Improving milk intrinsic quality: considering synergies and antagonisms of farming practices

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Contexte

The last 30 years, majority of the publications only studied one farming practice


vs


+ yellow
+ fatty acid Omega 3 / - palmitic fatty acid
- protein content
- mineral content

} Antagonistic effects

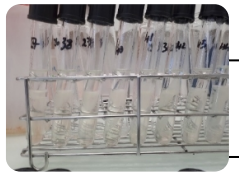
... but little on a global approach of milk quality
... and on the effect of combinations of practices taken together

➔ **What combinations of farming practices to improve milk quality?**
Are there synergies and trade-offs of those practices on milk quality?

Material and methods

91 French dairy farms

Bulk tank milk



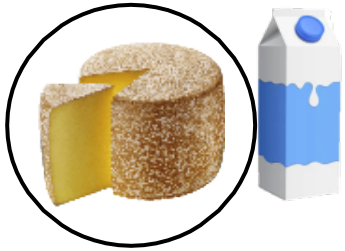
Analyses

Multicriteria assessment

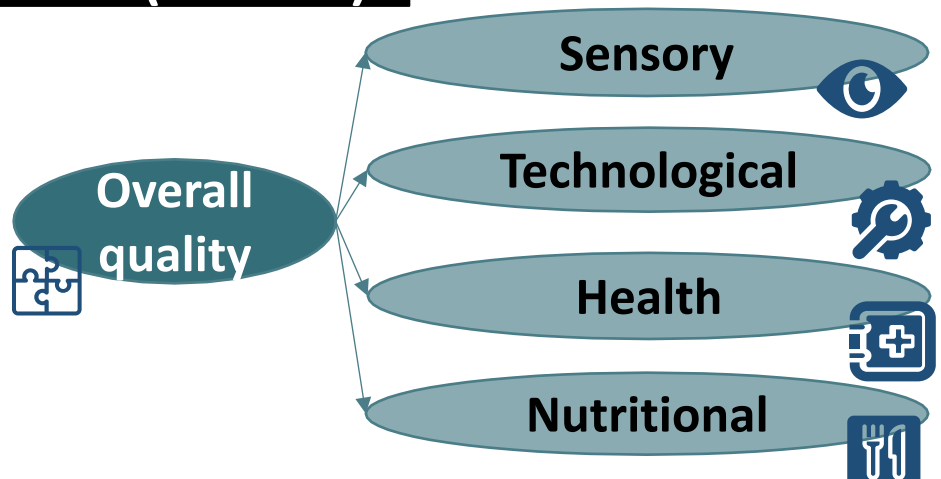
Rey-Cadilhac et al., 2021

Intrinsic quality scores (0 → 10)

Survey: Farming practices



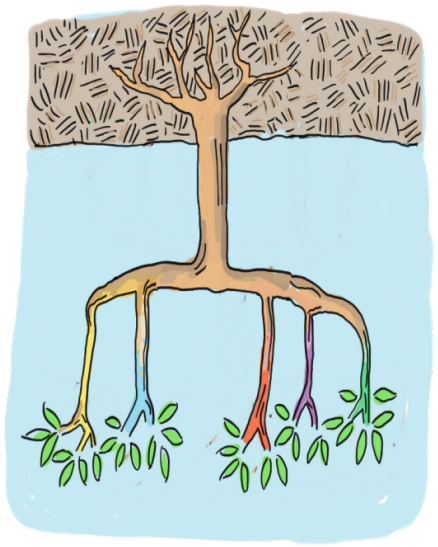
Dimension of quality

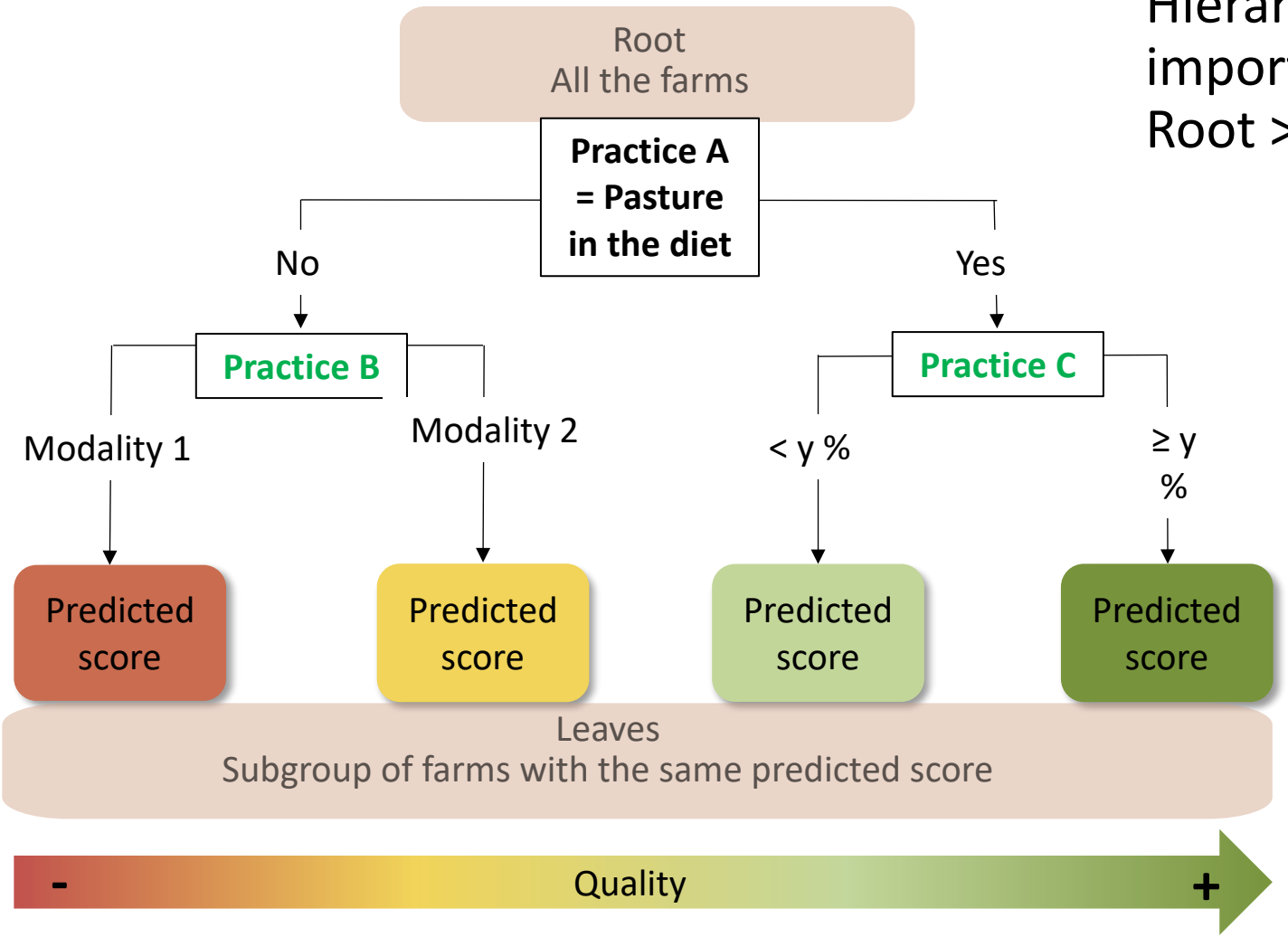


Identify the **combinations of practices** that lead to **the best quality scores** **+ synergies/trade-offs**

→ ***With regression trees***

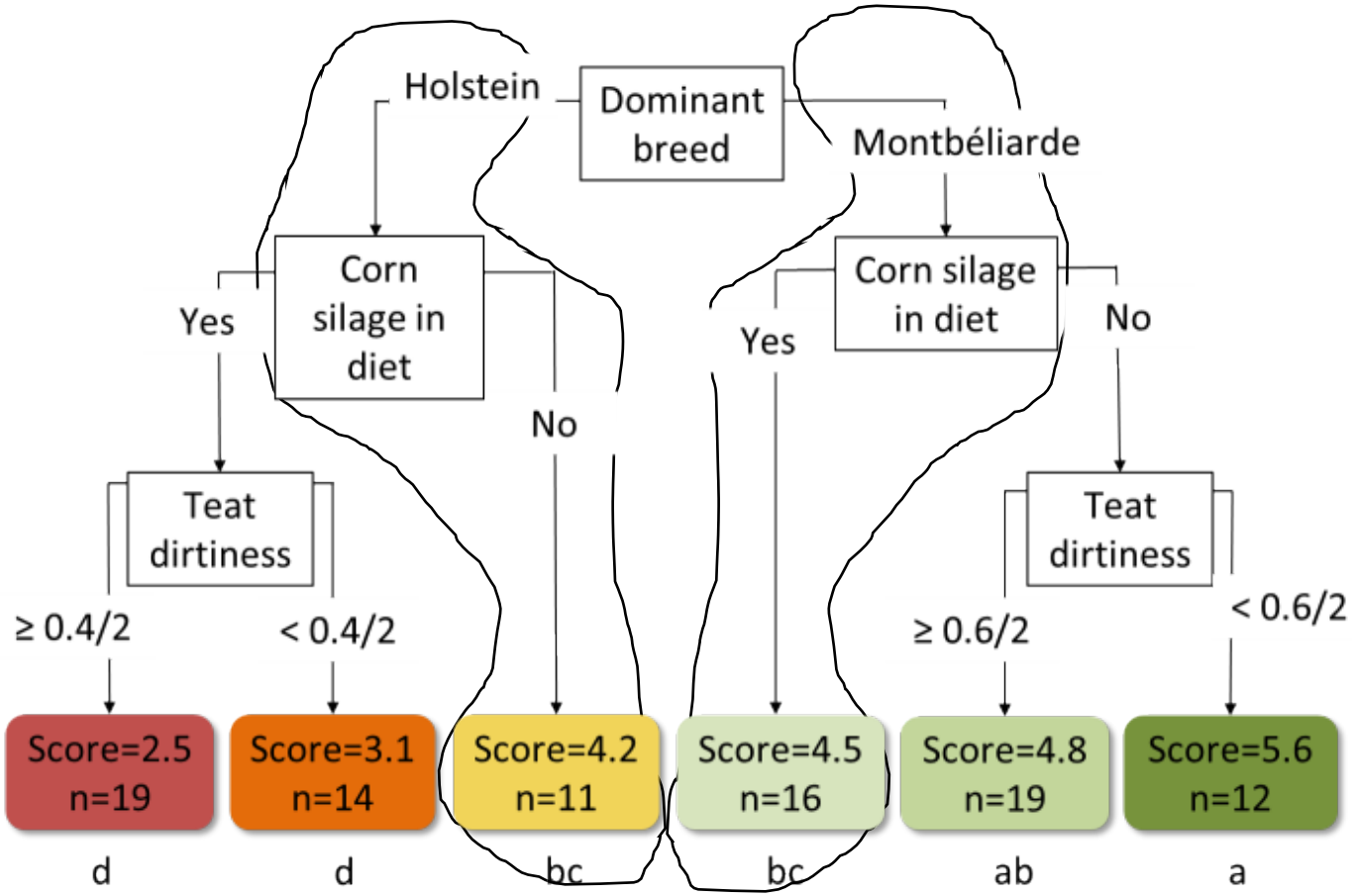
Regression tree - method principle





Hierarchical structure with importance of practices: Root > leaves

Effect of combinations of practices on cheese overall quality score

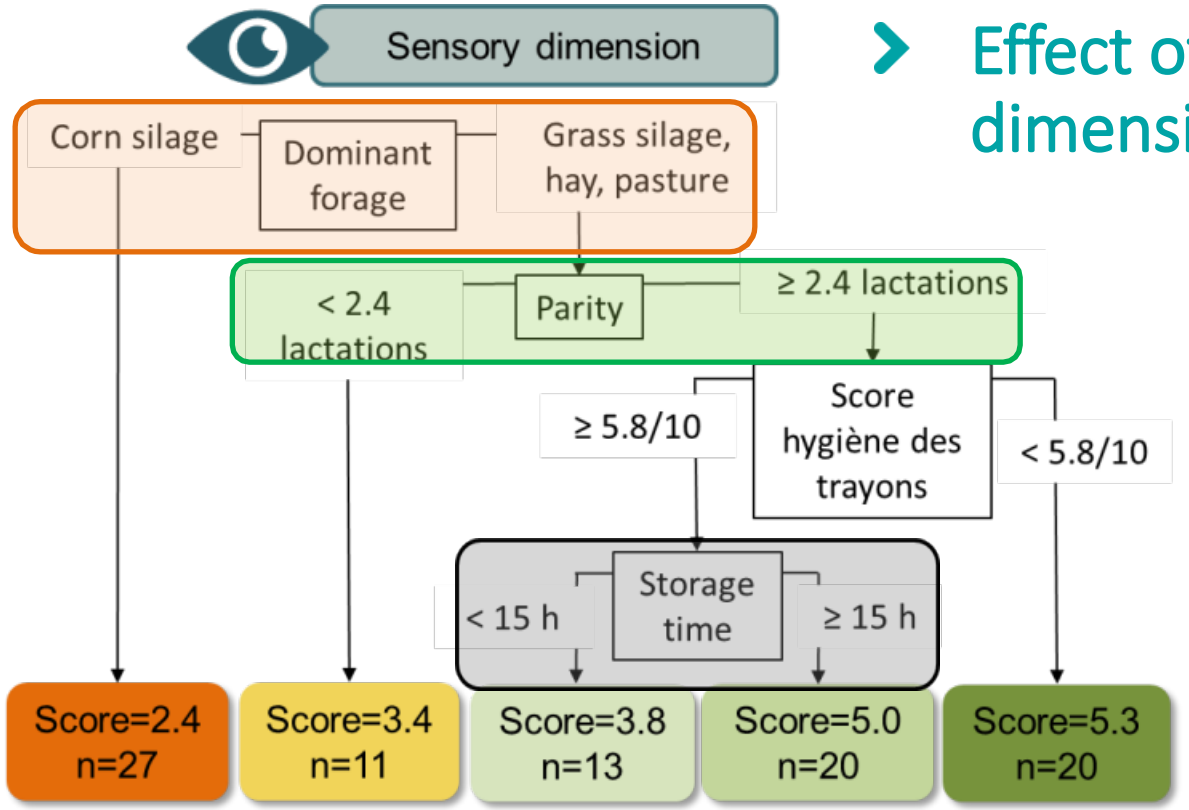


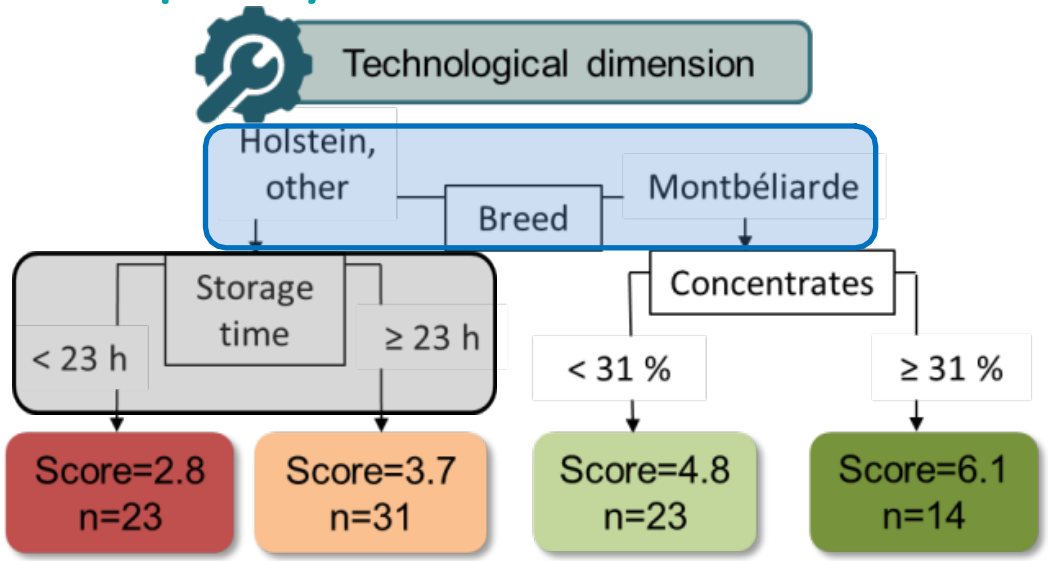
- Ranking of practices in terms of importance
- Identification of combination of practices that achieve the best score
- Different ways to achieve similar score

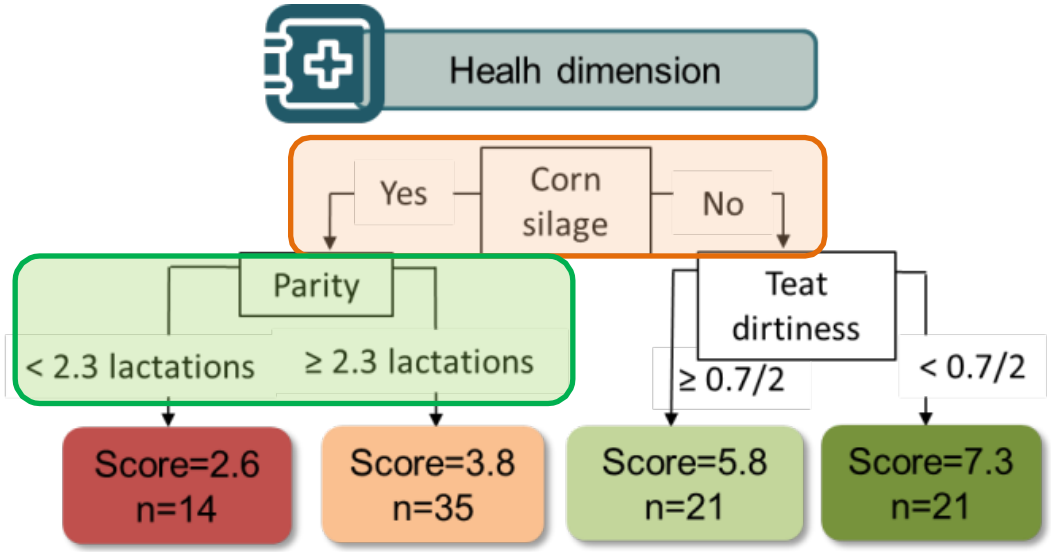
➔ Different combinations of practices

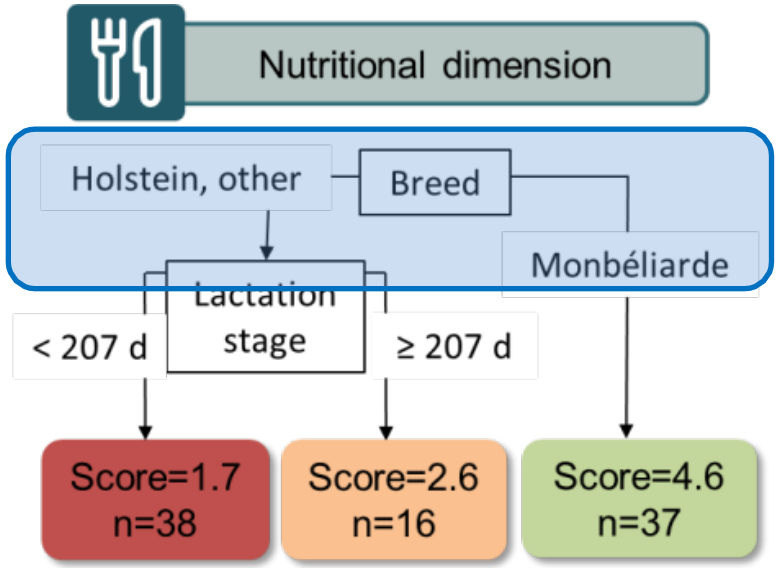
➔ Need to know the future of the milk to adapt the practices

Effect of combinations of practices on the dimensions' quality scores







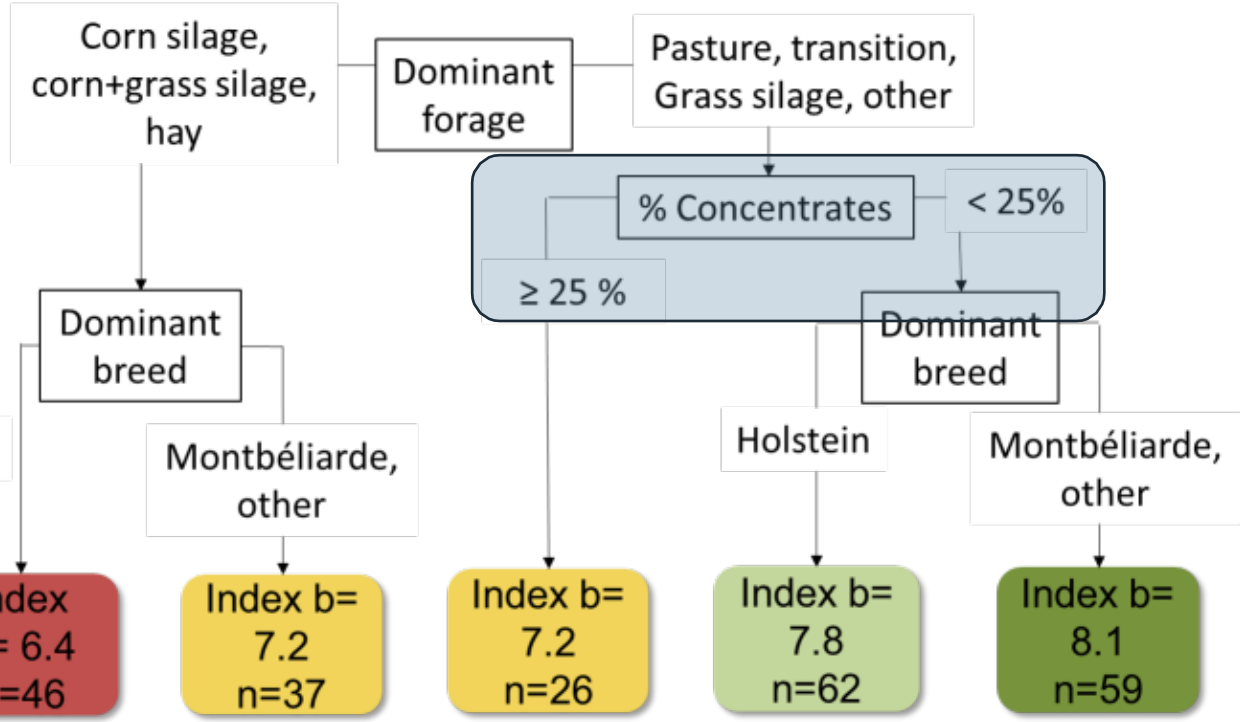


- **Specific combinations**
- Two important practices (forage+breed)
- Only **synergistic effects**

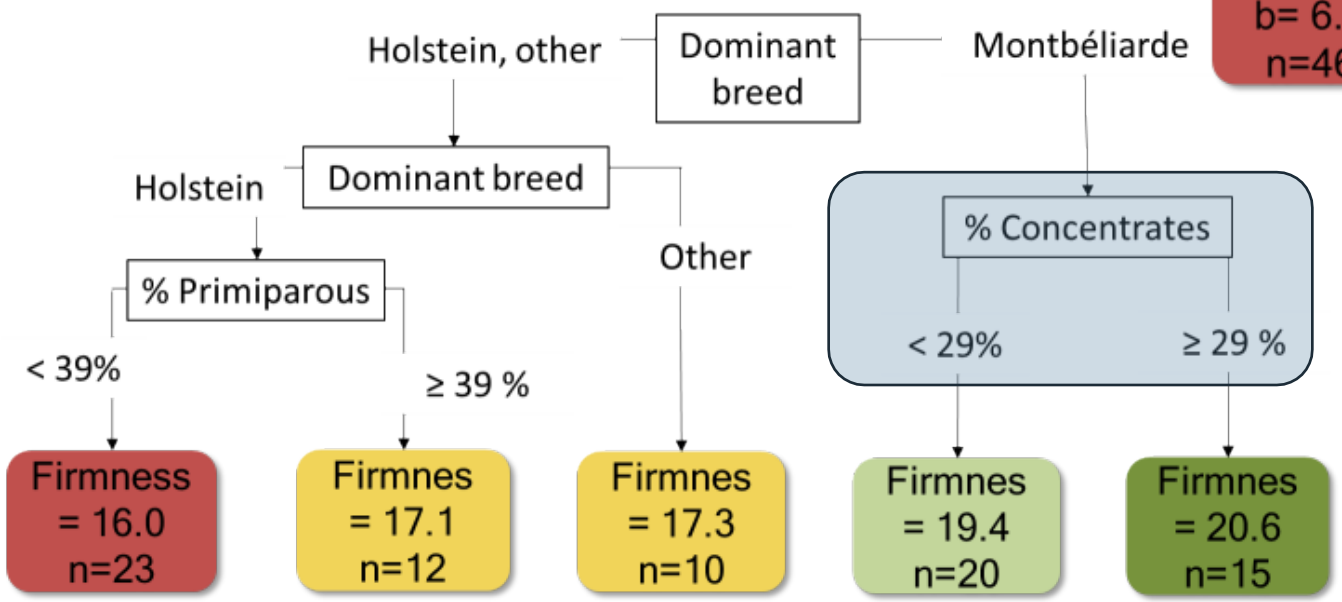
Effect of combinations of practices on initial milk analyses

Initial database compiled with a previous database

Yellow index b



Gel firmness (IF)



Regression trees developed for 33 analyses

- **Specific combinations** for each analysis
- A same practice can have an improving effect on some milk analyses and a deteriorating effect on others

➔ **Antagonist effects**

Conclusion

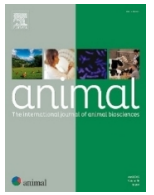
Regression trees allow to:

- **Rank the practices** in terms of importance
- Identify the **combinations of practices that lead to the best results**
- Identify that **different ways can achieve similar score**
- Identify **synergies or antagonisms** effects of farming practices among indicators/dimensions

Use of regression trees on the field:

- Easy to understand → transferable
- Identify threshold values / modalities to improve quality
- Need to be improve with larger and more diverse databases

Thank you for your attention



Rey-Cadilhac et al. (2021):
https://doi.org/10.1016/j.animal.2021.100264

Rey-Cadilhac et al. (2023):
https://doi.org/10.3168/jds.2022-22486