

FORAGING BEHAVIOUR BY HORSES FACING A TRADE-OFF BETWEEN INTAKE RATE AND DIET QUALITY

Edouard N, Fleurance G, Dumont B, Baumont R, Duncan P

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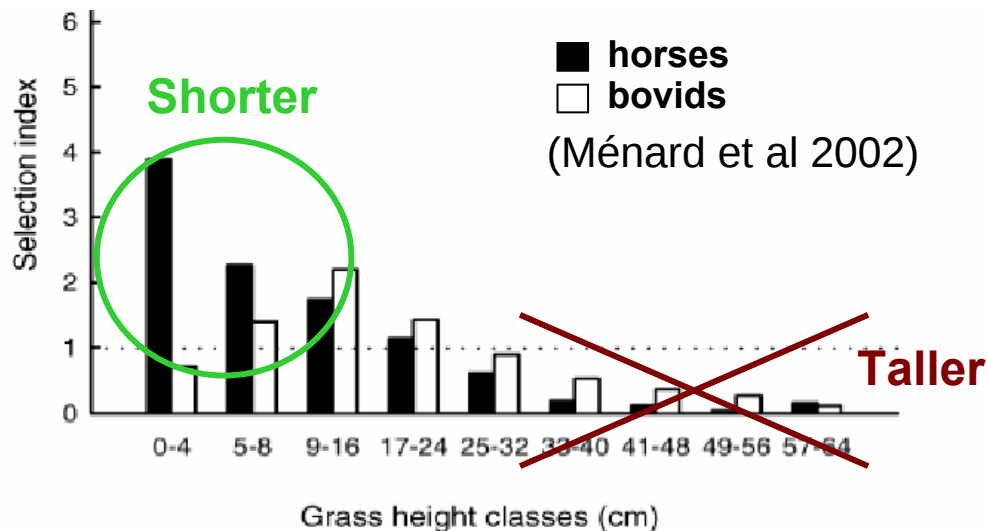

Equids number
 (1 million in France, OESC 2007)



=> Grass: 70% of the diet (leisure, heavy horses)
 (Martin-Rosset et al 1984)

Understanding the principles governing their **foraging behaviour** important for
 the **management of animals & grasslands**

Natural grasslands (≠height & quality):

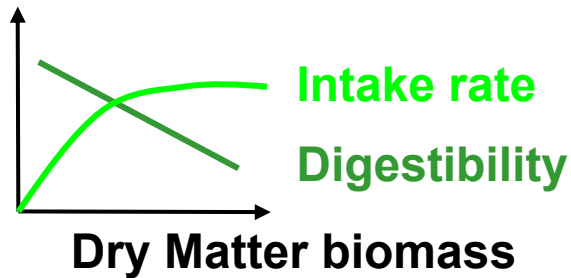


Determinants?



Sward features?
 (Fleurance et al 2005)

For grazers:

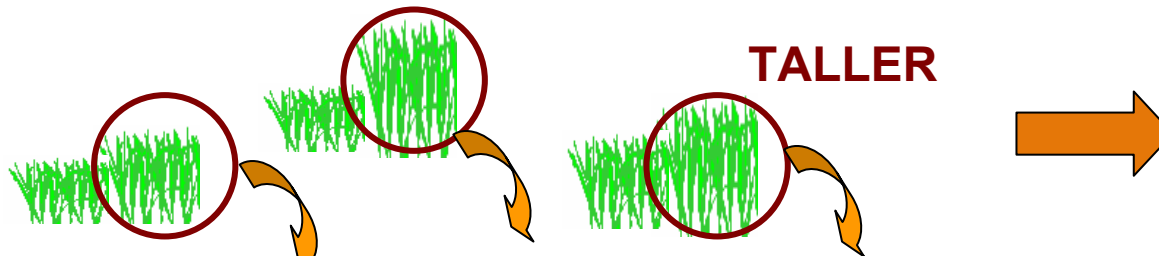


- **tall** grass = **high intake rate**, low digestibility
- **short** grass = **high digestibility**, **low intake rate**

To maximize their net energy acquisition rate
(Optimal foraging models, Stephens & Krebs 1986)
horses should trade-off between sward height & quality

Influence of sward height on feeding site choices:

Pair-wise choices between 6, 11 and 17cm
vegetative swards (constant quality)

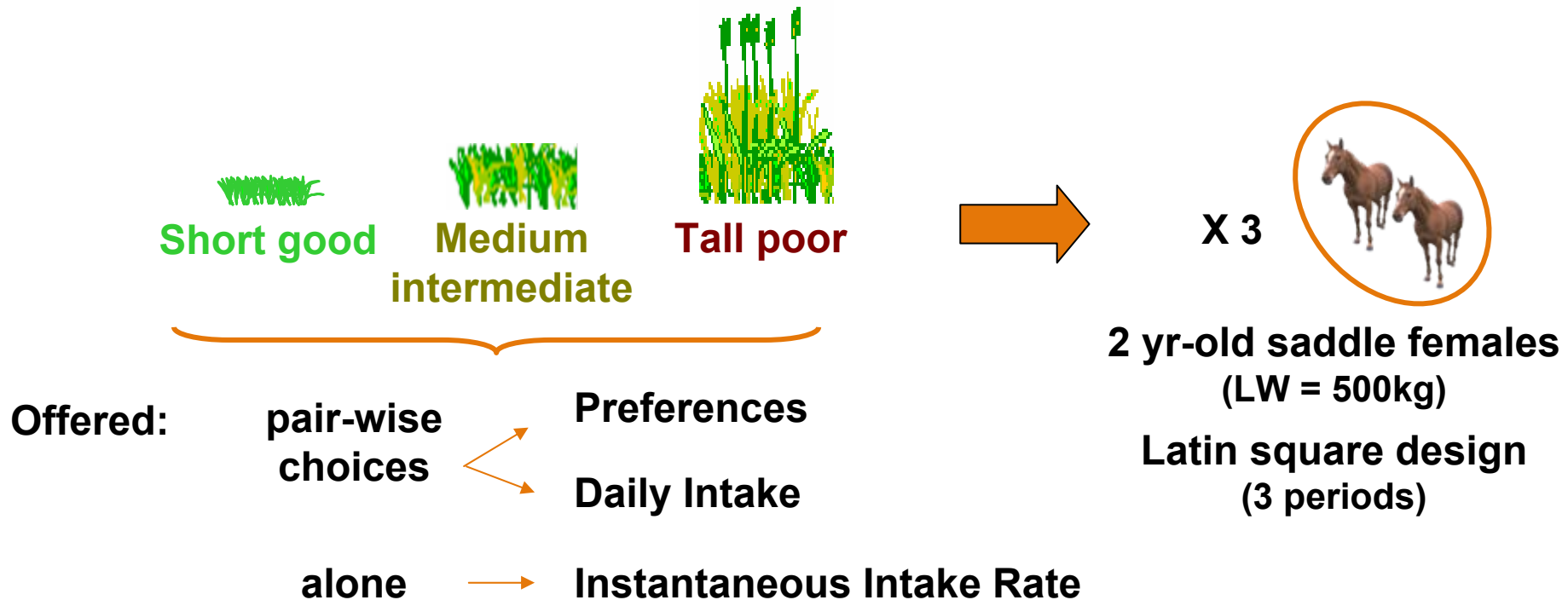


Daily DM **Intake** and
grazing time **CONSTANT**
whatever the situation:

21gDM/kgLW/day
14h/day

Instantaneous Intake Rate of DM maximised
(Edouard et al 2009)

Influence of **sward height & quality** on **feeding choices** by horses.
Consequences for daily intake



Horses should **select** their feeding sites to **maximise nutrient IIR**
& **maintain intake** of Digestible DM
(Illius & Gordon 1990)

Feeding site choices

- ✓ Strips of $\neq$ sward types:
grass mowing at 4cm and regrowth
- ✓ New areas of test offered each day,
same amount of DDM on the $\neq$ swards
(resource not limiting, Ménard et al 2002)



% of 24h feeding time
(scan sampling, Altmann 1974)

Daily Digestible Dry Matter Intake (*DDMI in gDDM/kgLW/day*)



Total faecal collection
(kgDM/individual)

X

Digestibility
from faecal Crude Protein (*CP*)
(Mesochina et al 1998)

Instantaneous Intake Rate (*IIR in gDM/min*)

Bite mass (gDM/bite)

Experimental
trays indoors



X

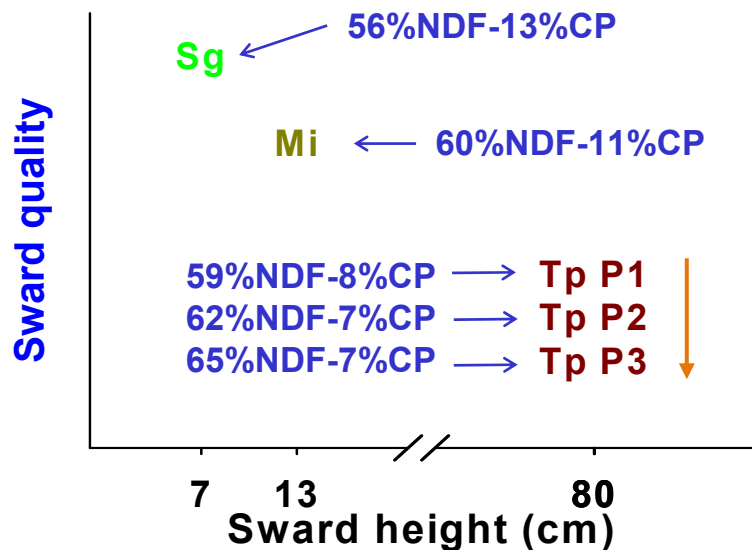


Bite rate (n/min)

At pasture



varied in height & quality

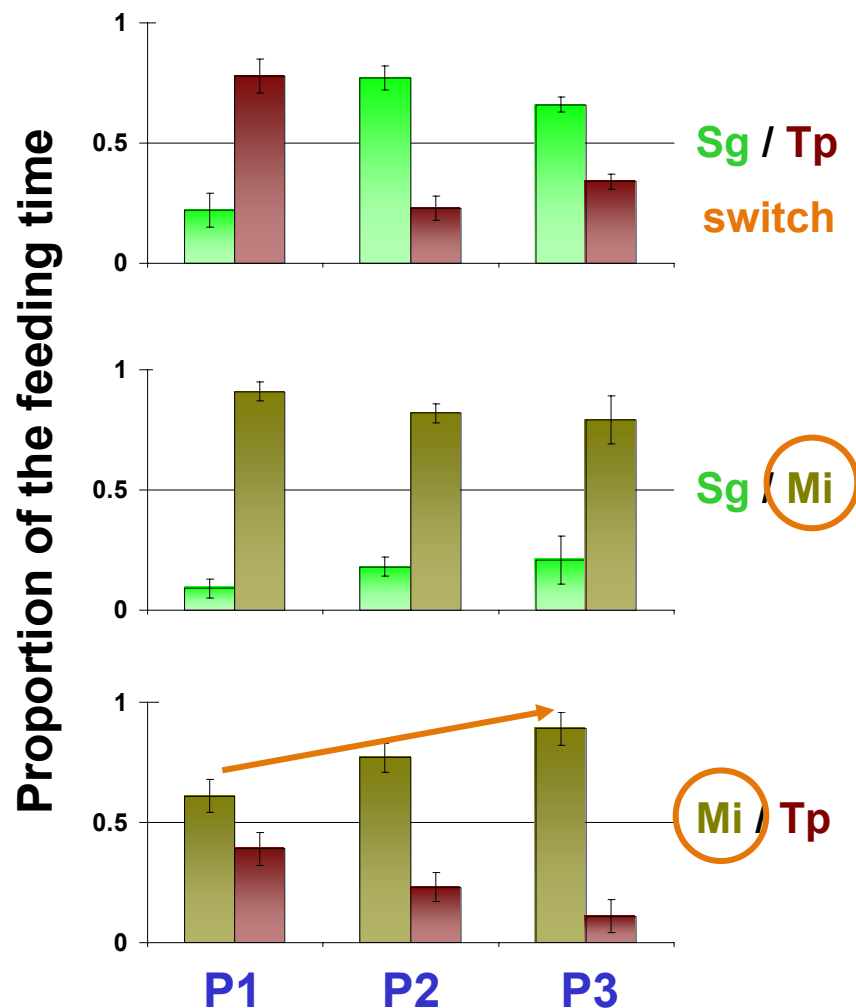


Quality of Tp decreased across time!
(maturation process)

**Quality differences:
a gradient P1 – P2 – P3**

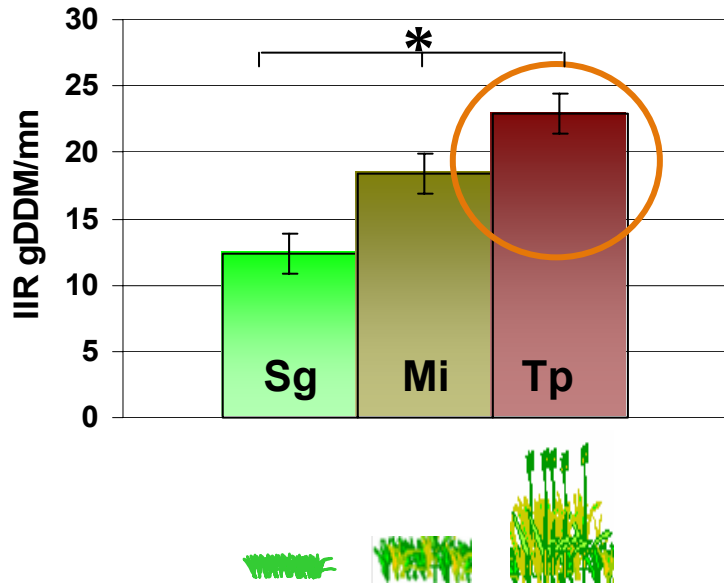
Results: Swards & Preferences

Preferences



- Mi selected
- Tp avoided when mature

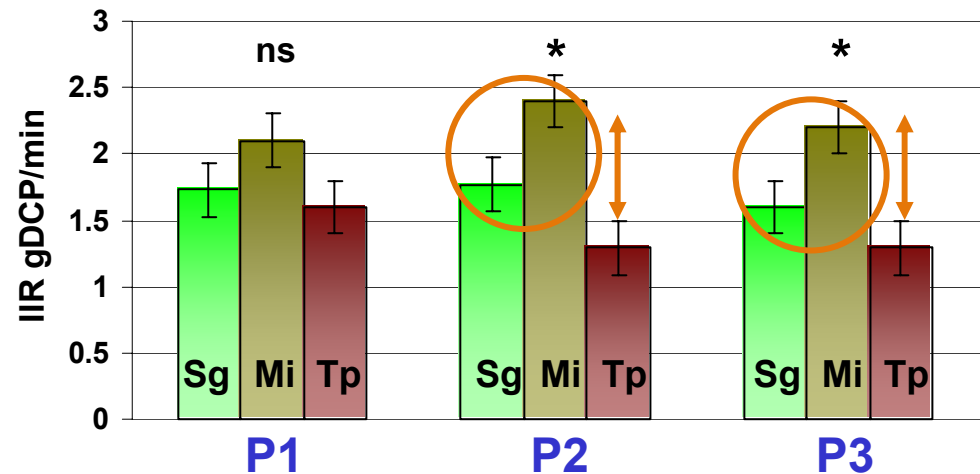
Results: Determinants of the selection

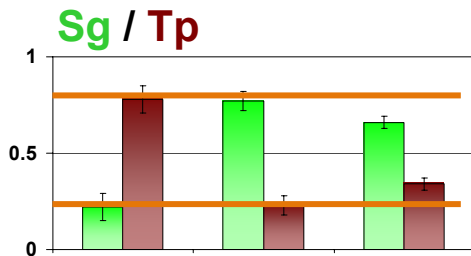


=> IIR of Digestible DM & Net Energy
higher on the taller sward
 whatever the period considered!

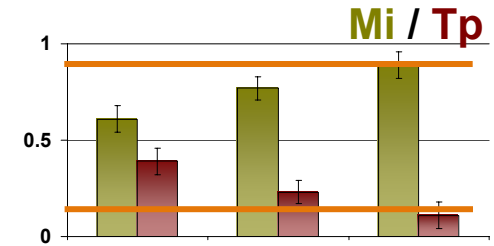
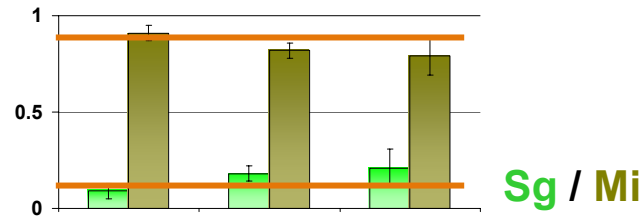
Feeding site choices
 well explained by
 a **DCP IIR maximisation**

IIR Digestible Crude Protein





Partial preferences
(~80% of their daily feeding time on the preferred sward)



Horses shared their daily feeding time between

Short and Intermediate swards
maximised DCP intake rates



Tall poor swards
maximised Energy intake rates



Balance
DCP & E supplies?



Daily intake of Digestible DM and total feeding time CONSTANT
13gDDM/kgLW/day & 14h/day whatever the choice offered (normal growth)

Heterogeneous grazing



Patches of **short vegetative grass** selected
in a matrix of **tall swards avoided**



Nutritional characteristics of
the vegetation (protein content)

Management of horses and pastures:



Grazing **earlier** in spring

- Vegetative grass widely available
- High quality diet



How to **increase the use**
of **matured** swards?

- Protein supplies: could limit over-use of short good quality swards?
=> selection of taller swards
- Use horses of $\neq$ body sizes / levels of requirements?

A close-up photograph of two brown horses in a green field. The horse in the foreground is looking down, and its head is slightly tilted. The horse behind it is also looking down. The background is a lush green field with some trees in the distance.

*Thank you for
your
attention!!*

And thanks to:

- ***INRA Theix, URH-RAPA Team***
- ***The National Stud & the Experimental farm of Chamberet (France)***
- ***Région Limousin***
- ***CNRS-Chizé, Biodiversity Team***