INRA SCIENCE & IMPACT

ECOLE NATIONALE d'EQUITATION
Le Cadre Noir de Saumur

les Haras nationaux

Institut français du cheval et de l'équitation

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Effect of energy supplementation on grass intake, performances and parasitism in lactating mares

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From intensive farming practices to <u>agroecology</u> …

Equine production has a low profitability due to high feeding costs

→ supplementation of grazing animals with high dietary requirements

↘ inputs + maintenance of production

Natural & renewable resources

Better use of grass

+

↘ losses of nutrients & toxic molecules

Optimal use of concentrates

↘ chemical drugs: ↘ resistance

<u>Sustainable farming systems</u>

(↘ costs, more autonomous, ↘ environmental footprint)

Lack of knowledge about grass utilization

It remains to determine:

The necessity and nutritional consequences of a supplementation for grazing horses with high requirements

Objectives

Characterize the effect of energy supplementation at pasture on:

1. the voluntary intake of lactating saddle mares
2. the mare and foal performances
3. the level of parasite infestation of mares

Energy supplement : **BARLEY** (commonly used in horse farming)

EXPERIMENTAL DESIGN AND METHODS

Experimental design

16 lactating saddle mares

(identical winter diet)
BCS close to 3 at the beginning of the experiment

8 supplemented mares
experimentally infested
(5000 L3 cyathostomes)
Barley : 60% of energy needs for lactation

8 non-supplemented mares
experimentally infested
(5000 L3 cyathostomes)

Groups equally balanced regarding to:
intake capacity / foaling date / parasitic sensitivity level / BCS / LW

Test 03/2012

EPG 02/2012

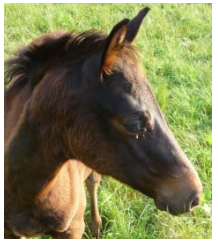
- **Rotational grazing from June to September 2012 (4 months)**
- **3 grazing cycles on fertile permanent pastures**

Main measurements

- **Intake:**
  - total feces collection (4 consecutive days, 1 time/cycle)

    intake = faecal production / (1 – digestibility)

    Digestibility was estimated with faecal CP content *(Mésochina et al. 1998)*
    Correction to take into account the part of barley in faecal production (DM and CP dig. of barley)



- **Animal performances:**
  - mare and foal weighing (1 time/week in June/July, 1 time/15 days in August/September)
  - withers height and cannon bone width on foals aged of 11 months old
  - BCS of mares (1 time/month)

- **Parasitic excretion:**
  - individual coproscopy (faecal egg count) of every mares (1 time/15 days)

❶ VOLUNTARY INTAKE OF LACTATING SADDLE MARES

All the results are presented by mean ± se
Letters are significant differences between cycles

group*cycle: 0.0008

Grass dry matter intake

Variable	Grazing cycle	Suppl. group	NS group	p
Grass DM intake	1	**23.5** (± 1.5) **a**	**22.6** (± 1.3) **a**	ns
(gDM/kgLW)	2	**22.7** (± 1.1) **a**	**25.4** (± 0.6) **b**	ns
	3	**21.7** (± 0.9) **a**	**28.0** (± 1.0) **b**	**

Grass DM intake of Suppl. mares stayed stable whereas the one of NS mares increased between 1st and 3rd cycle

3rd cycle: grass DM intake of NS mares > Suppl. mares

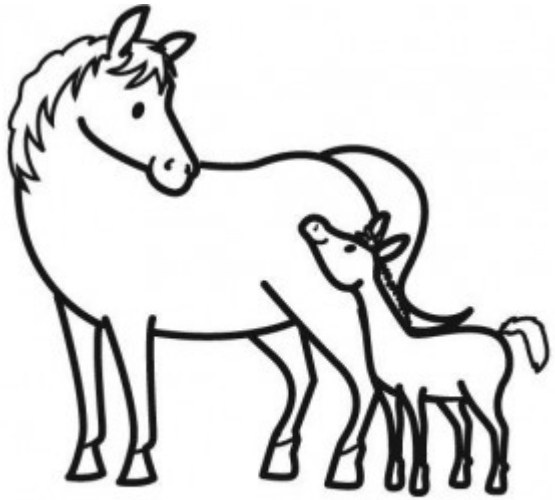
group*cycle: 0.0002

Total digestible dry matter intake

Variable	Grazing cycle	Suppl. group	NS group	p
Total DDM intake	1	**17.0** (± 1.0) **ab**	**13.4** (± 0.8) **a**	*
(gDDM/kgLW)	2	**16.8** (± 0.7) **a**	**15.2** (± 0.4) **b**	ns
	3	**15.1** (± 0.4) **b**	**16.1** (± 0.6) **b**	ns

Total DDM intake of NS mares increased between 1st and 3rd cycle

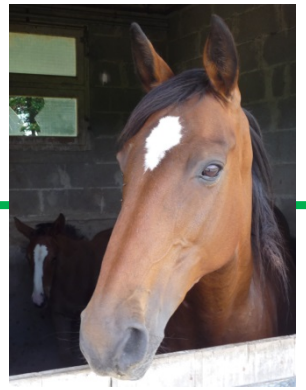
3rd cycle: total DDM intake of NS mares = Suppl. mares

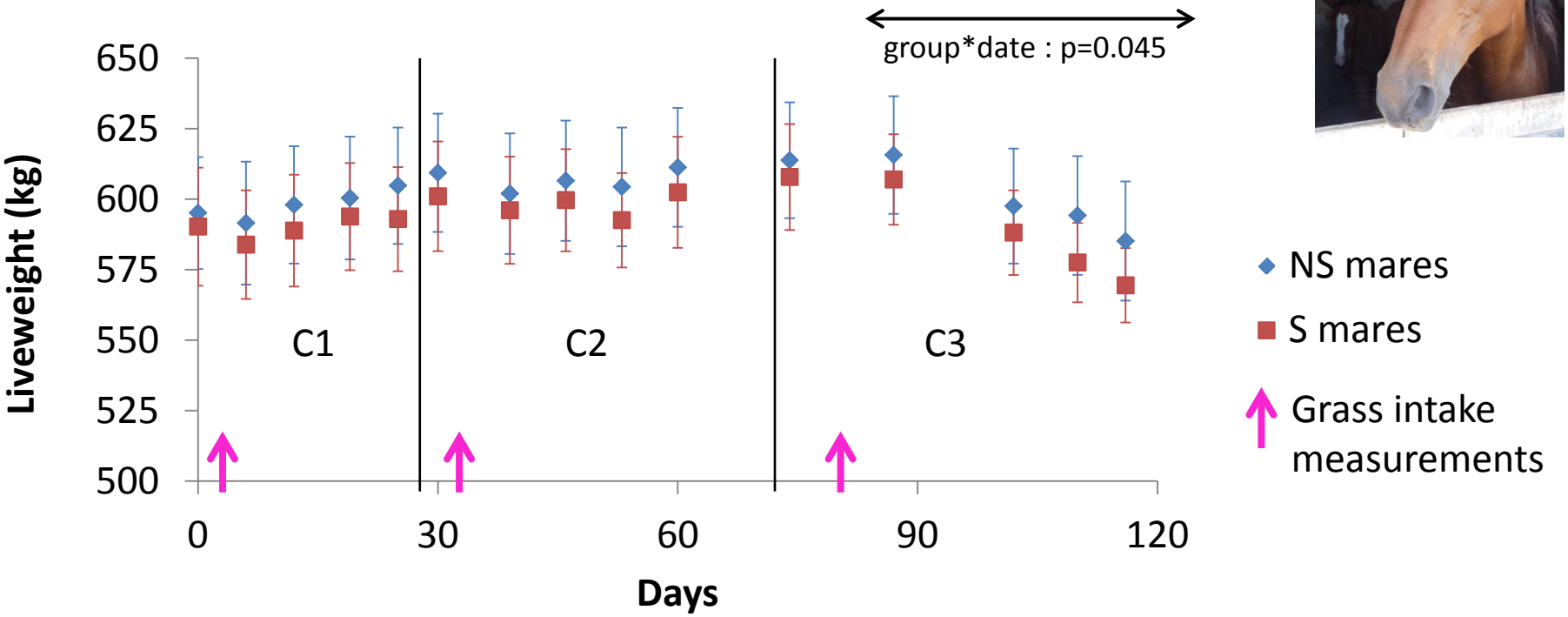


❷ MARE AND FOAL PERFORMANCES

All the results are presented by mean ± se

Mare performances

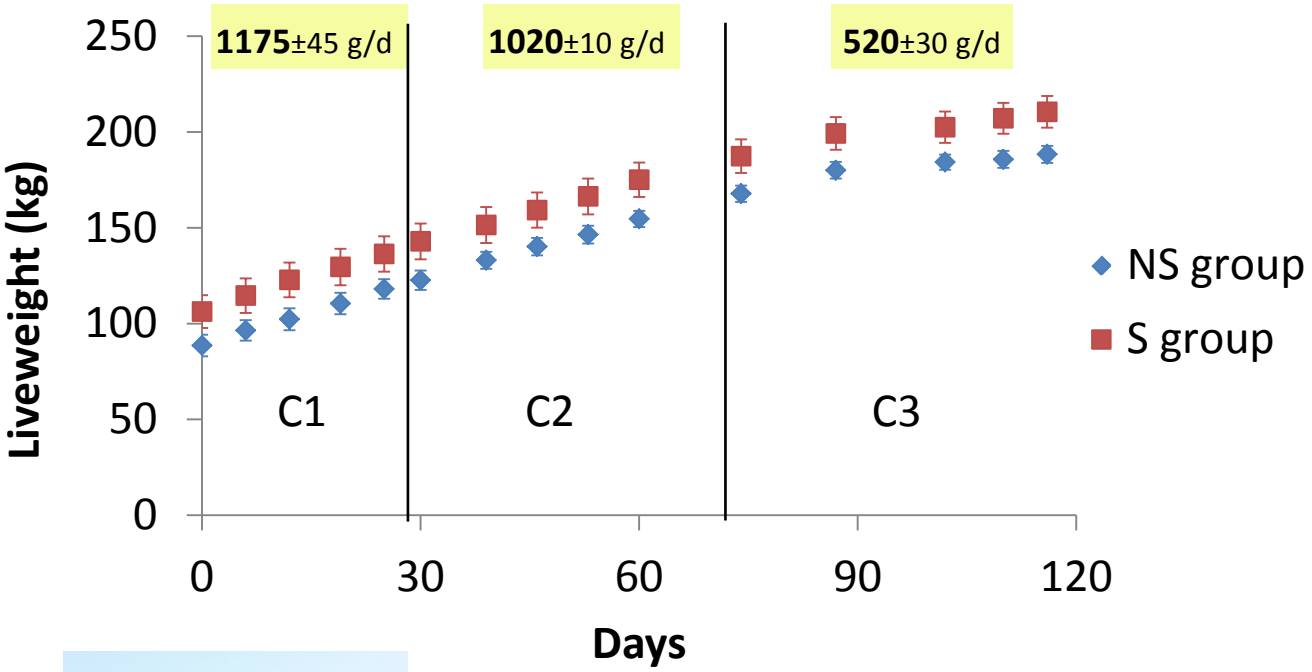




No liveweight differences between S and NS mares
(from 1st cycle to the start of 3rd cycle)

BCS between 3 and 3.5

Foal performances



Measurements on foals aged of **11 months old**:

- **Withers height**: group*age : p>0.05

- **Cannon bone width**: group*age : p>0.05

No differences between S and NS group

Growth in accordance with references

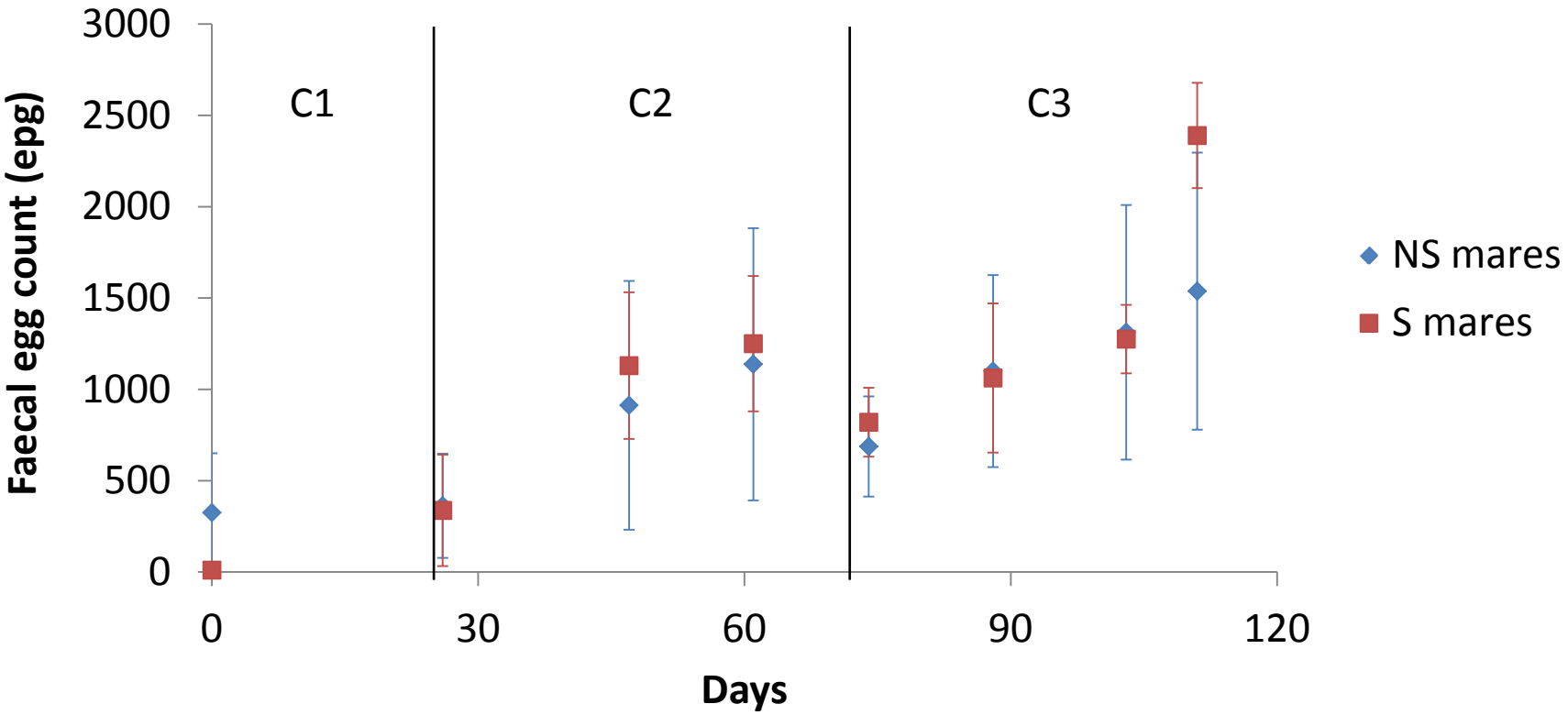
(Trillaud-Geyl et al. 1990)

❸ LEVEL OF PARASITE INFESTATION OF MARES

All the results are presented by mean ± se

Parasite infestation

Suppl. vs. NS: p= 0.71
group*date: p=0.07



Energy supplement did not help supplemented mares to better regulate their parasite burden

Parasitism

- It’s possible that:

  - grazing conditions were not enought limiting

  - experimental infestation was not sufficient

  to observe an energy supplement effect

  (sucking lambs: Prache et al. 1990, 1992)

To conclude

The behavioural flexibility of non-supplemented mares led them to increase grass consumption, and to ensure a good foal growth and conformation under our grazing conditions

Barley supplementation did not increase mare resistance to parasitism

Other kinds of supplementation,
as plants with condensed tanins (secondary metabolites)
could improve the parasite state of horse
(an experiment will be set up in November 2013)

Thank you !

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INSTITUT CARNOT SANTÉ ANIMALE

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Organisers of this 64th EAAP Annual Meeting

And you for your attention !

EAAP 2013

Grazing characteristics

	1st cycle	2nd cycle	3rd cycle
Dates	06/06 to 05/07	06/07 to 19/08	20/08 to 02/10
Stocking rate (LU/ha)	3.1	1.5	1.5
Height (cm)			
Start	52.2 (± 8.3) a	26.5 (± 5.1) b	11.9 (± 1.4) c
End	13.3 (± 1.8) a	7.5 (± 0.9) b	5.3 (± 0.5) c
Biomass (kgDM/al/day)	50.2 a	77.8 b	74.5 b
Quality (%DM)			
CP	12.5 (± 0.5) a	11.2 (± 0.6) ab	10.1 (± 0.6) b
NDF	45.3 (± 2.4) a	43.8 (± 1.4) a	47.0 (± 3.5) a

(Mean ± se ; letters are significant differences between cycles)

Grazing time

	MARES		FOALS	
	NS group	S group	NS group	S group
1st cycle	15.2 (± 0.2) a	15,1 (± 0.5) a	6.2 (± 0.5) e	6,0 (± 0.6) e
2nd cycle	14.0 (± 0.3) b	14,3 (± 0.7) b	8.7 (± 0.3) f	8,6 (± 0.4) f
3rd cycle	16.6 (± 0.5) c	15,7 (± 0.3) c	11.7 (± 0.9) g	11,2 (± 09) g

cycle: ***
cycle*group: ns

cycle: ***
cycle*group: ns

No differences of daily grazing time between S and NS group within each grazing cycle

Total nutrient intake

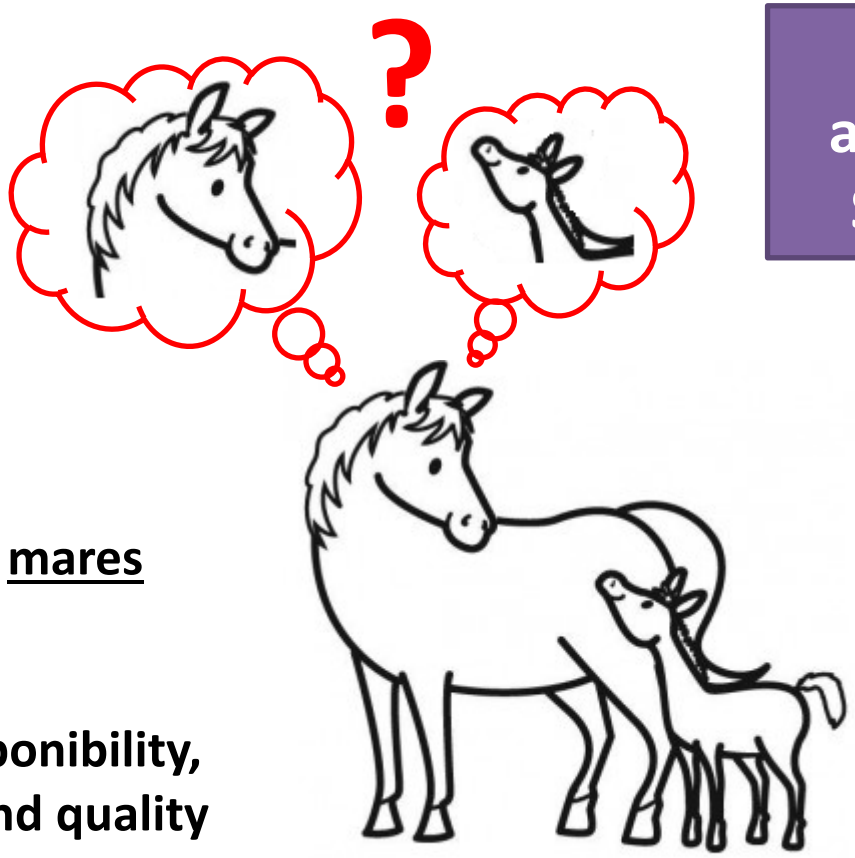
- **UFC (UFC)**

	NS mares	S mares
1st cycle	**96.6 %**	122.7 %
2nd cycle	120.2 %	133.7 %
3rd cycle	144.3 %	137.1 %

- **MADC (g)**

	NS mares	S mares
1st cycle	**83.6 %**	101.2 %
2nd cycle	**86.1 %**	**96.7 %**
3rd cycle	**89.4 %**	**89.9 %**

Resource allowance trade-off: foal favored?



The same resource allowance strategy for Suppl. and NS mares

Weight loss of <u>mares</u>

=> Hyp:
↘ in grass disponibility, accessibility and quality

↗ in nematode infestation

Growth & grazing time identical for the 2 groups of <u>foals</u>

=> Hyp:
equal milk production by NS and S mares