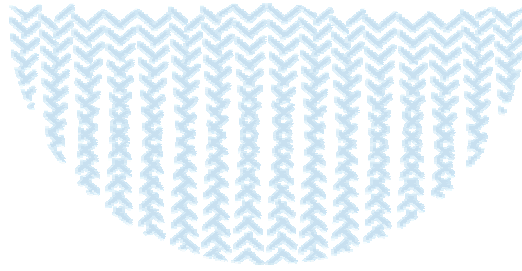


Digestive efficiency in the early-weaned rabbit : impact of measurement method, and of the ratio protein/energy in the feed



T. Gidenne, A. Feugier, S. Lacroix

Station de Recherches Cunicoles, INRA-Toulouse



Introduction

- Measure of nutritional requirements for the young rabbit, before 35 days = ?
- Problem: method for faecal digestibility, valid for a stable physiological status (e.g. : in 6 weeks old rabbits => EGRAN method, Perez et al., 1995)
- Impact of protein intake = ?

Material & Methods

3 X 12 youngs
metabolism cages

2 rab. par cage till 32d

Composition of experimental diets (% as fed)

<i>Diets</i>	MAD1	MAD2	MAD3
<i>Chemical analyse (% as fed)</i>			
Organic matter	83,5	82,9	82,9
Crude Protein	14,7	17,8	20,5
A.D.F.	18,5	18,5	19,5
CP / DE *, g/ Mcal	42,2	56,3	67,7
* values, at formulation			



- Faecal excretion
- Intake and live-weight

Results

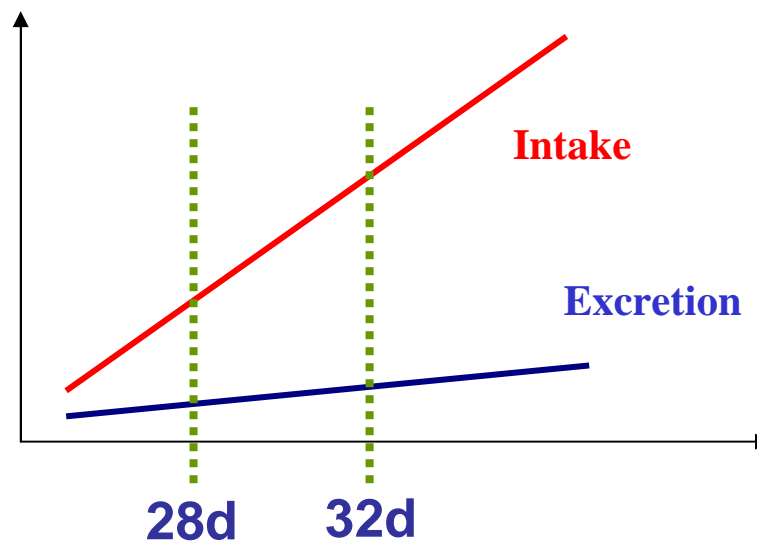
Digestive efficiency in the young : **impact of calculation method**

Standard calculation :

OK if intake and excretion are
stable with time

$$\text{aDC} = \frac{\text{intake (28-32d)} - \text{excreted (28-32d)}}{\text{intake (28-32d)}}$$

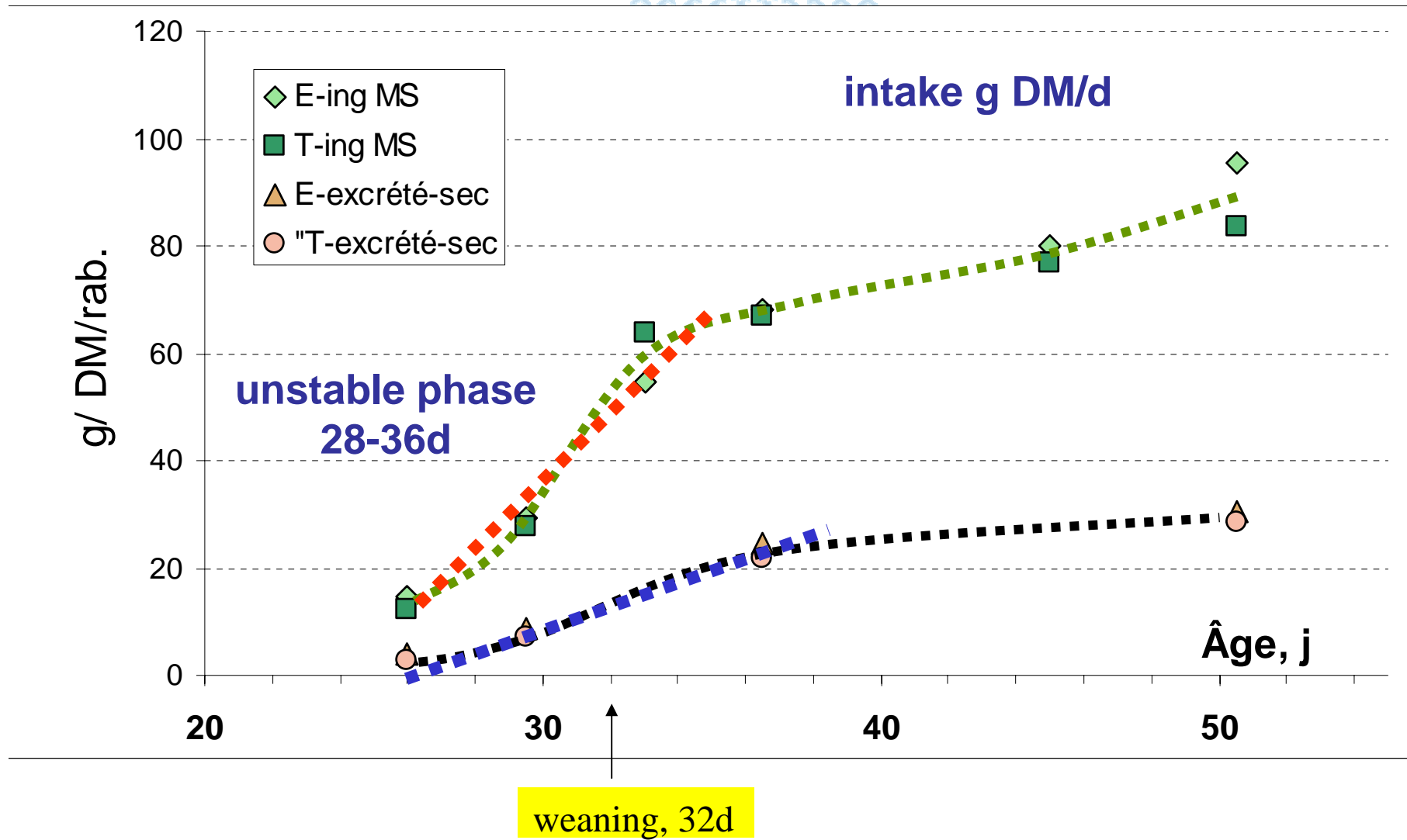
But for the young
: sharp increase
of the feed intake



And: Faecal excretion is measured from 28-32d, from a previous in intake, in fact probably about 12h before (see literature on rate of passage).

And, 27-31d intake is lower than 28-32d =>

Relationship between intake and excretion of DM



Results

Digestive efficiency in the young : **impact of calculation method**

Step 1

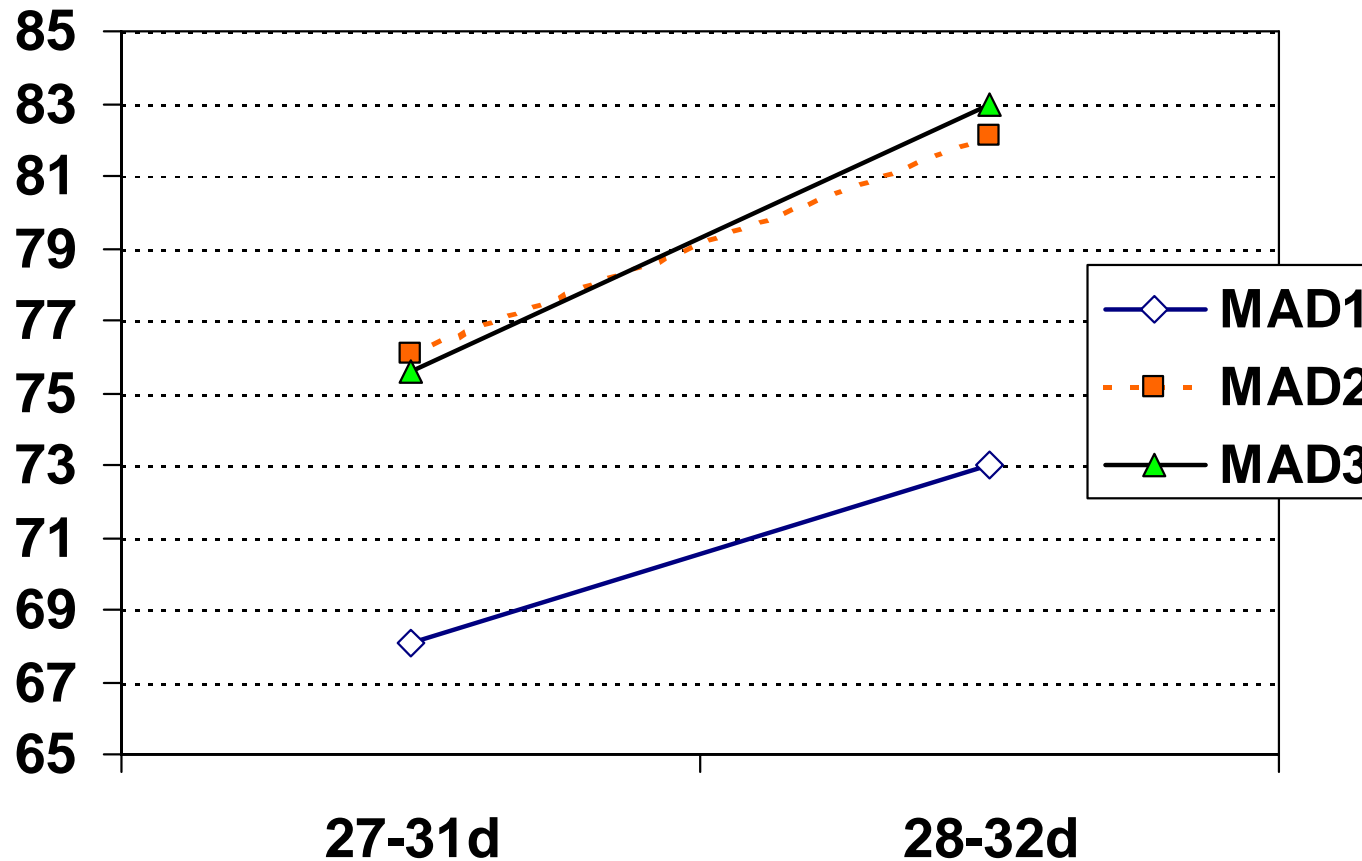
correction of intake, to estimate the value for the period 28-32

Method :

- * measure the increase in feed intake among 27-31 & 28-32
- * this increase is divided by 2 (12h rate of passage)
- * this value is subtracted to the 28-32 intake.

Step 1: correction of intake

Daily feed intake for 2 rab./cage. (g/d as fed)



27-31 & 28-32 = 4.9 , 5.9 , 7.3 g resp. for MAD1 to 3

Step 1: correction of intake

A	B	C	D	E	F	G	H	I	J
				Ingéré	Ingéré				
		ing brut 2 lap g/j		I-MS27-31	I-MS28-32	ccroisser	ccroisser	valeur à dédu	ing MS corr
cage	lot	i27_31	i28_32	4 jours*2lap	4 jours*2lap	e les 2 péri	en %	MS sur 4j&la	4j*2lap
1	MAD10	71.6	78.6	260.3	285.8	25.4	9.3%	12.7	273.0
4	MAD10	56.4	62.3	205.0	226.5	21.5	9.9%	10.7	215.8
7	MAD10	72.8	71.1	264.7	258.5	-6.2	-2.4%	-3.1	261.6
10	MAD10	59.8	62.6	217.4	227.6	10.2	4.6%	5.1	222.5
13	MAD10	76.3	81.5	277.4	296.3	18.9	6.8%	9.5	286.8
16	MAD10	70.8	75.3	257.4	273.8	16.4	6.4%	8.2	265.6
19	MAD10	68.3	75.1	248.3	273.0	24.7	9.3%	11.9	260.7
22	MAD10	64.4	71.8	234.1	261.0	26.9	10.2%	13.4	247.6
25	MAD10	65.9	70.4	239.6	255.9	16.4	6.8%	8.2	247.8
28	MAD10	62.9	68.1	228.7	247.6	18.9	7.9%	9.5	238.1
31	MAD10	80.0	86.5	290.8	311.5	23.6	7.9%	11.9	302.7

correction = 50% de l'écart total mesuré sur 4 jours, entre les 2 périodes i27-i31 et i28-i32,

raw intake g/d for two rab.

DM intake g for 4d & for two rab.

% intake increase 27-31&28-32

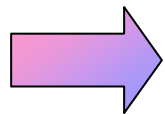
corrected value for intake => raw intake minus 50% of the increase

correction = about 10g DM less
(=> - 5% of the intake)

Step 2. Correction of the fecal excretion

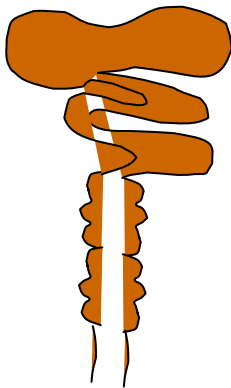
Young rabbit : increase in digesta volume

→ some "feed" remain non-excreted



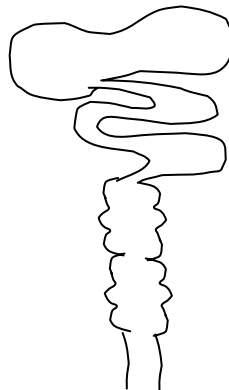
Correction = estimation of the increase in whole digestive dry content

Dig. tract: full



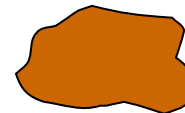
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Dig. tract: empty



=

Dry content (% PV)



$$\text{aDC corrected} = \frac{\text{DM intake (28-32corr)} - [\text{DM excreted(28-32)} - \text{dry content}]}{\text{DM intake (28-32corr)}}$$

Step 2. Correction of the fecal excretion

To calculate the increase of digesta content => publication of Xiccato et al., 2001 (JRC)

calculation : at 28d the fresh digesta content = 15.2% of the live-weight ; and 17.8% at 32d

C	K	L	M	N	O	P
	TG0403 : 2 lapins par cage de 28 à 32j // sevrage à 23 jours.					
cage	P28 moy	P32 moy	Cont D sec28	cont D sec 32	Valeur à ajouter à l'excrété	
	en grammes	gr par lapin	gr par lapin	gr par lapin	gr pour 2 lapins dans la cage	
1	673	886	19.7	30.4	10.7	
4	488	672	14.3	23.1	8.8	
7	674	838	19.8	28.8	9.0	
10	539.5	703.5	15.2	24.2	8.3	
13	682.5	900.5	19.3	30.9	10.9	
16	567.5	716	16.6	24.6	7.9	
19	626	840.5	18.4	28.9	10.5	
22						

15.2% = proportion du contenu digestif total frais, par rapp au PY
19,3% = taux moyen de MS (cf biblio)

on multiplie par 2, car 2 lapins par cage, puis on multiplie par 0.5 pour coeff digestion + caecotrophie

17.8% = proportion du contenu digestif total frais, par rapp au PY
19,3% = taux moyen de MS (cf biblio)

Step 2. Correction of the fecal excretion

correction = about 8 to 15g DM more (for 2 rab.)
 (<=> about +10% of the excretion)

C	K	L	M	N	O	P
	TG0403 : 2 lapins par cage de 28 à 32j // sevrage à 23 jours.					
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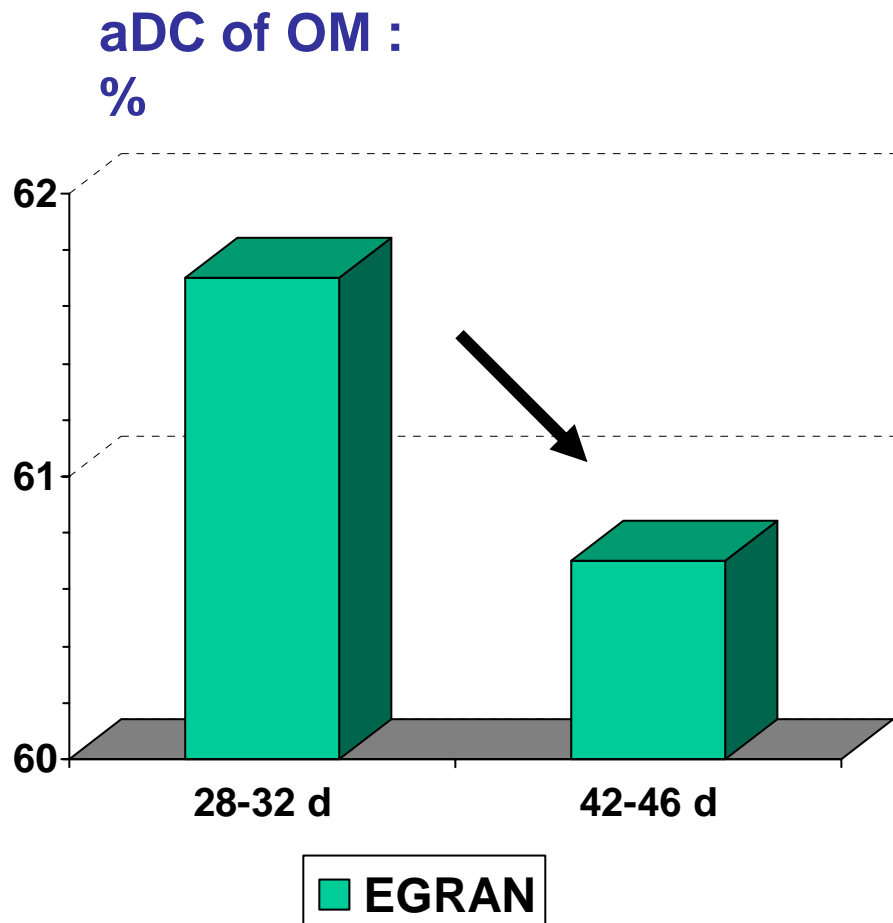
Results

Step 2. Correction of the fecal excretion



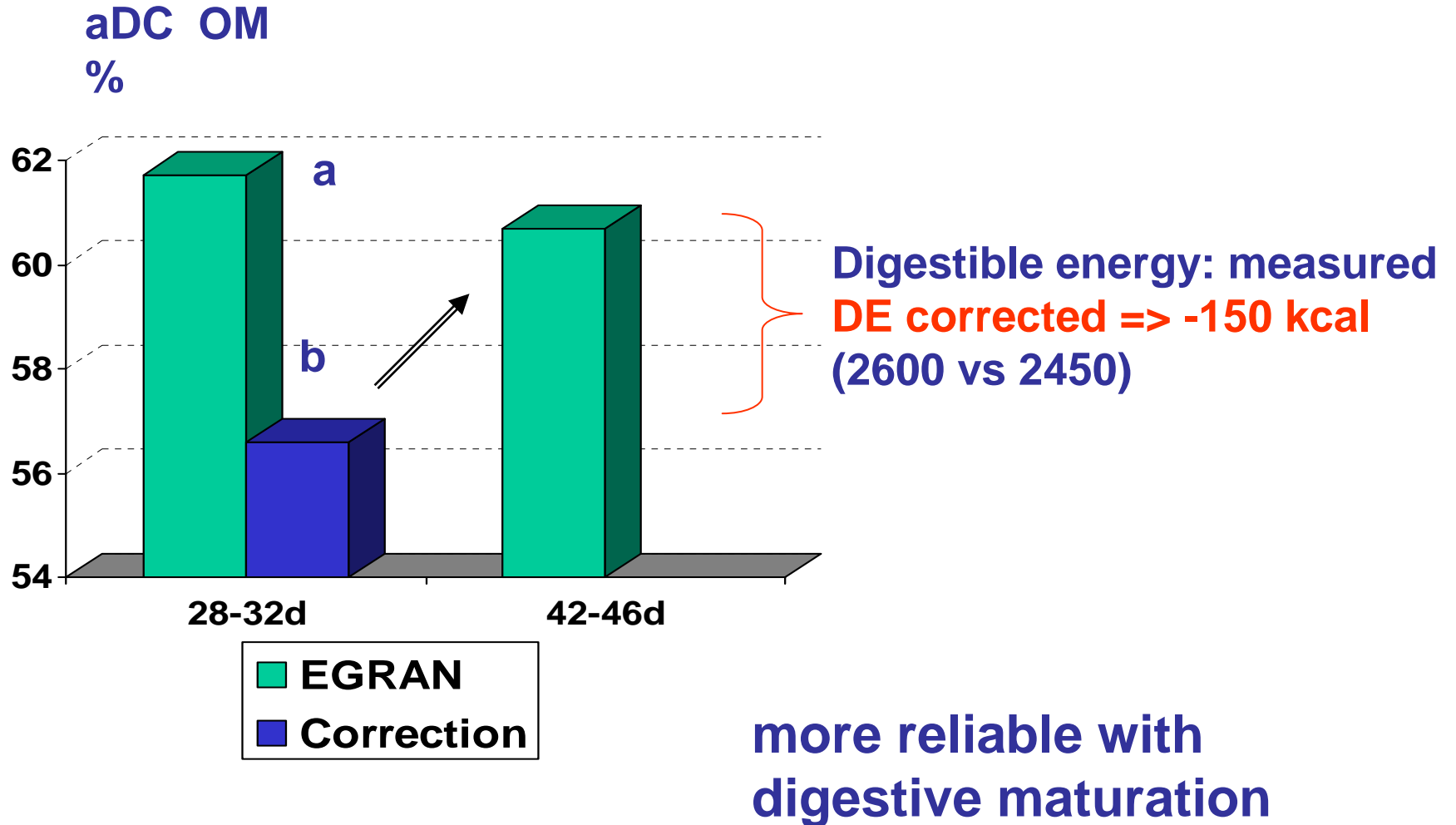
Results

Digestive efficiency in the young : **impact of calculation method**



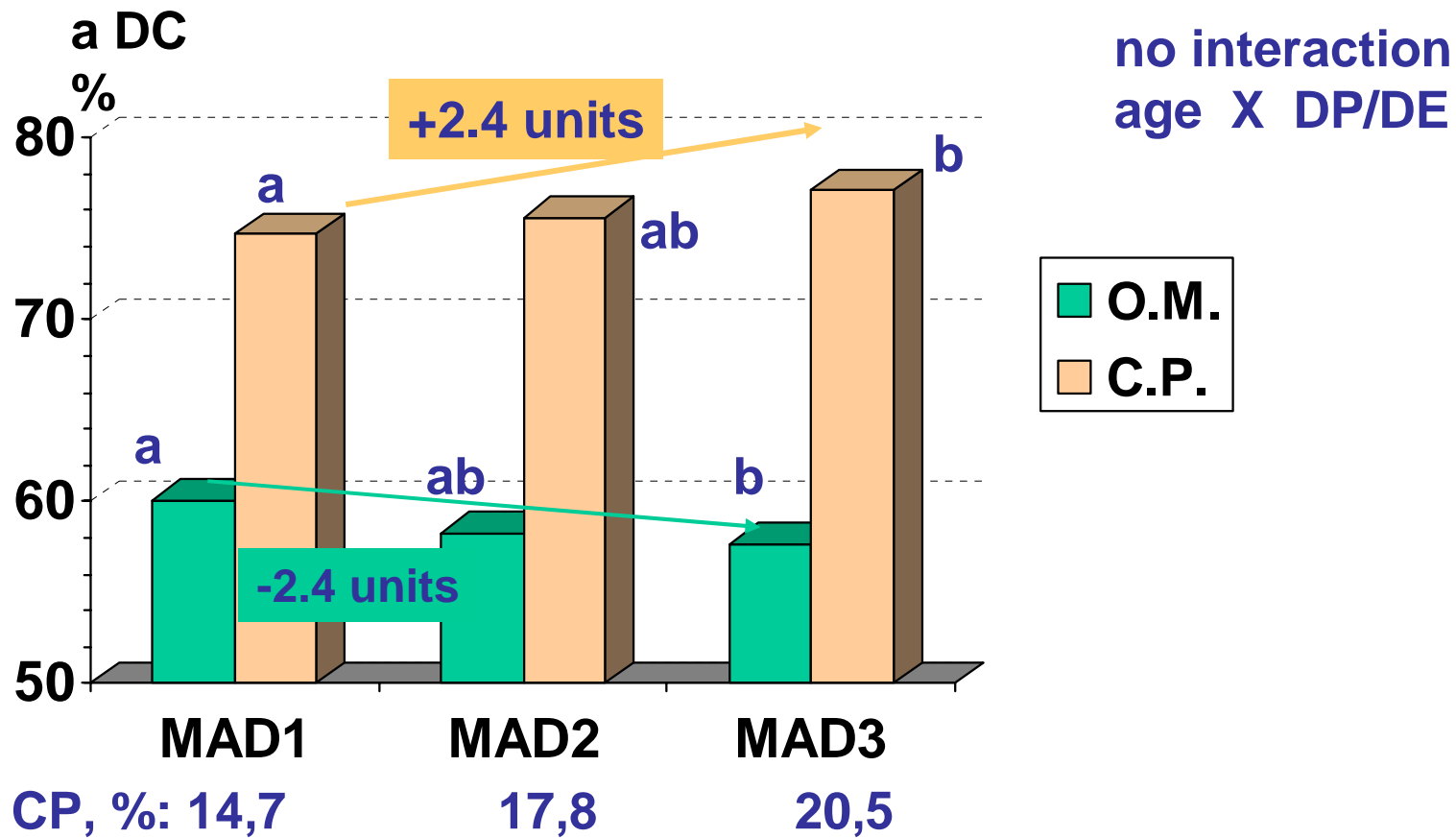
Results

Digestive efficiency in the young : **impact of calculation method**



Results

Digestive efficiency in the young : **effect of the DP/DE ratio**



Results

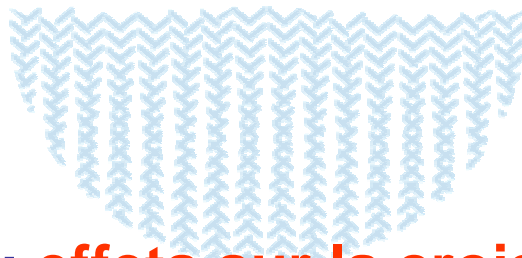
Nutritive value of the diets : **effect of age and DP/DE**

		MAD1	MAD2	MAD3
digestible energy				
kcal	28-32 d	2530	2450	2330
	42-46 d	2640	2490	2500
Digestible protein				
g/kg	28-32 d	109	135	156
	42-46 d	110	134	160

F age
Yes
No

The young rabbit : good digestive efficacy for protein

Résultats



Valeur des aliments : effets sur la croissance et l'ingestion

Période 23-32 jours

Ingestion, g/j

MAD1

53,1^a

MAD2

59,5^{ab}

MAD3

62,2^b

Gain de poids, g/j

39,0^a

45,9^b

46,8^b

Période 32-64 jours

Ingestion, g/j

138

149

141

NS

Gain de poids, g/j

49,0

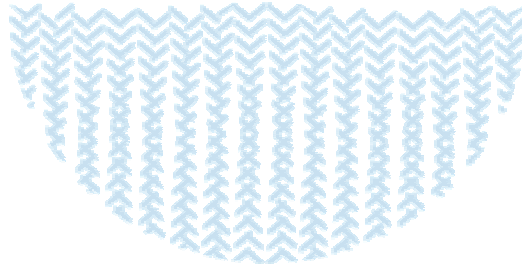
51,1

46,8

NS

à valider sur un grand nombre d'animaux (ici , n=22/ lot)

Conclusions



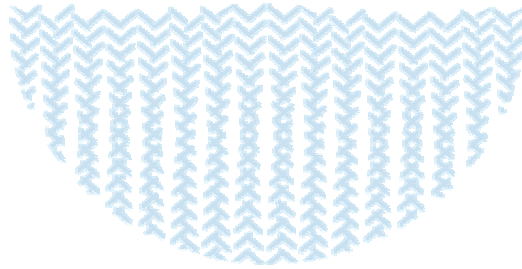
1- Digestion chez le lapereau :

correction des calculs (<35j)

2- Digestion des protéines élevée chez le lapereau

3- Recommendations en protéines digestibles :

périsevrage : pas plus de 110 - 120 g/kg



Cristophe de Prasse 2001

Remerciements

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J. et J. de Dapper, A. Lapanouse, M. Segura, V. Tartié**

