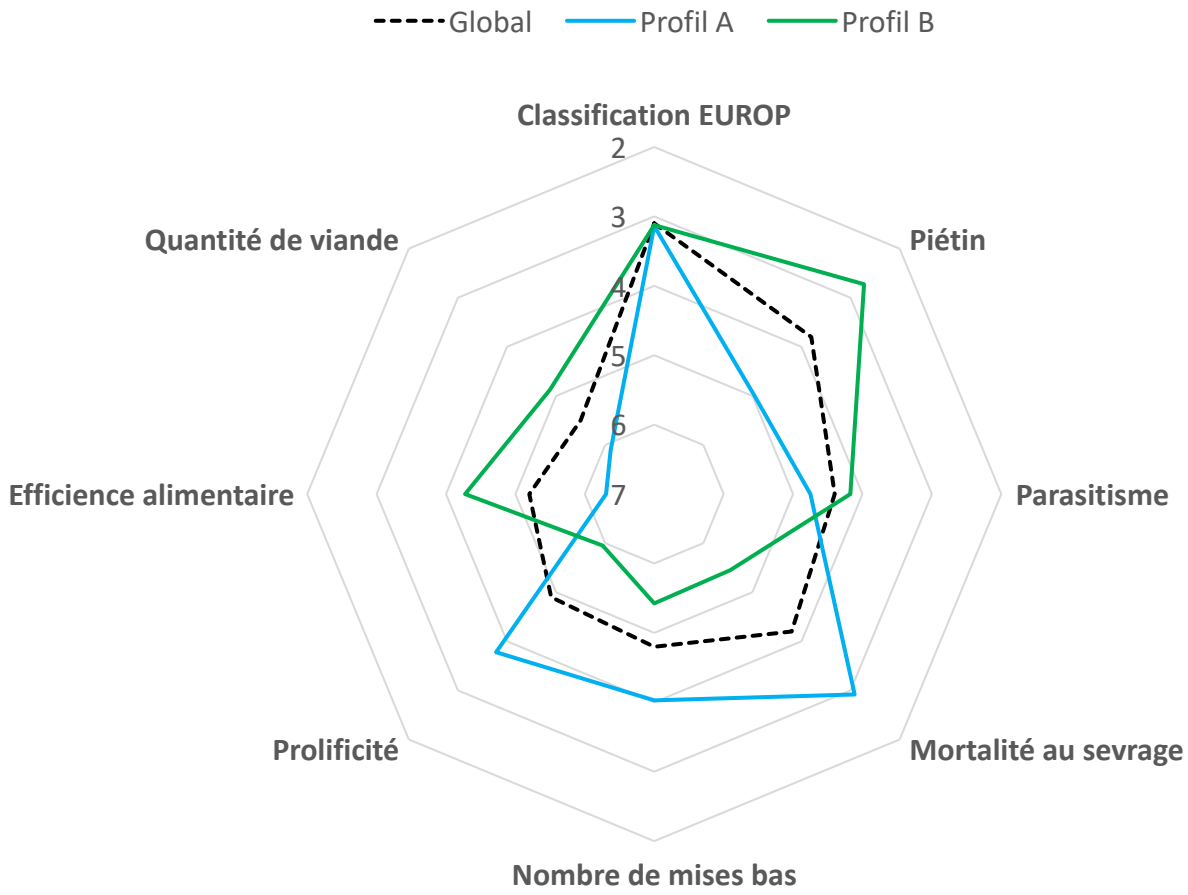
Higher priority



Ranking of farmers' preferences for different animal Resilience and Efficiency traits.
Survey done by 38 farmers having Romane sheep (France)

Farmer typology: 2 clusters

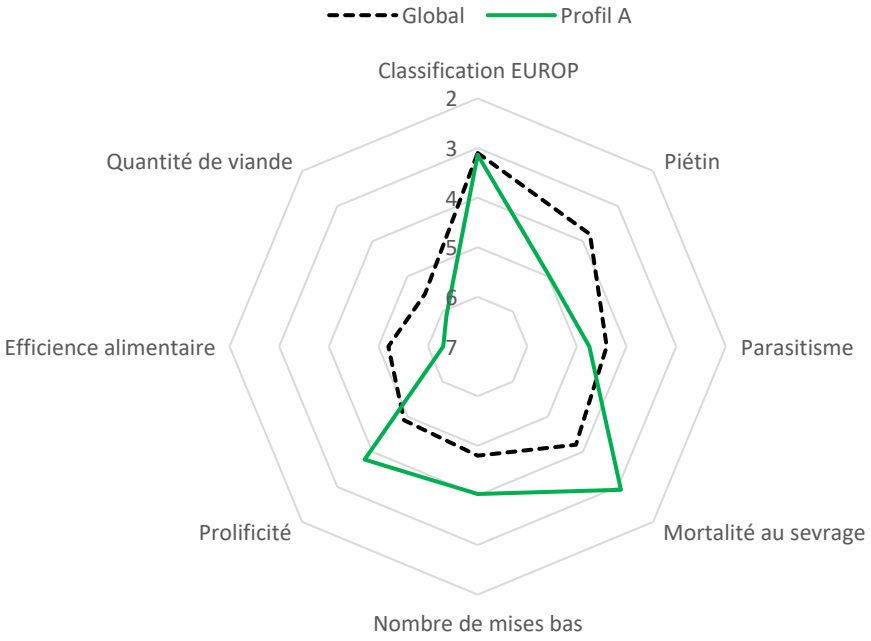


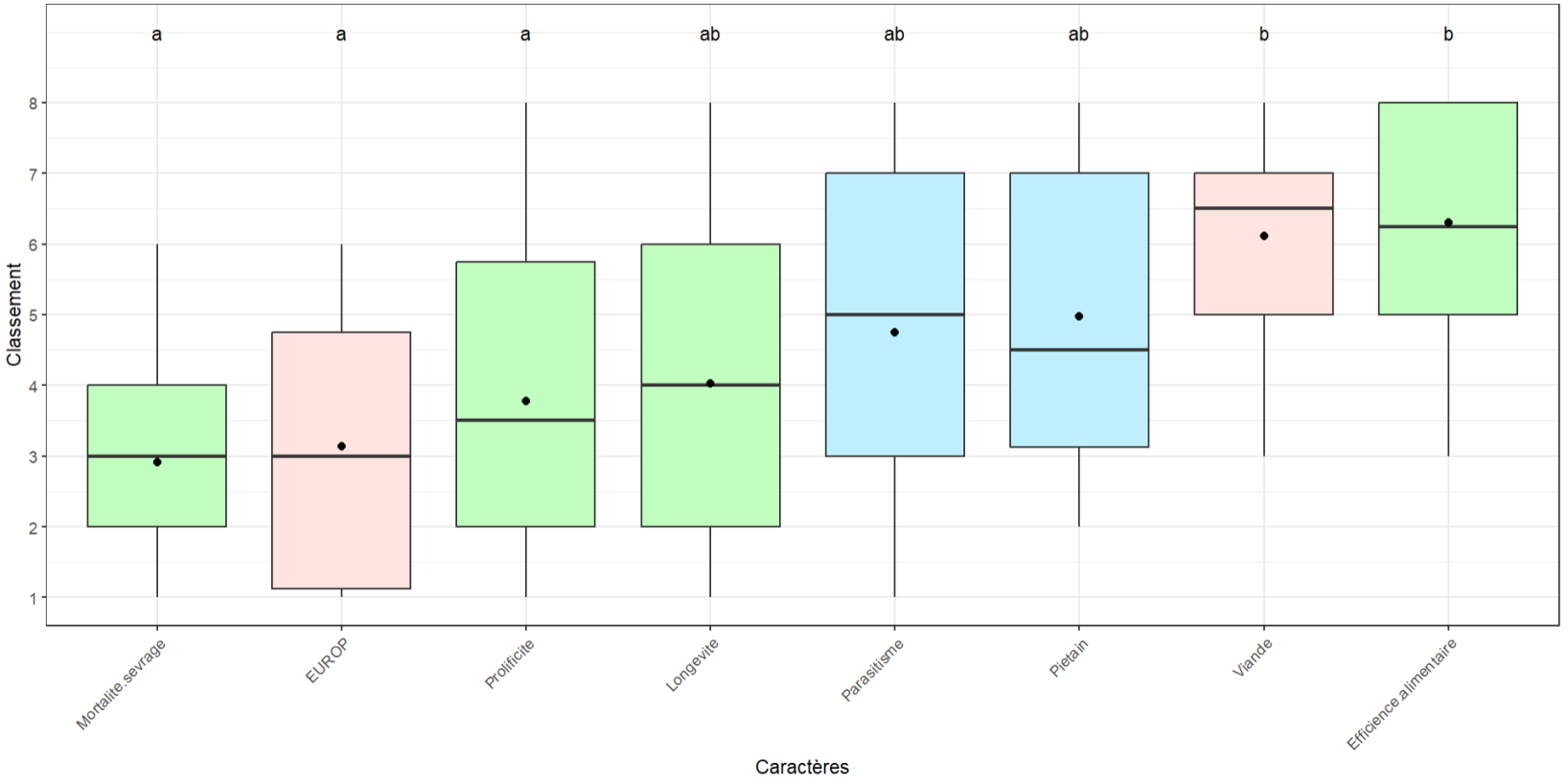


(n=38)

Cluster A: Reproductive performance

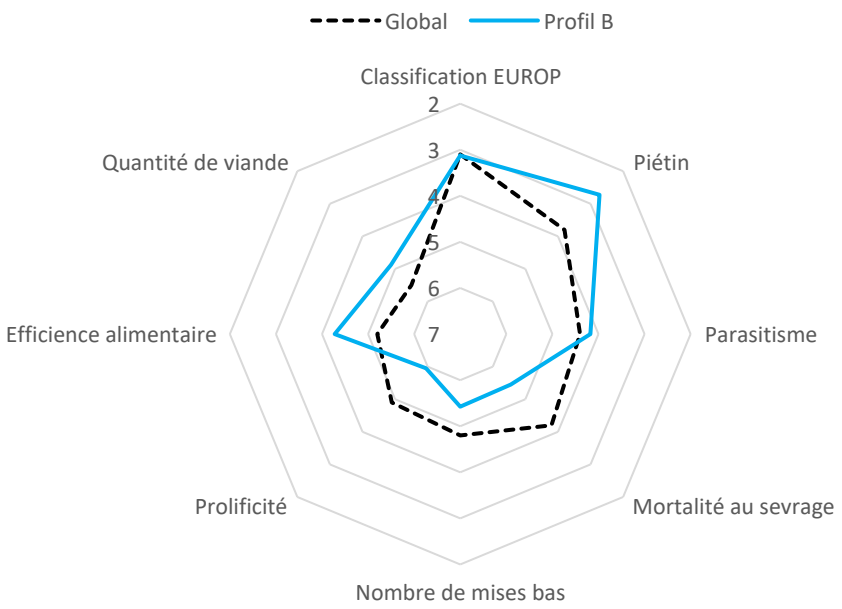
Red: Production
Blue: Resilience
Green: Efficiency

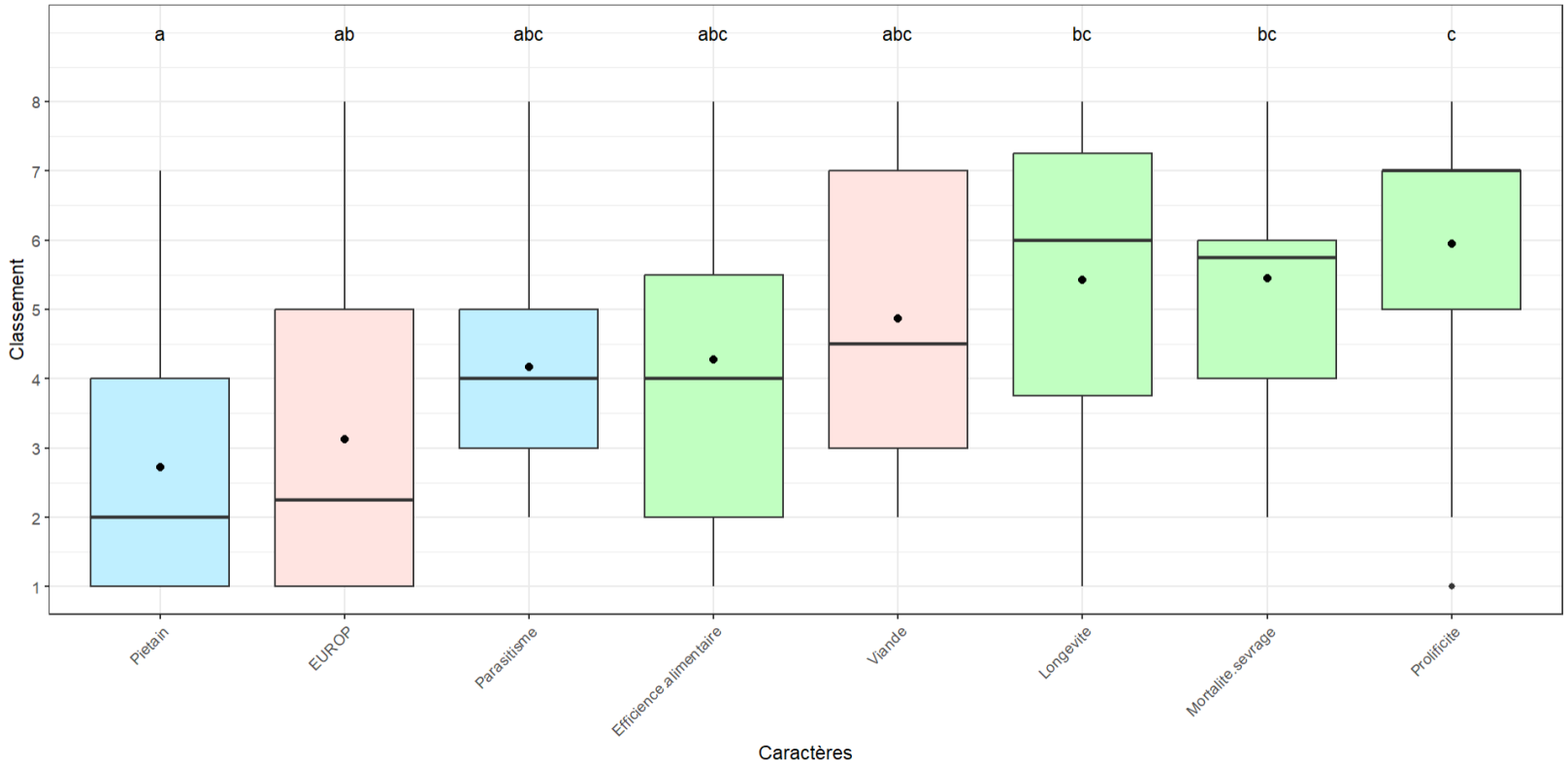




Cluster B: Health and profitability

Red: Production
Blue: Resilience
Green: Efficiency





Conclusions

- Next steps: test significant differences in ranks and in utilities

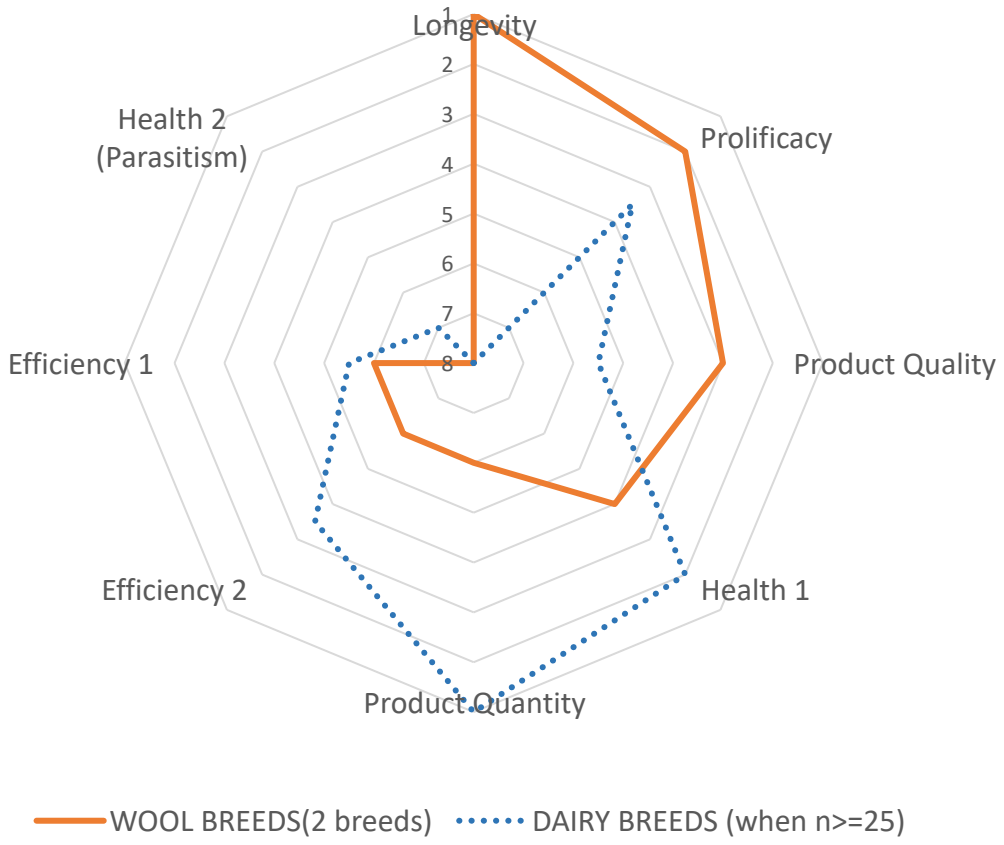
- Diversity of profiles in each breed and each country
- Help to balance breeding goals with new traits
- Combine these results with the economic aspect, environmental, societal, etc
- Surveys also collected from research, extension agents and students (n=49)

Thanks to partners and farmers

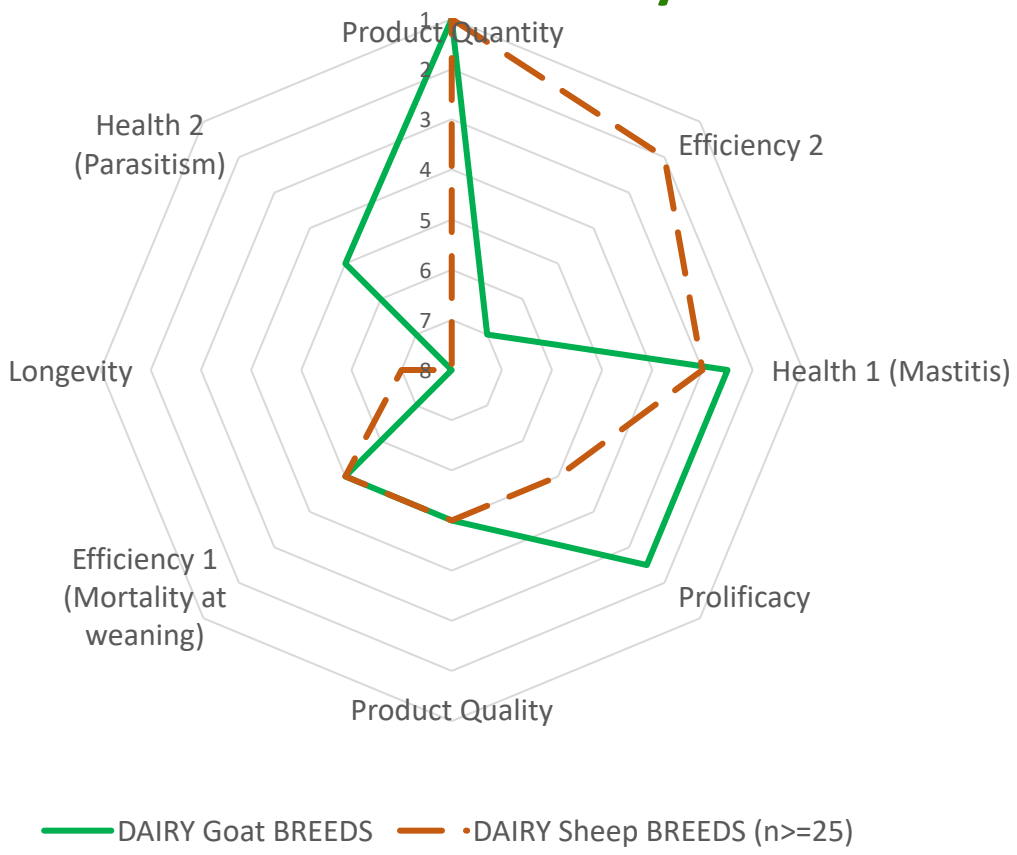
All breeds

Preferences for

WOOL versus DAIRY breeds



GOAT versus SHEEP dairy breeds



The 8 traits compared

Category	Traits « dairy sheep and goat»	Traits « wool sheep »	Traits « meat sheep »
Production	Milk quantity	Wool quantity	Carcass Quality
	Dry matter in milk	Wool fibre diameter	Meat quantity
Health	Mastitis	Foot rot	Foot rot
	Parasitism	Parasitism	Parasitism
Efficiency	Feed efficiency	Slaughter weight	Feed efficiency
	Mortality at weaning	Adult weight	Mortality at weaning
Cross-themes	Longevity	Longevity	Longevity
	Prolificacy	Prolificacy	Prolificacy

Traits collectively selected based on literature review and work done in other WP of the project
Units and levels (=« high », « medium »,« low » values) defined through expert opinion and, in some breeds focus groups with farmers

A survey adapted to each system x breed

Units and levels (values for« high », « medium »,« low ») based on

- expert opinion and,
- focus groups with farmers (only for some breeds)

	Trait	Unit	Levels
Production	Milk	*Lmilk/ewe/lactation*	200 250 300
	Dry matter in milk	*g/L*	100 120 140
Resilience	Parasitism	*%*	20 15 10
	Mastitis	*Somatic cell/mL*	1100000 900000 700000
Efficiency	Feed efficiency	€/ewe	60 45 30
	Prolificacy	*Nb lambs/ewe*	1,2 1,4 1,6
	Longevity	*Lactations/ewe*	4 6 8
	Mortality at weaning	%	15 10 5

Traits and levels selected to build the alternatives of the preference survey for dairy sheep Manech tête rousse

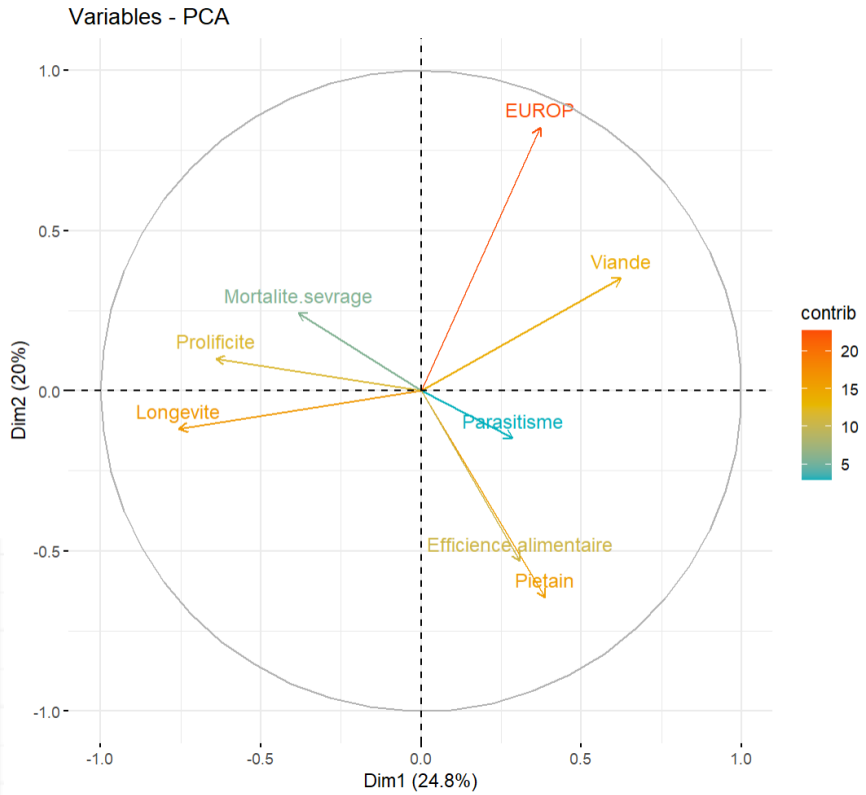
Classement global des caractères en Romane

	Classement	
Caractères	Moyenne	Ecart-type
Classification EUROP	3,1	2,2
Piétin	3,8	2,3
Parasitisme	4,2	2,0
Mortalité au sevrage	4,4	2,0
Nombre de mises bas	4,8	2,5
Prolificité	4,9	2,3
Efficience alimentaire	5,2	2,2
Quantité de viande	5,5	2,1

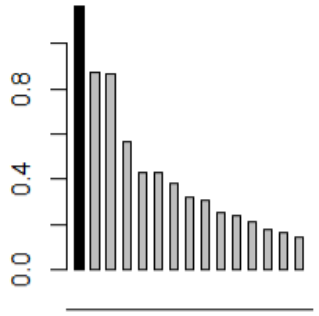
Tableau des valeurs d'utilité des caractères étudiés pour la race Romane (n=38)

PCA and clustering in ROMANE

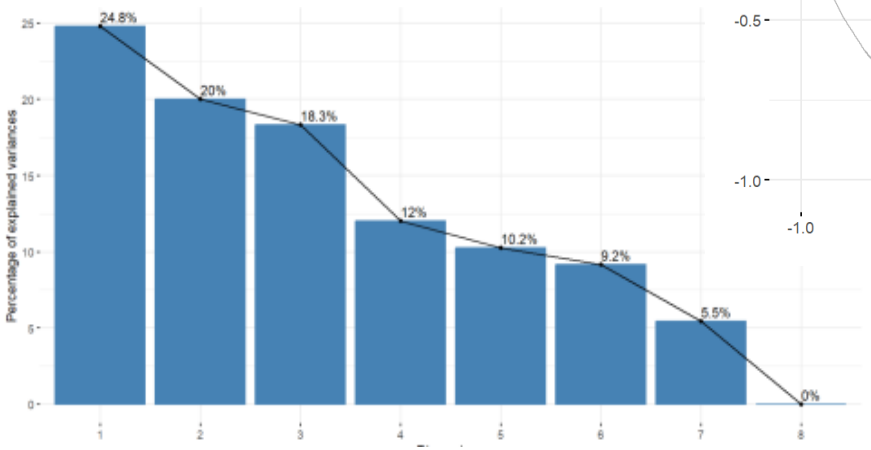
Dim 1 and Dim 2 of PCA

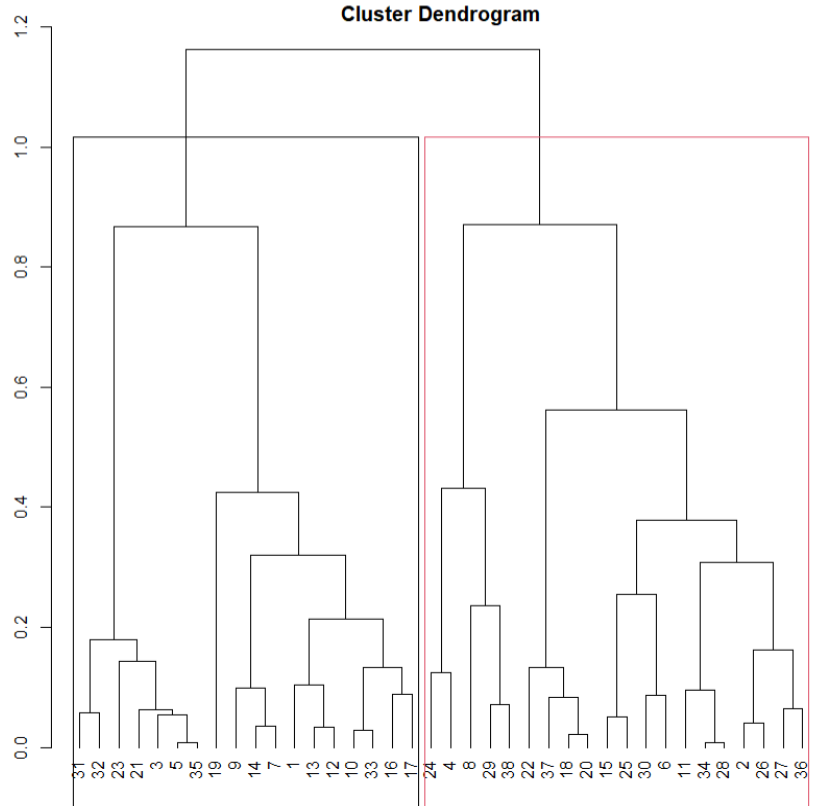


Inertia gain plot



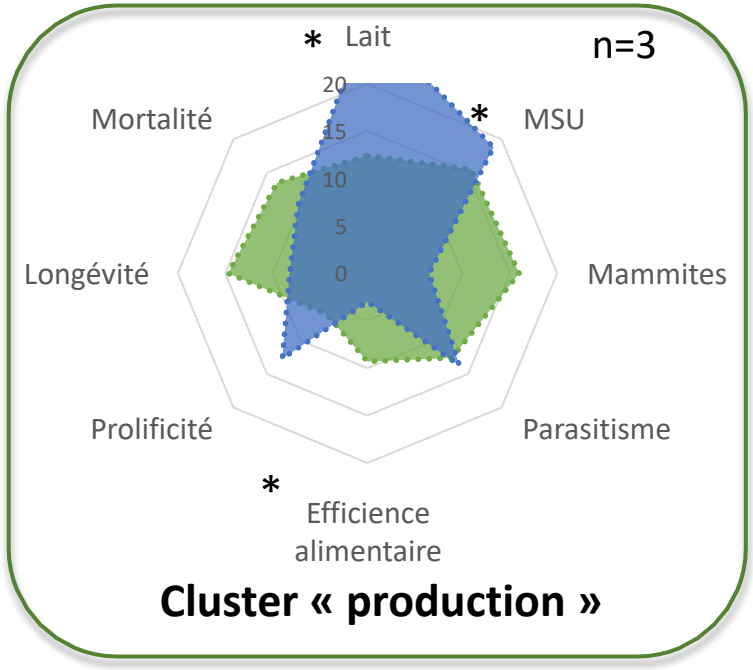
Scree plot of PCA



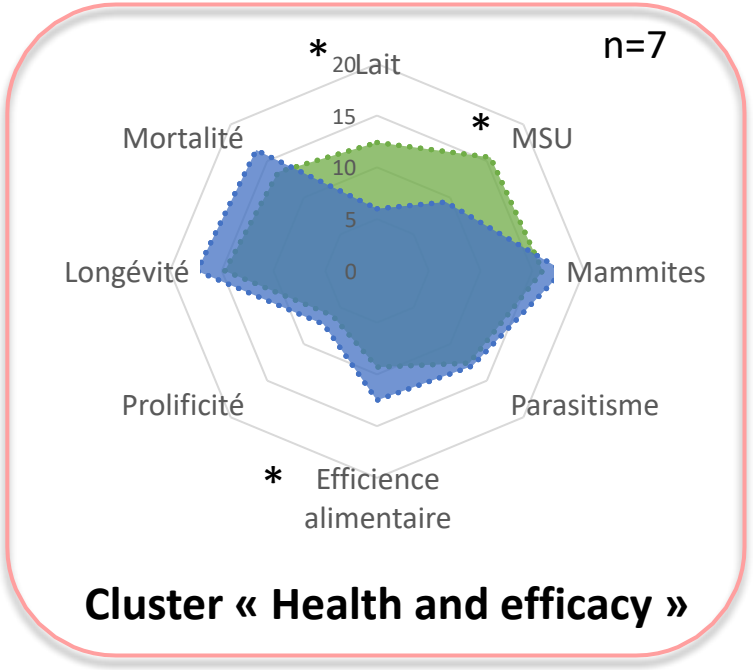


A diversity of preferences profiles (6 clusters in Manech Tete Rousse)

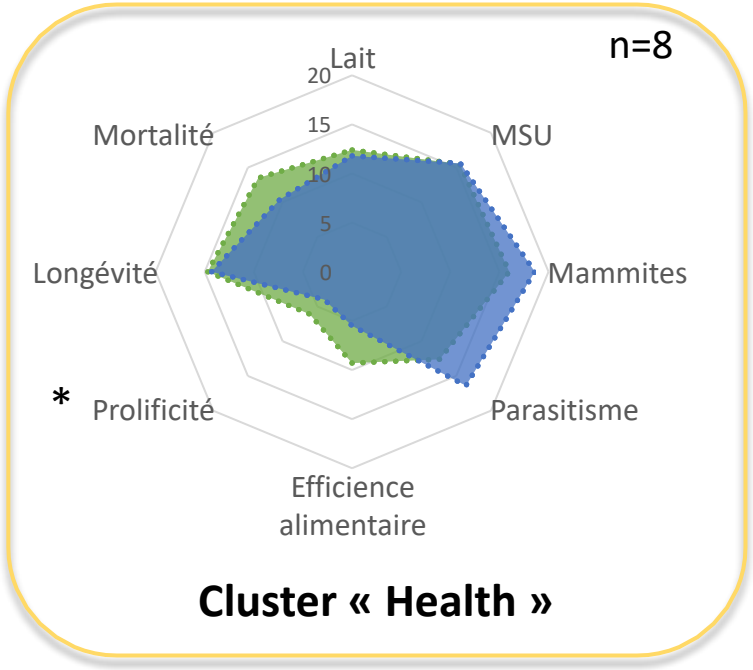
*: significant difference



Farmer's preference for cluster 1 (in blue) compared to the average preference of the entire group (in green)

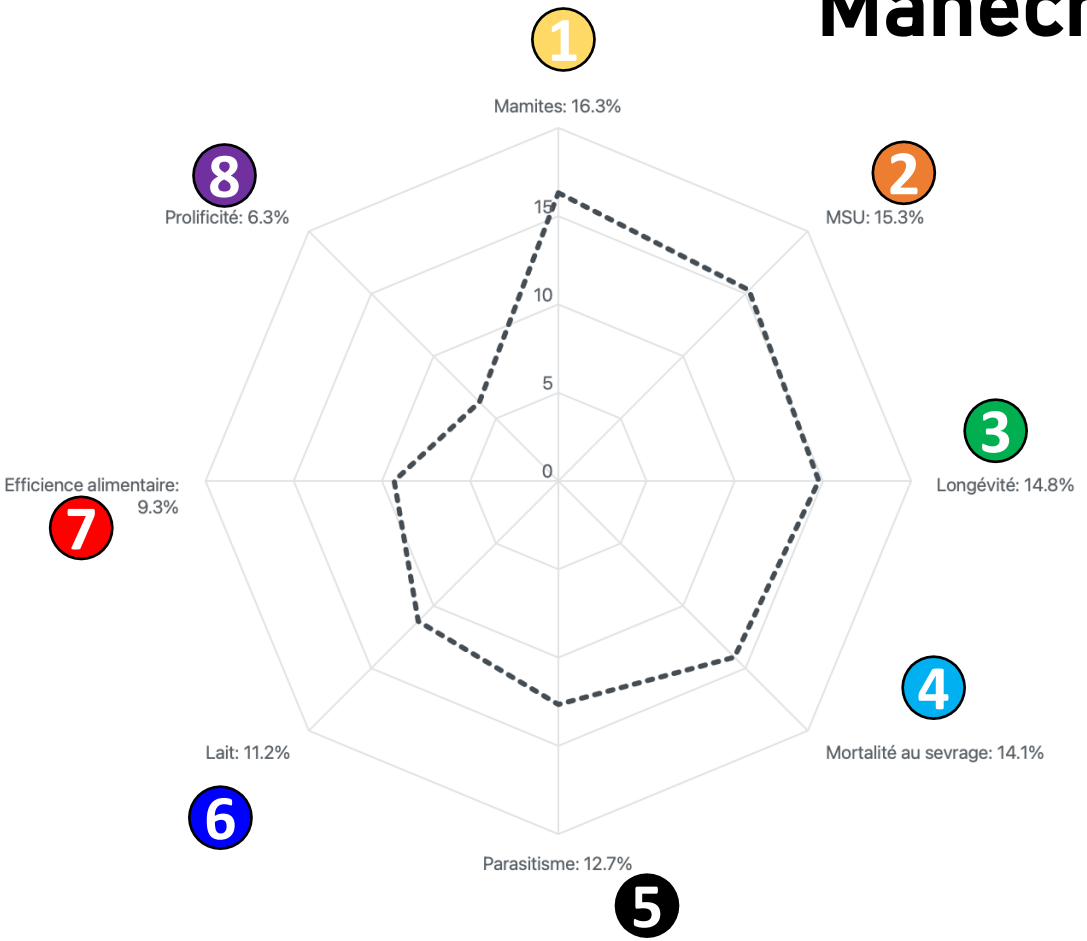


Farmer's preference for cluster 4 (in blue) compared to the average preference of the entire group (in green)

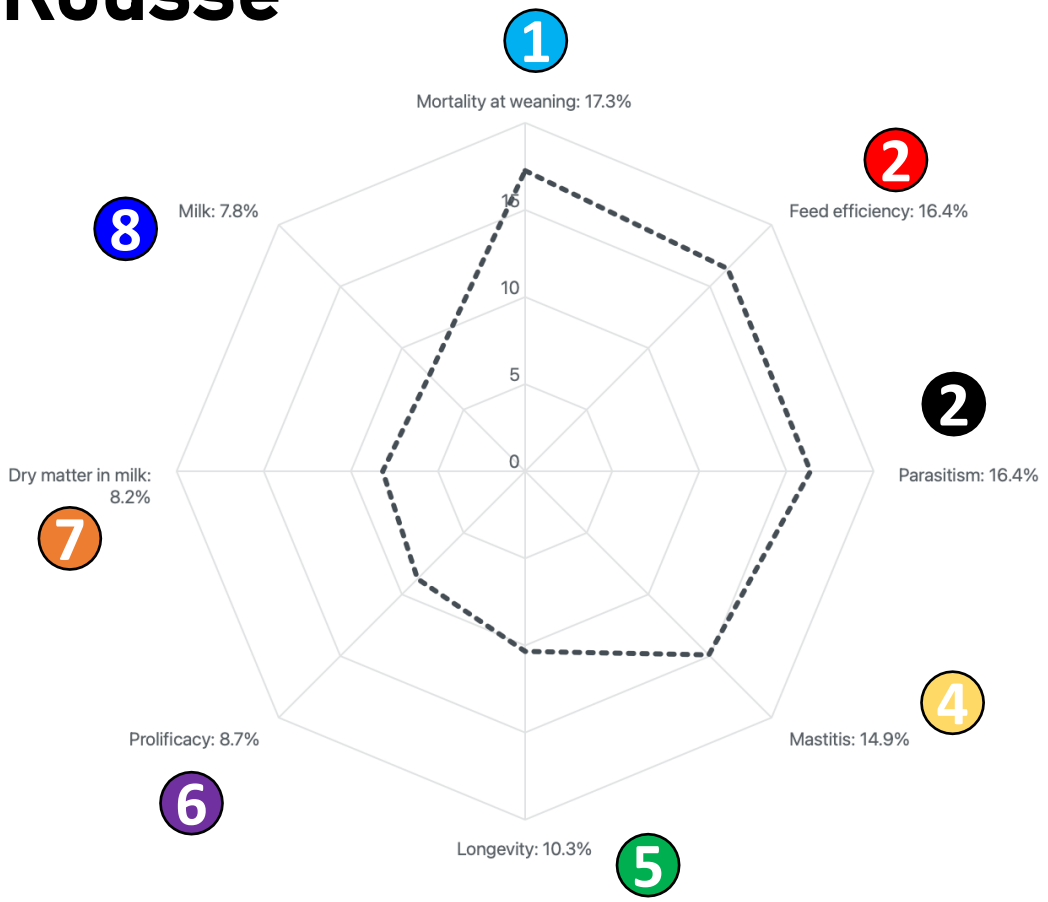


Farmer's preference for cluster 2 (in blue) compared to the average preference of the entire group (in green)

Researchers VS breeders
Manech Tête Rousse



Breeders



Researchers

Researchers VS breeders
Manech Tête Rousse

Prolificité

1,2 agneau/brebis 1,4 agneau/brebis 1,6 agneau/brebis	1,4 agneau/brebis 1,6 agneau/brebis 1,2 agneau/brebis	1,4 agneau/brebis 1,2 agneau/brebis 1,6 agneau/brebis	1,6 agneau/brebis 1,4 agneau/brebis 1,2 agneau/brebis	1,6 agneau/brebis 1,2 agneau/brebis 1,4 agneau/brebis	1,2 agneau/brebis 1,6 agneau/brebis 1,4 agneau/brebis
36.4%	27.3%	15.2%	12.1%	6.1%	3.0%

Breeders n=33

Prolificacy

1,2 lambs/ewe 1,4 lamb/ewe 1,6 lamb/ewe	1,6 lamb/ewe 1,4 lamb/ewe 1,2 lambs/ewe	1,4 lamb/ewe 1,2 lambs/ewe 1,6 lamb/ewe	1,4 lamb/ewe 1,6 lamb/ewe 1,2 lambs/ewe
44.4%	44.4%	5.6%	5.6%
Group 1	Group 2		

Researchers n=18