How does stress due to water restriction and parasitic infection affect plasma hormone levels in high and low tolerance Rasa Aragonesa ewes fed with sainfoin?

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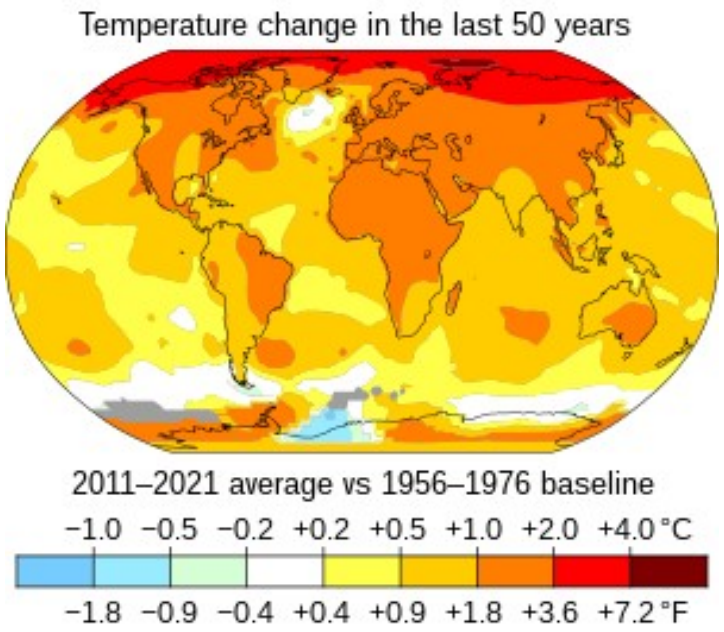
CENTRO DE INVESTIGACIÓN Y TECNOLOGÍA AGROALIMENTARIA DE ARAGÓN

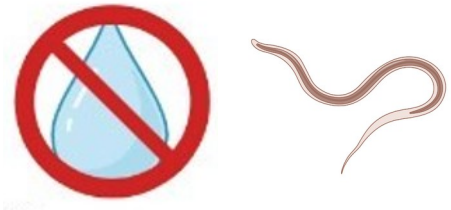
Introduction



Climate change increases exposure to **<u>environmental stressors</u>**:

- **Heat**
- **Drought**
- **Parasitic diseases** →

Introduction: Why Use Agro-Industrial By-Products?



Animal stress responses involve

Activating hormonal pathways

SAINFOIN

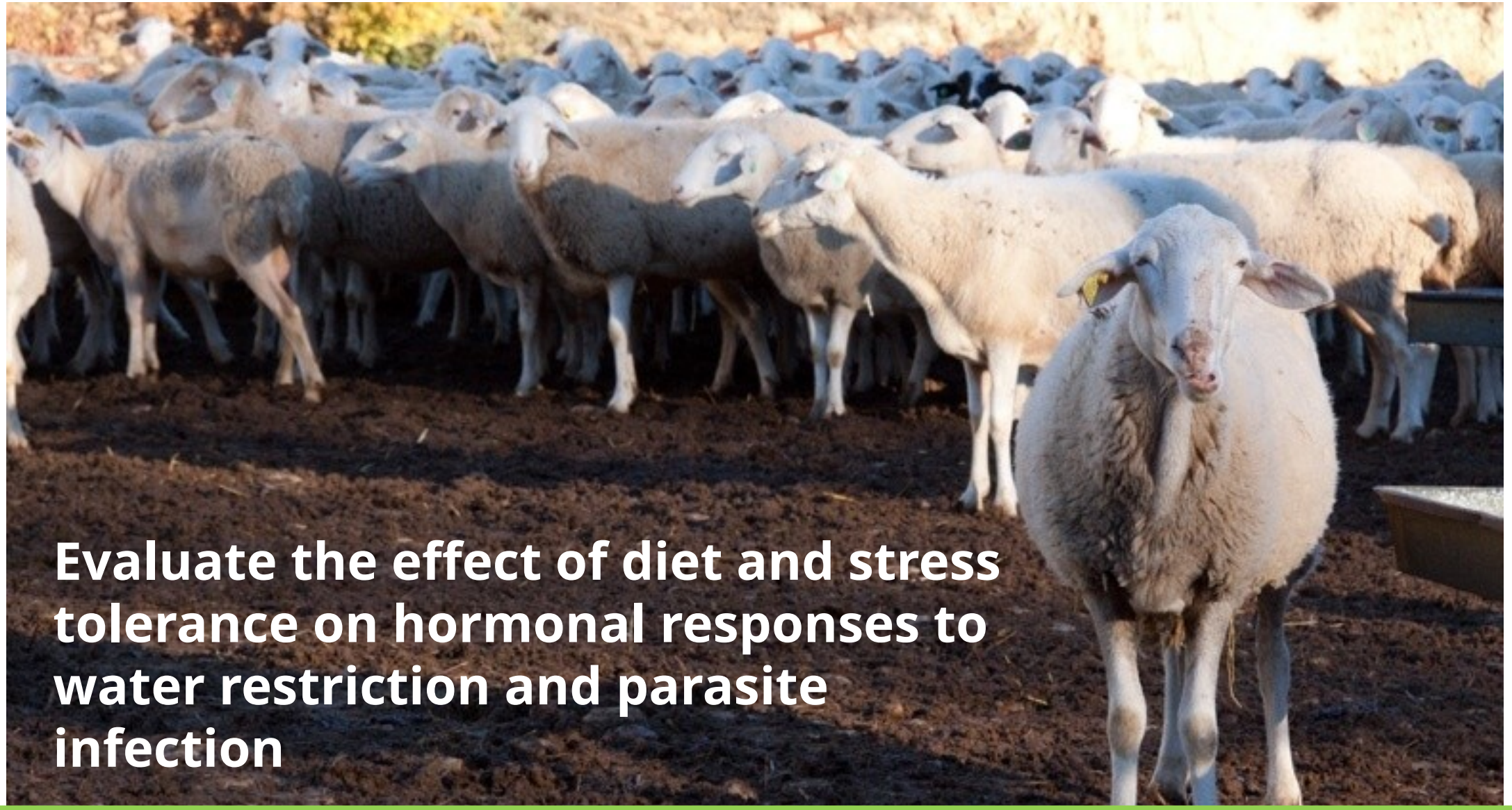
Onobrychis viciifolia

Biomarker associated to stress

- ✓ **Cortisol**
- ✓ **Dehydroepiandrosterone (DHEA)**
- ✓ **DHEA-s**
- ✓ **Neutrophil-Lymphocyte ratio**

- Multianual legume
- Widely used in Mediterranean areas
- Condensed tannins → *Antiparasitic*
- Polyunsaturated fatty acids → *Inhance inmune function*
- Antioxidants → *Stress-protective*

OBJECTIVE



Evaluate the effect of diet and stress tolerance on hormonal responses to water restriction and parasite infection

METHODOLOGY: Experimental design

Previous trial

5 days

Hemogram
Metabolites
Hormones: Cortisol, DHEA & DHEA-S

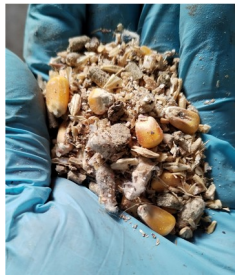
202 Rasa Aragonesa ewes

High tolerance
(n 20)

Low tolerance
(n 20)

Neutrophil - Lymphocyte ratio (**N/L**)
Low molecular relatedness

CONTROL
(n 10)



SAINFOIN
(n 10)

CONTROL
(n 10)

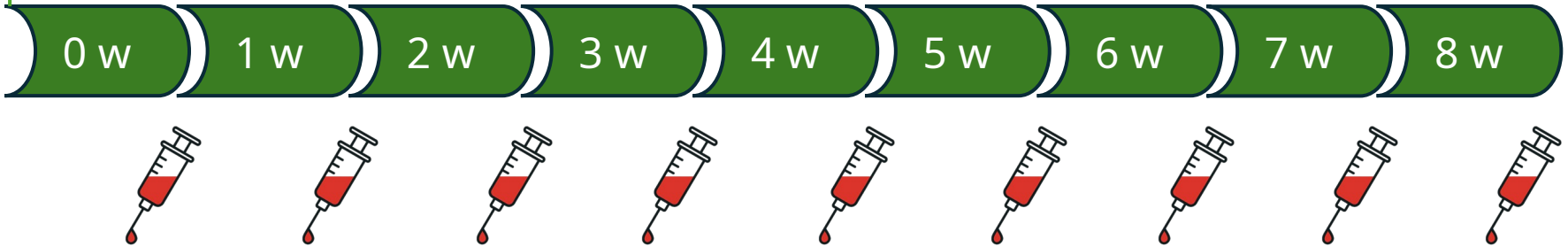
SAINFOIN
(n 10)

Ewe/day
400 g
1 kg straw

METHODOLOGY: Sampling

L3 *H. contortus*

Partial water restriction
40%

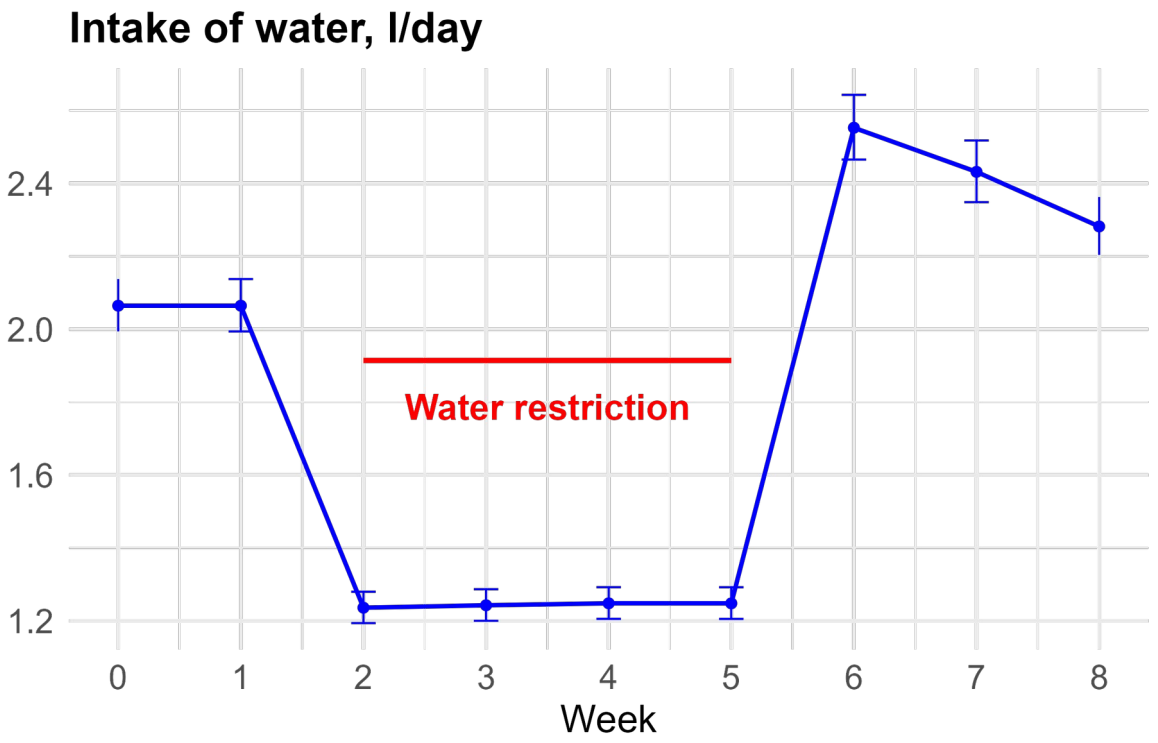


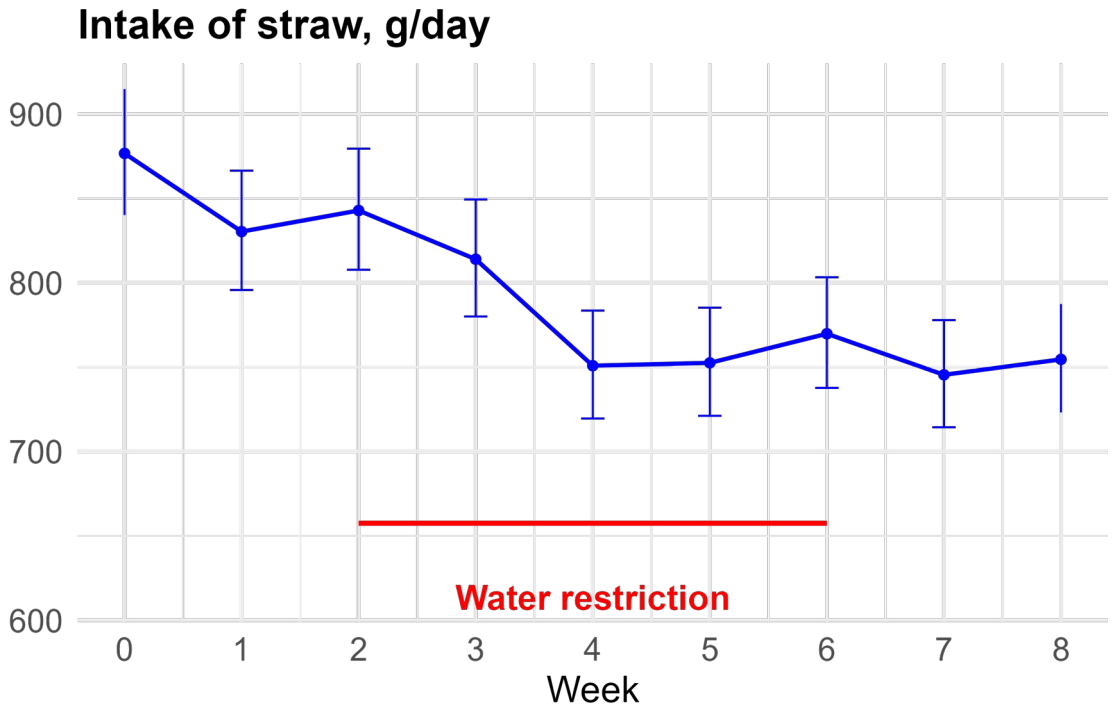
Daily water-feed intake

Hemogram
Metabolites
Hormones: Cortisol, DHEA & DHEA-S

RESULTS

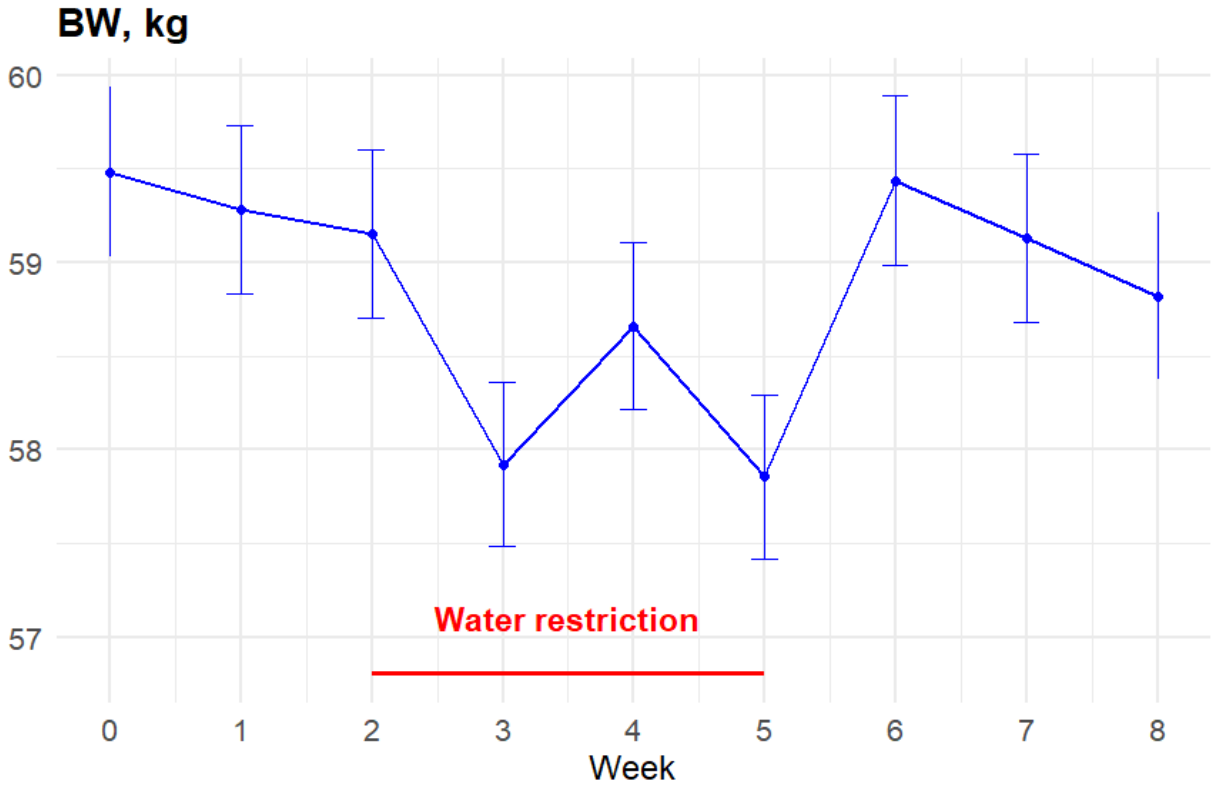
NO effect: Diet
Stress tolerance

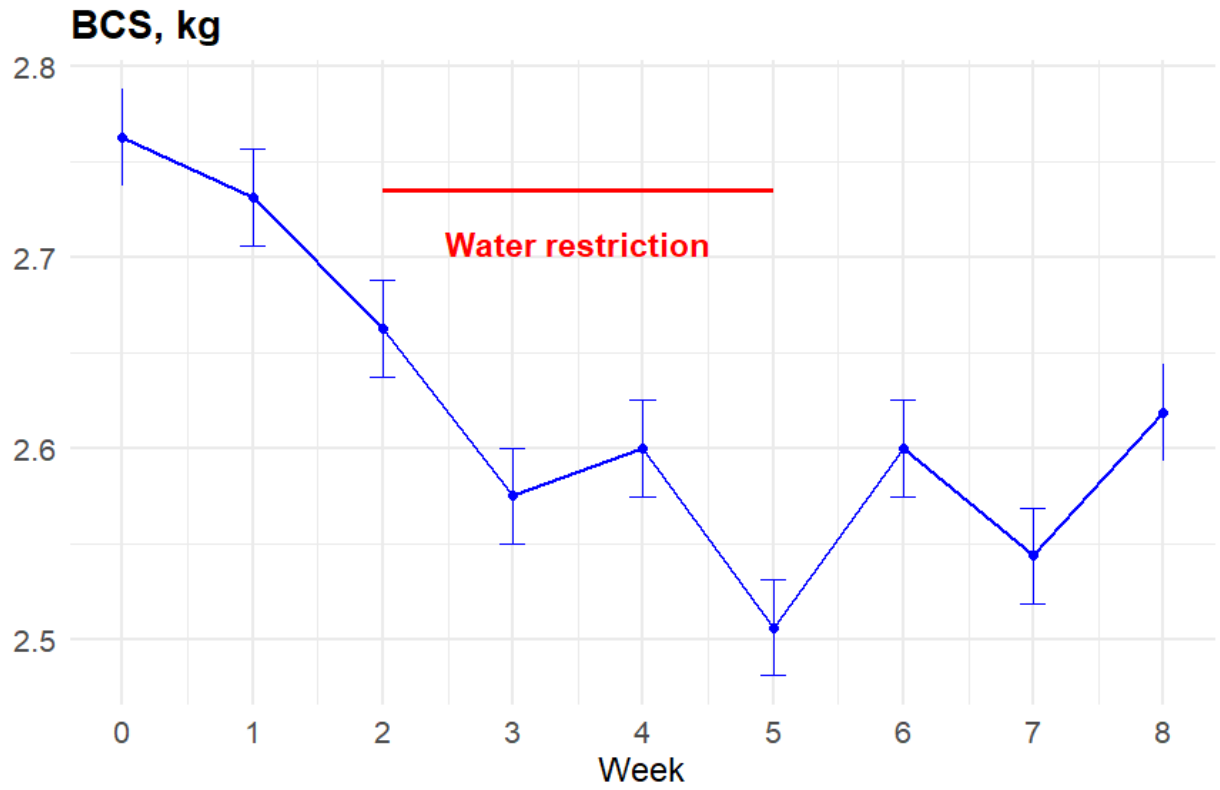




RESULTS

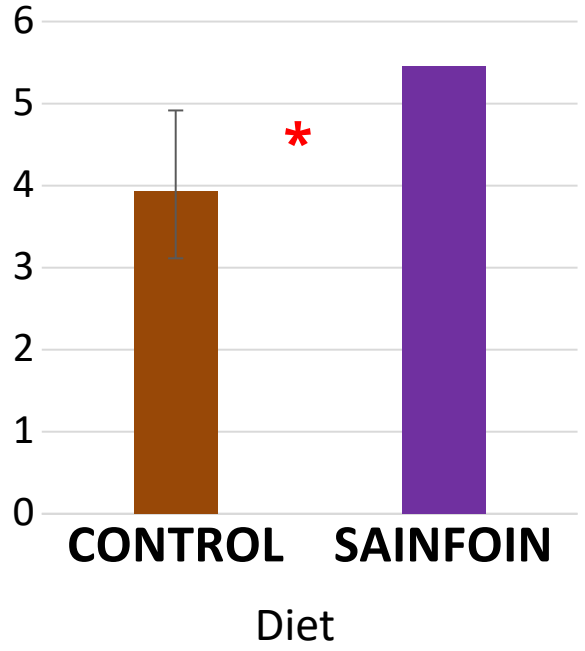
NO effect: Diet
Stress tolerance

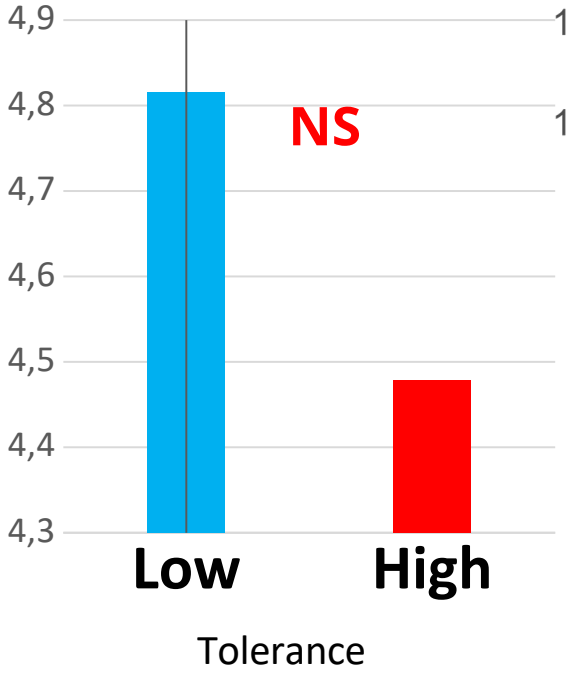


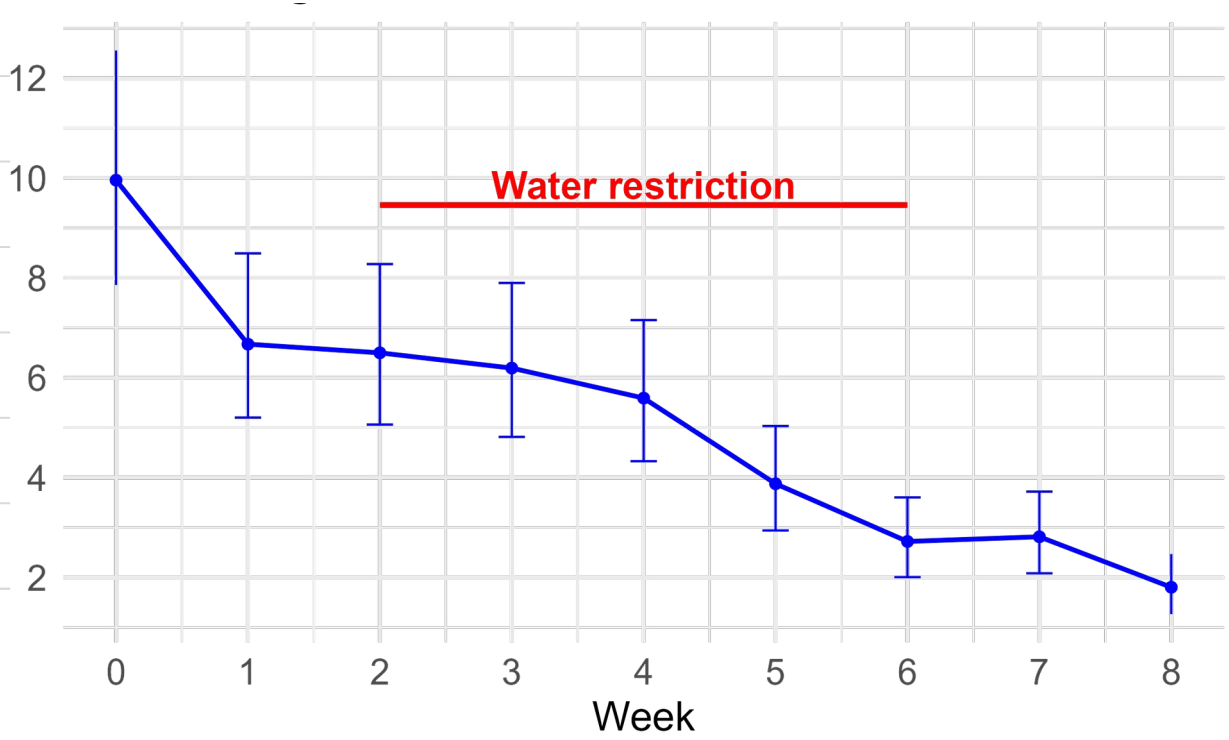


RESULTS

CORTISOL, ng/ml

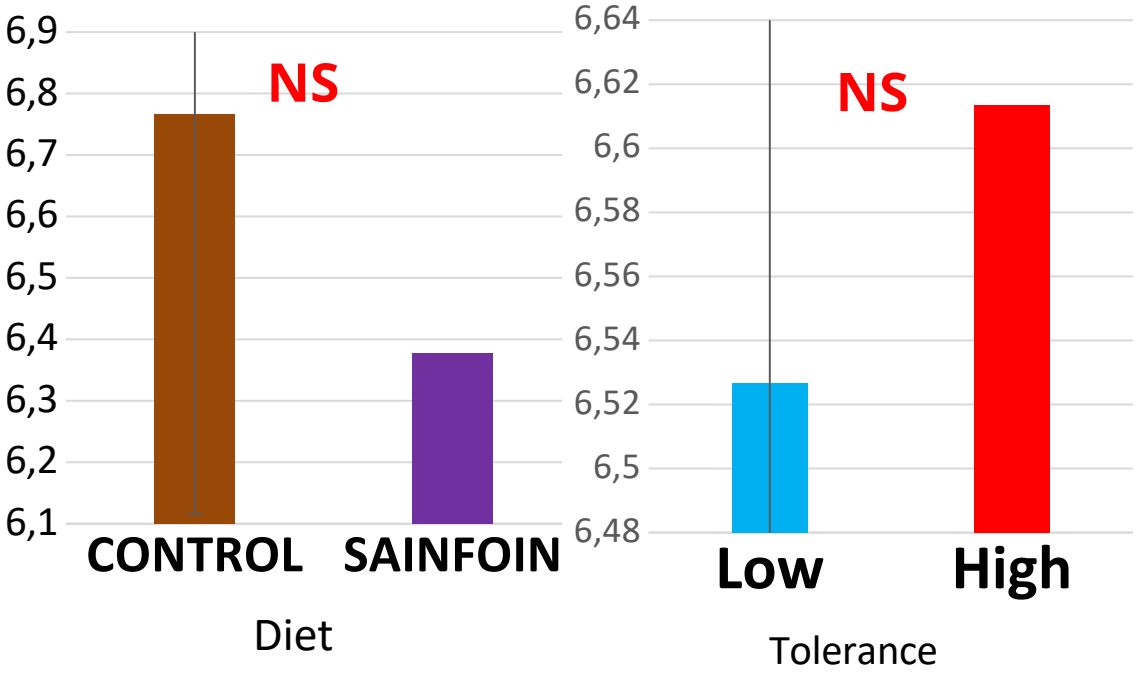


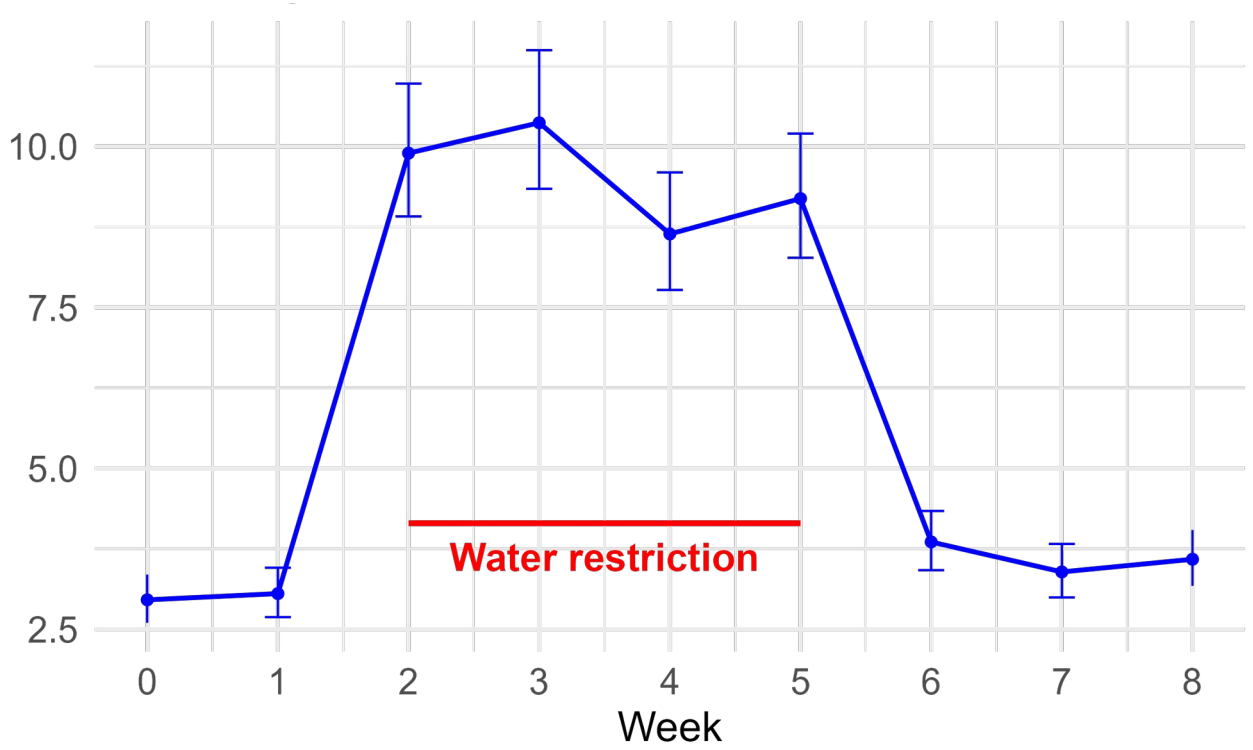




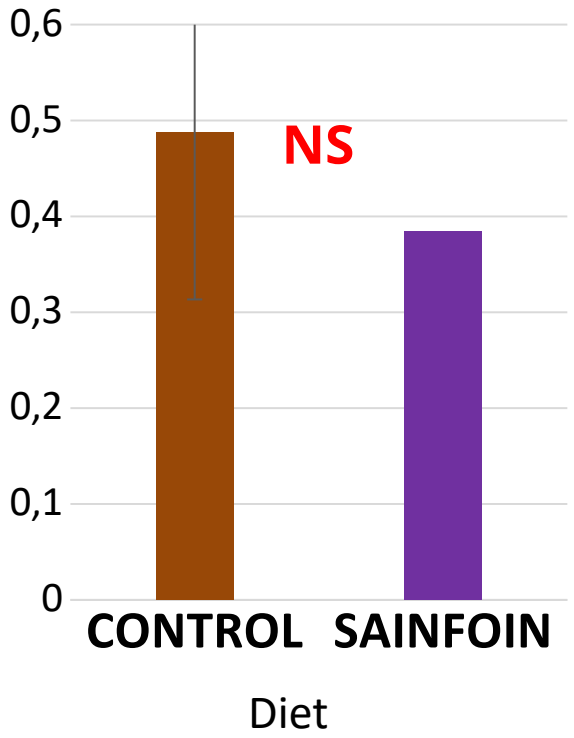
RESULTS

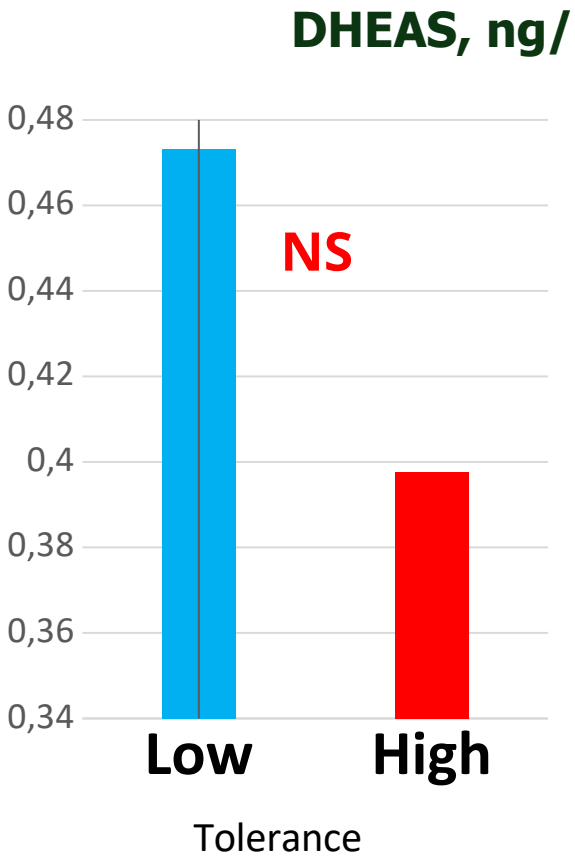
DHEA, ng/ml

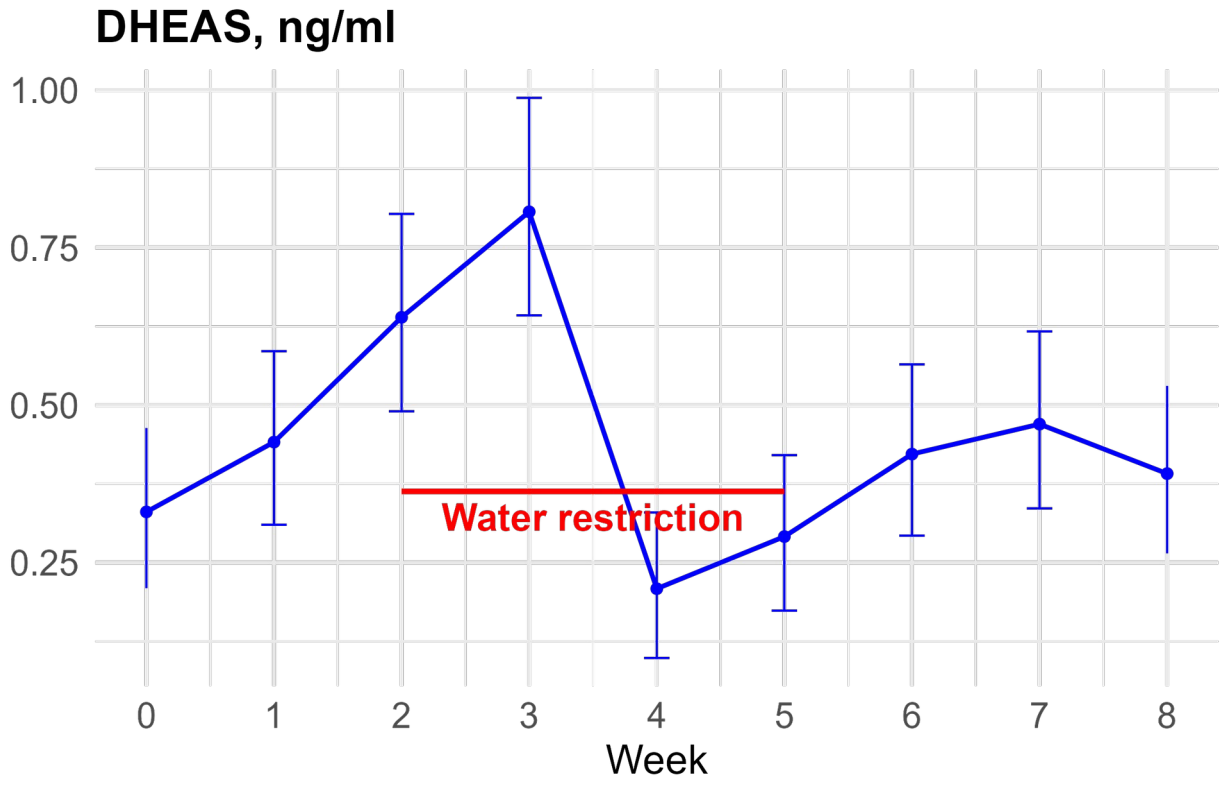




RESULTS


0,6
0,5
0,4
0,3
0,2
0,1
0
NS
CONTROL
SAINFOIN
Diet


DHEAS, ng/ml
0,48
0,46
0,44
0,42
0,4
0,38
0,36
0,34
NS
Low
High
Tolerance


DHEAS, ng/ml
1.00
0.75
0.50
0.25
Water restriction
0
1
2
3
4
5
6
7
8
Week

CONCLUSIONS

- ✓ Diet and stress tolerance did not affect most of the hormones,
  → except SAINFOIN (increased plasma cortisol)
- ✓ **Cortiso**l levels dreceased over time, possibly reflecting acclimation.
- ✓ Water restriction inceased plasma **DHEA**, suggestion a protective mechanism.
- ✓ No consistent pattern of **DHEA-s** throughout the trial

Next step: Associate different biomarkers to the genetic background

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Thank You!

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