Effects of housing or feeding practice in dairy goats estimated by the INRATION®V5 feeding system

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Background

- ✓ Optimal nourishing requires accurate rationing system
- ✓ Update in 2018 INRA feeding systems for ruminants

Development of support software INRATION®V5

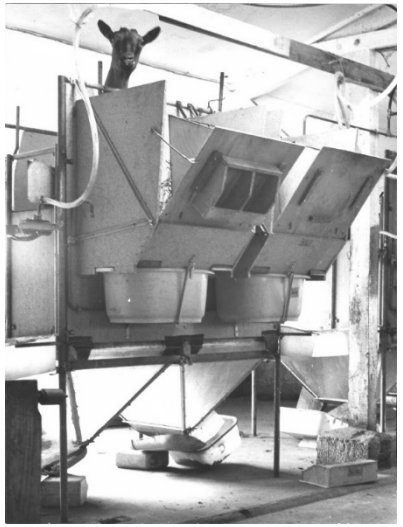
Aim of the study

Are some outputs of this software INRATION®V5 in agreement with observed data on dairy goats obtained at MoSAR's unit?

❑ Effects of housing or feeding practice on saturation coefficient and predicted milk yield

Two types of housing

Individual crates (CRA)



Collective pens (PEN)

Feeding practice

✓Separate feed ingredients (SF)

✓Total Mixed ration (TMR)

✓ **Types of roughages used:**

- Alfalfa hay
- Grassland hay
- Corn silage

fed alone or associated with

- Sugarbeet pulp silage or dehydrated alfalfa

✓ **Concentrates:**

Very different (rich in starch or fibre)

Data processing:

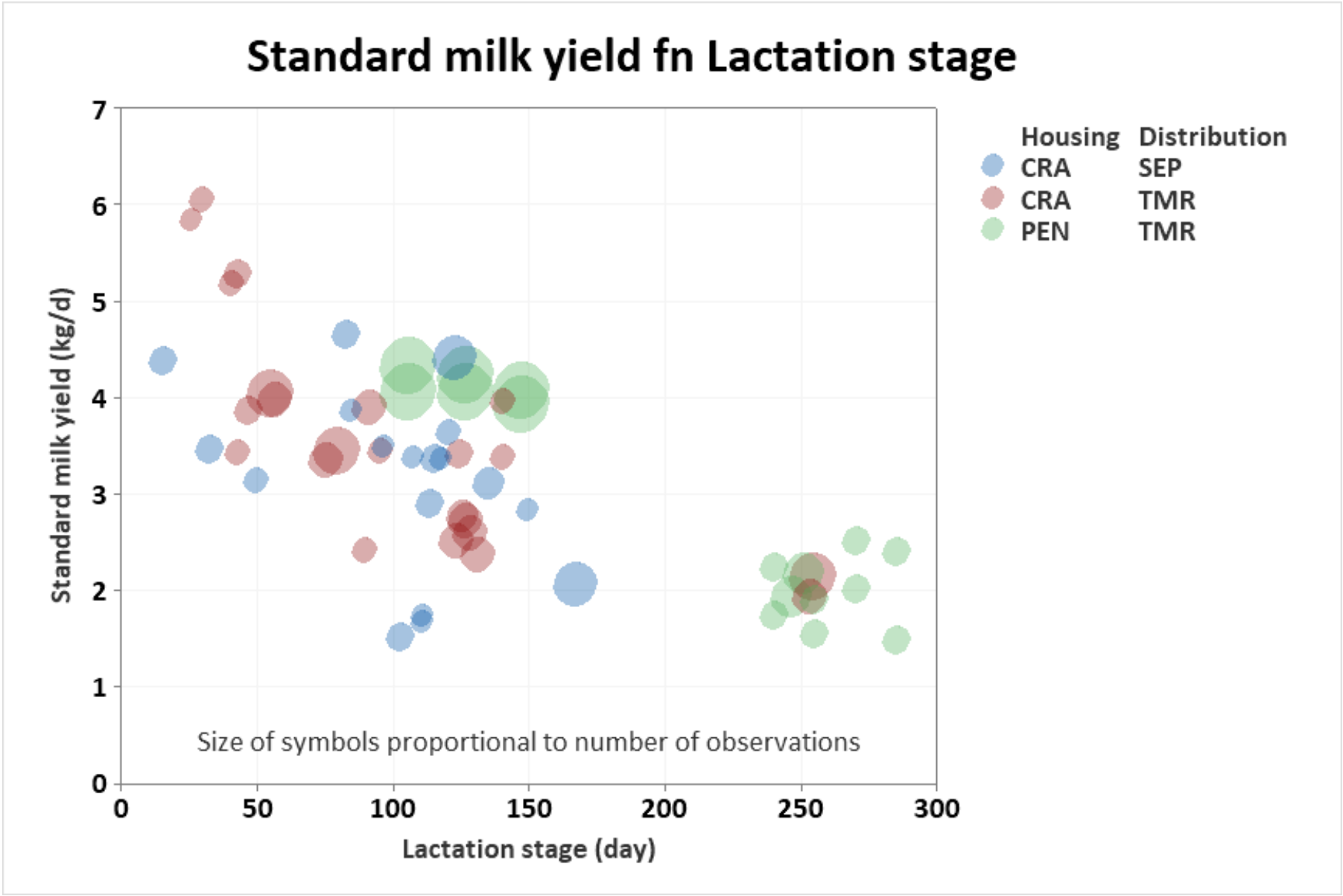
selection from several trials on dairy goats (1978-2021)

- ✓ Lactation
- ✓ Individual measurements of feed intake
- ✓ Refusals > 7 %

- ❑ Pool of individual weekly mean values in groups
  - Same basal roughage diet
  - Similar stage of lactation
  - Same housing
  - Same feeding practice

❑ 659 observations in 57 groups

	CRA	PEN
SEP	18 (129)	
TMR	23 (242)	16 (288)


Standard milk yield fn Lactation stage
Standard milk yield (kg/d)
Lactation stage (day)
0
1
2
3
4
5
6
7
0
50
100
150
200
250
300
Size of symbols proportional to number of observations
Housing Distribution
CRA SEP
CRA TMR
PEN TMR

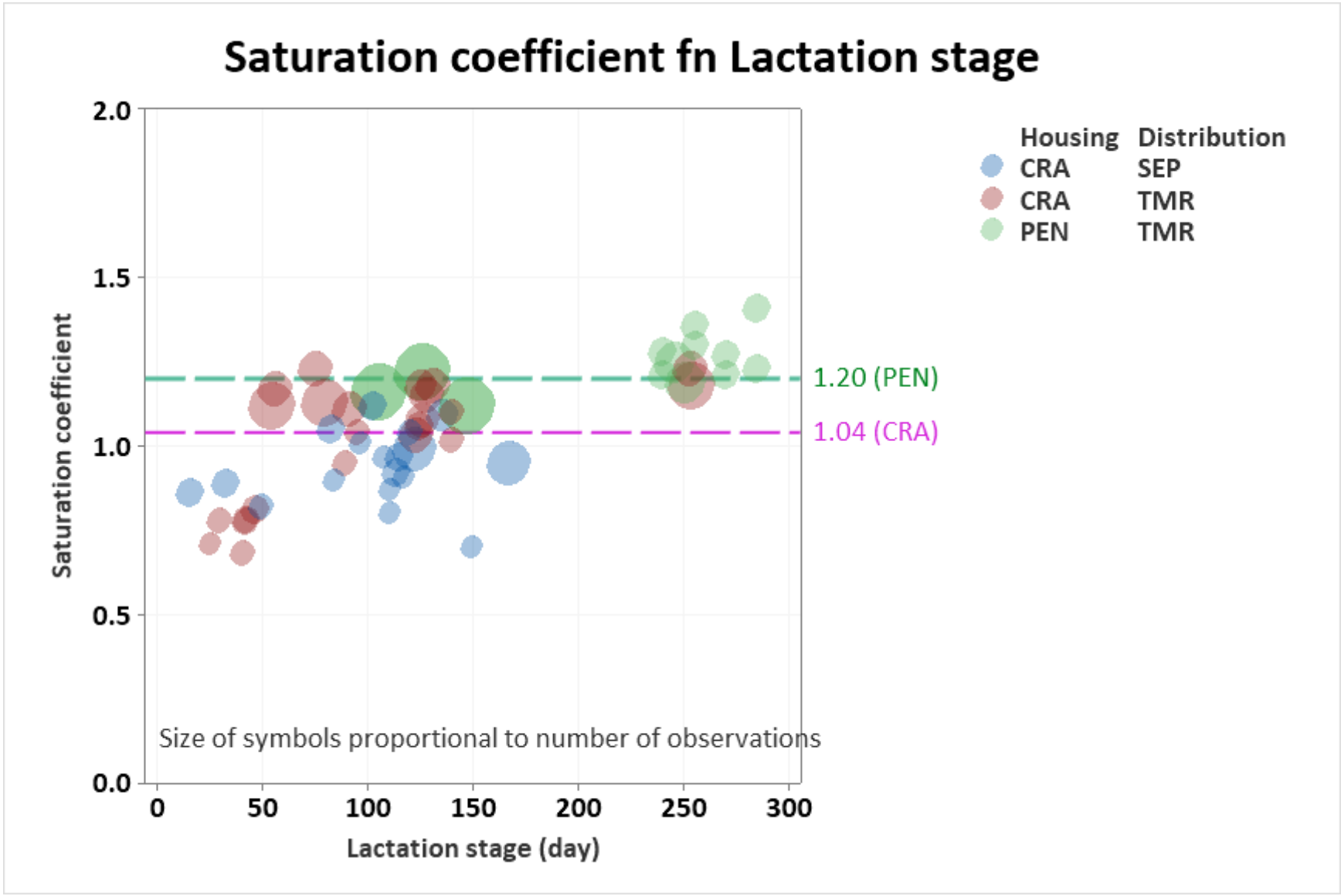
1st output of INRATION®V5 feeding system:
Saturation level

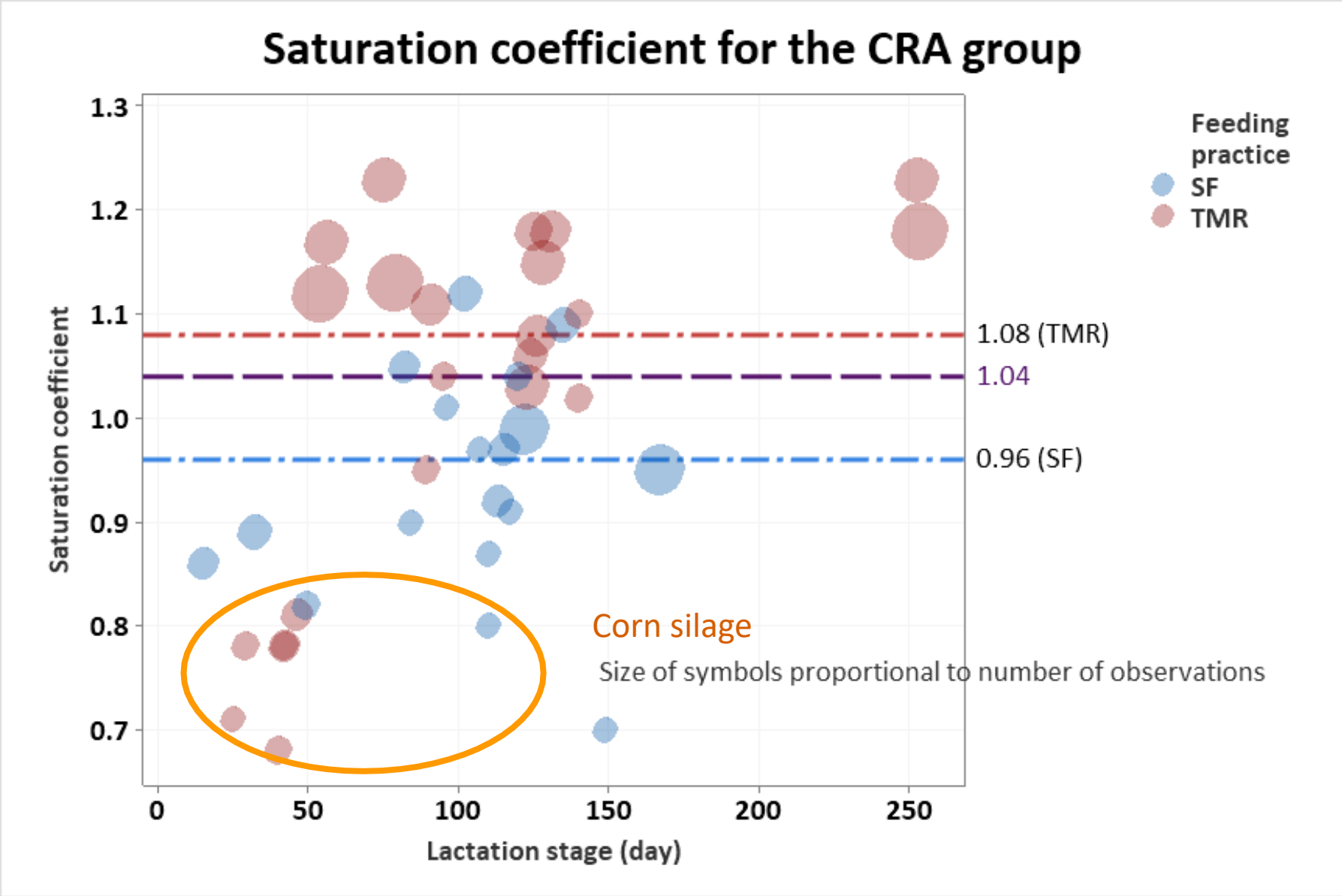
Definition

Dietary fill value/Intake capacity*

*corrected by the level of refusals (high sorting ability of dairy goats)

(Sauvant et al., 2021, INRAE PA)


Saturation coefficient fn Lactation stage
Saturation coefficient
2.0
1.5
1.0
0.5
0.0
0
50
100
150
200
250
300
Lactation stage (day)
Housing Distribution
CRA SEP
CRA TMR
PEN TMR
1.20 (PEN)
1.04 (CRA)
Size of symbols proportional to number of observations


Saturation coefficient for the CRA group
Saturation coefficient
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0
50
100
150
200
250
Lactation stage (day)
Feeding practice
SF
TMR
1.08 (TMR)
1.04
0.96 (SF)
Corn silage
Size of symbols proportional to number of observations

Saturation coefficient

✓ **Accuracy for the CRA group (1.04 ± 0.021, ngroups = 41)**

- **SF (0.96 ± 0.035, n = 18)**
- **TMR (1.08 ± 0.026, n = 23)**
- **Corn silage (0.80 ± 0.108, n = 8)**

✓ **Underestimation for the PEN group (1.20 ± 0.024, n = 16)**

Link with the Caprinut Data base?

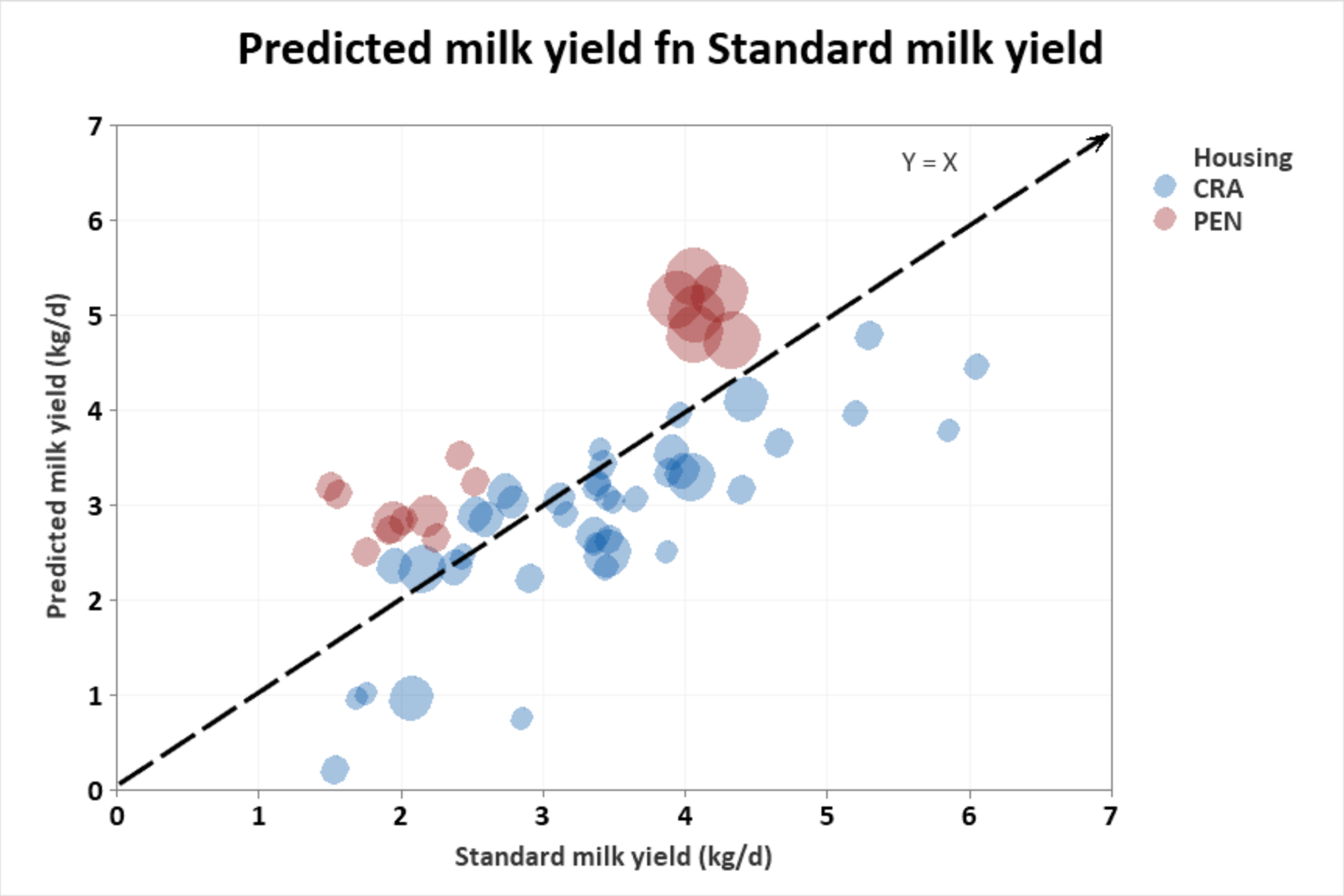
2nd output of INRATION®V5 feeding system:

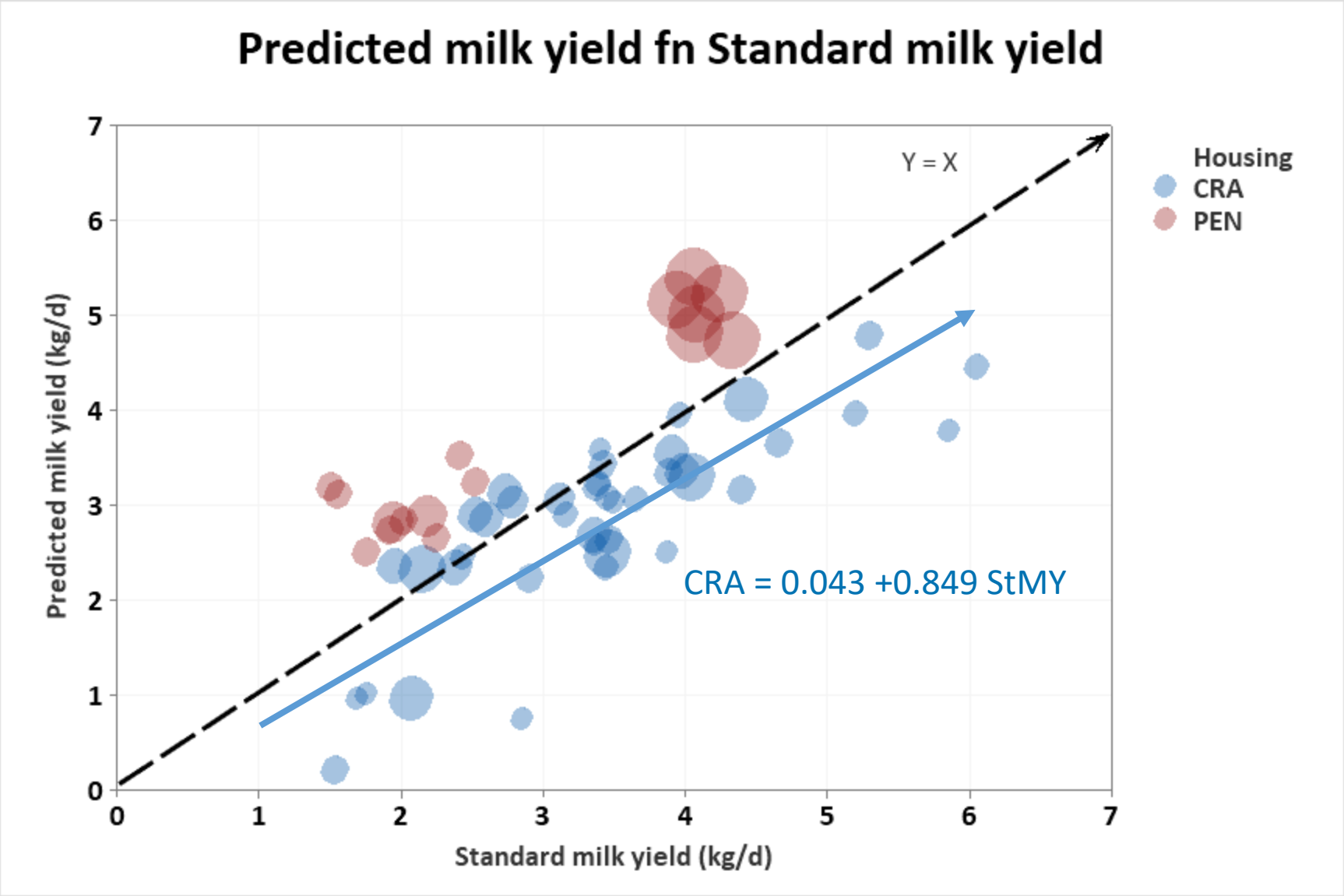
Predicted milk yield

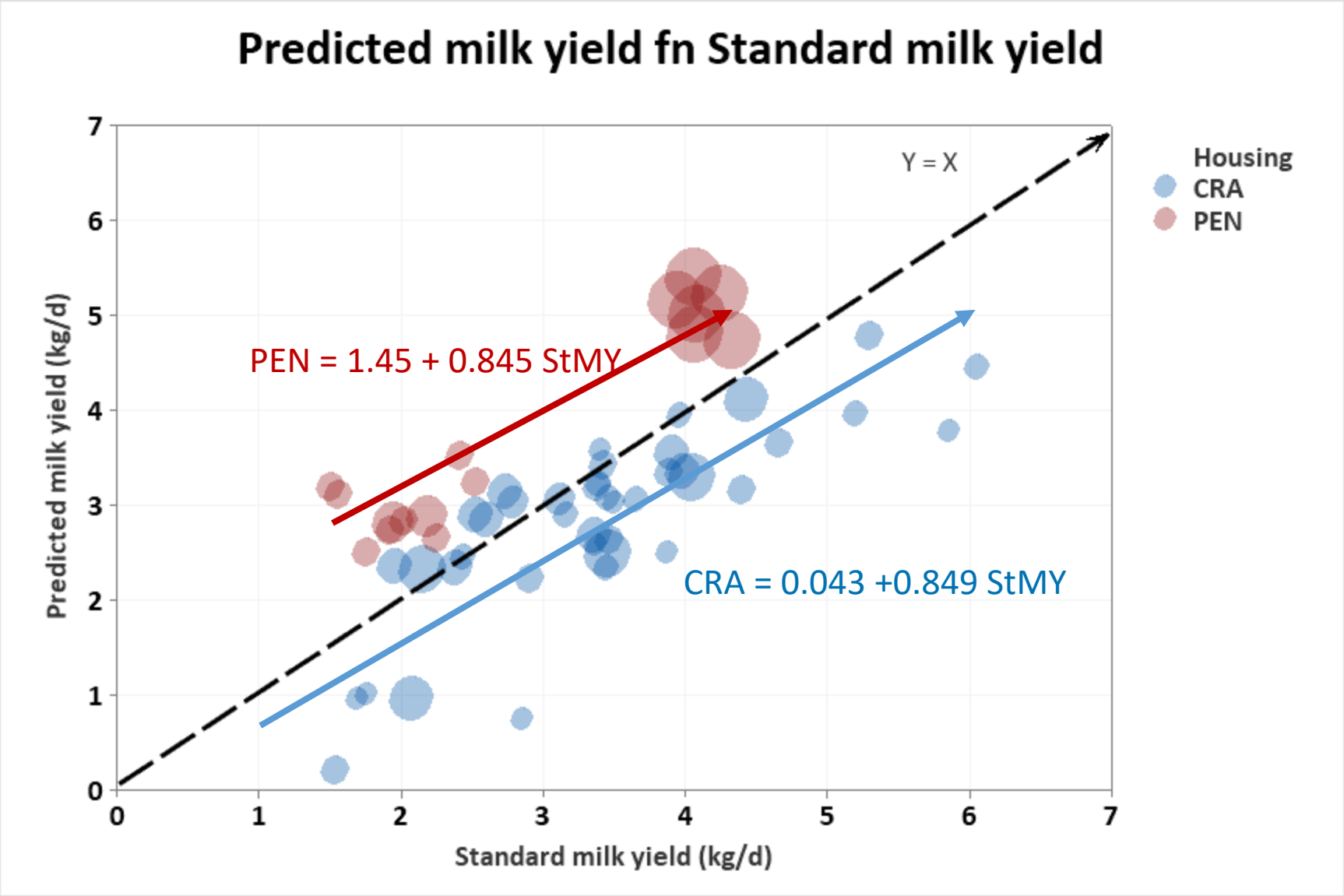
Standard milk yield observed was similar for both groups:

CRA: 3.28 ± 0.179 kg/d

PEN: 3.42 ± 0.203 kg/d


Predicted milk yield fn Standard milk yield
Y = X
Housing
CRA
PEN
Predicted milk yield (kg/d)
Standard milk yield (kg/d)
0
1
2
3
4
5
6
7


Predicted milk yield fn Standard milk yield
Predicted milk yield (kg/d)
Standard milk yield (kg/d)
Y = X
CRA = 0.043 +0.849 StMY
Housing
CRA
PEN
0
1
2
3
4
5
6
7


Predicted milk yield fn Standard milk yield
Predicted milk yield (kg/d)
Standard milk yield (kg/d)
0
1
2
3
4
5
6
7
Y = X
PEN = 1.45 + 0.845 StMY
CRA = 0.043 +0.849 StMY
Housing
CRA
PEN

Predicted milk yield

✓Underestimation for the CRA group:

- **Predicted: 2.83 ± 0.174 kg < Observed: 3.28 ± 0.179 kg/day**

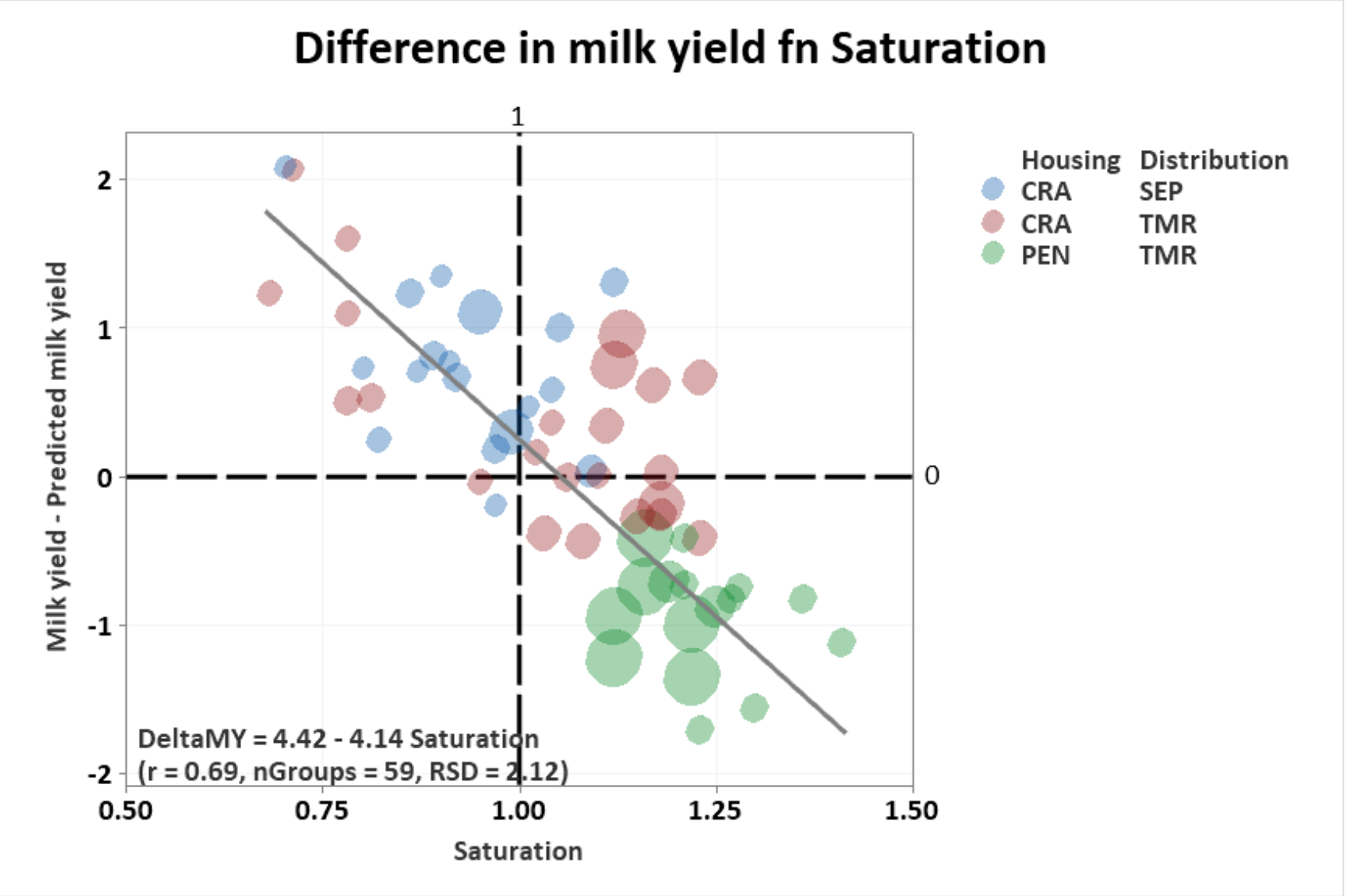
Lack of activity of groups in the CRA groups →
overestimation of non-producing requirements?

✓Overestimation for the PEN group

- **Predicted: 4.35 ± 0.197 kg < Observed: 3.42 ± 0.203 kg/day**

Higher intake observed than predicted →
Increase in passage rate with decrease in the nutritive value of diets

Genetic of the herd: CRA trials (1978-2017), PEN trials (2018-2021)


Difference in milk yield fn Saturation
Milk yield - Predicted milk yield
Saturation
1
0
2
1
0
-1
-2
0.50
0.75
1.00
1.25
1.50
Housing Distribution
CRA SEP
CRA TMR
PEN TMR
DeltaMY = 4.42 - 4.14 Saturation
(r = 0.69, nGroups = 59, RSD = 2.12)

In conclusion,

- Housing has an effect on saturation coefficient and predicted milk yield
- Saturation coefficient and predicted milk yield seem to be linked
- This test on a large number of data and diets is quite promising
- It needs to be extended on other diets, in different housing and feeding systems and in other locations

Acknowledgments,

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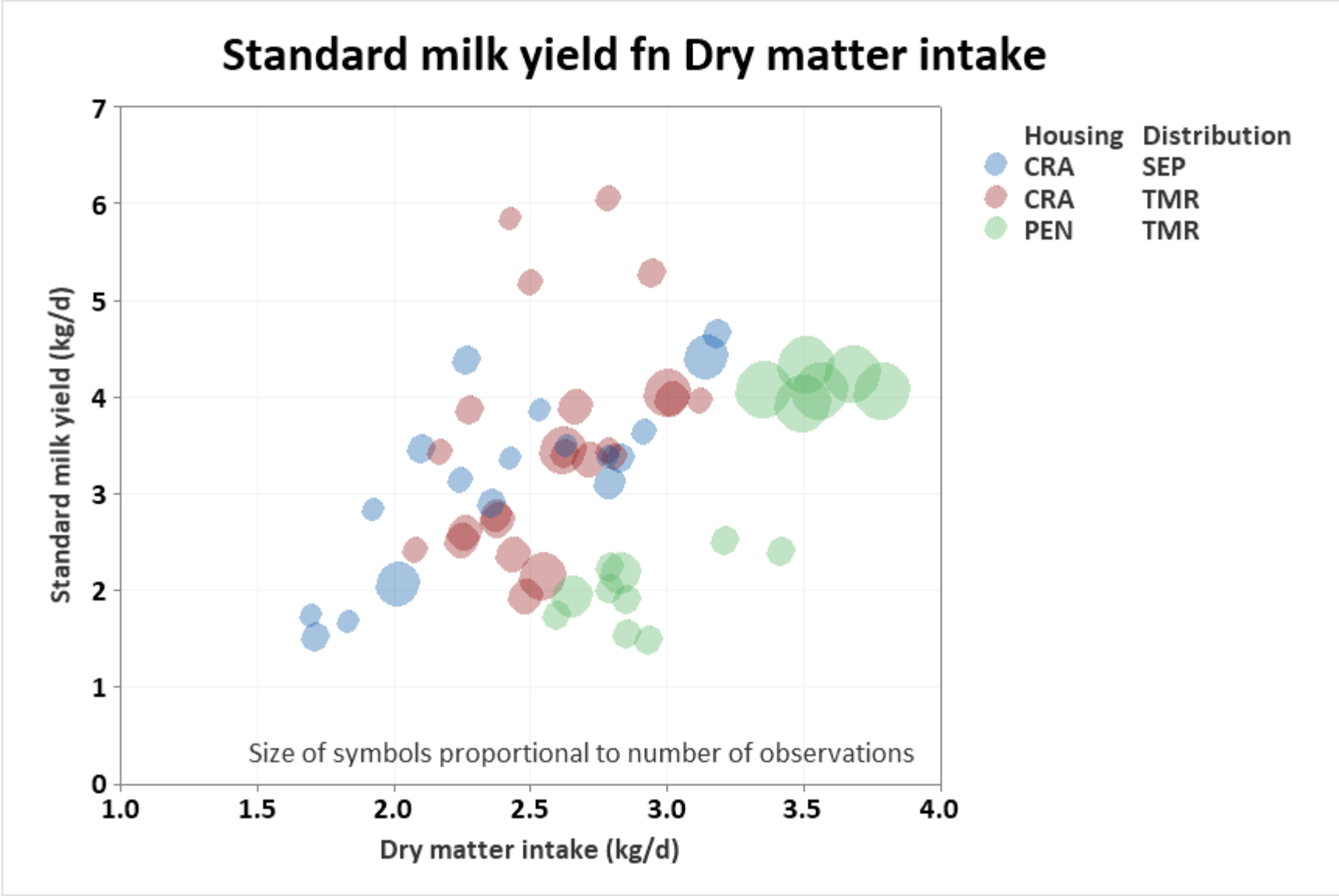
Standard milk yield fn Dry matter intake
Standard milk yield (kg/d)
Dry matter intake (kg/d)
0
1
2
3
4
5
6
7
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Housing Distribution
CRA SEP
CRA TMR
PEN TMR
Size of symbols proportional to number of observations