

# Feeding behavior in the rabbit

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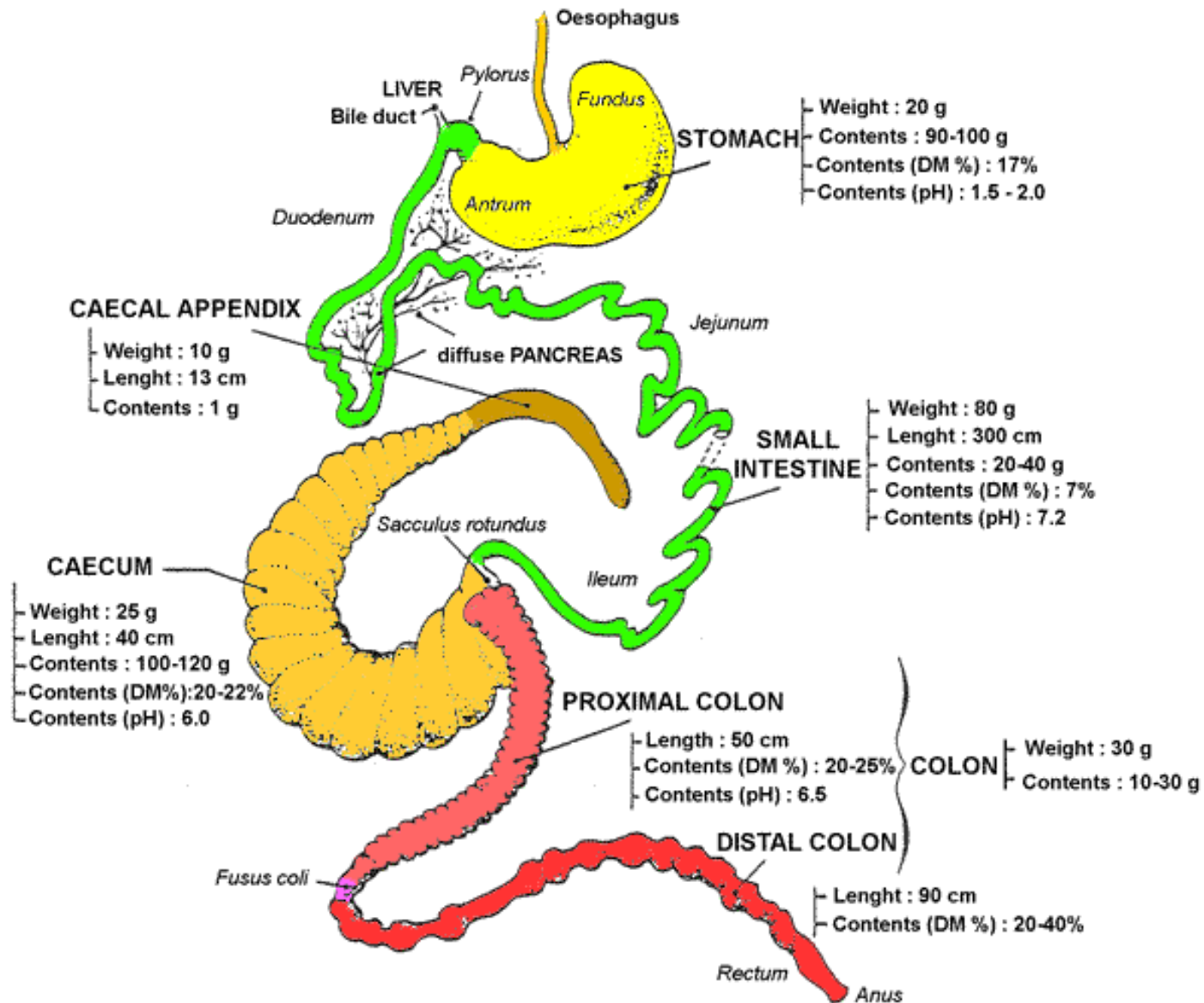
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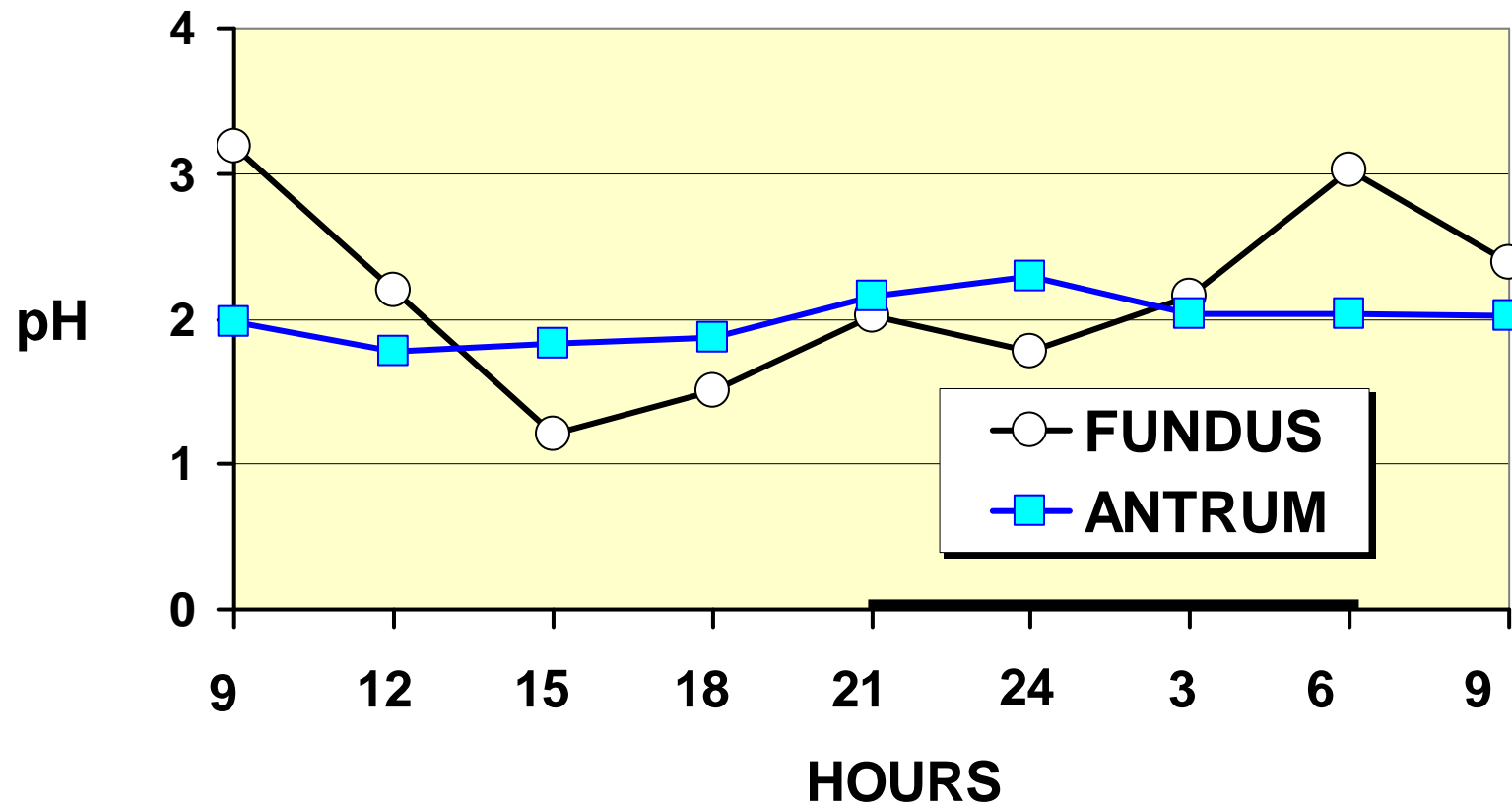
# Outline of the lecture

- **Anatomy and digestive physiology** (caecotrophy, ...)
- **Standard feeding behavior of domestic rabbit**
  - from birth to weaning
  - growing and adult rabbits
- **External factors influencing feeding behavior**
  - diet composition and presentation
  - environmental factors (temperature, lighting, ...)
- **Feeding behavior in free choice situation**
  - wild rabbits in open situation
  - caged domestic rabbits
- **Conclusion**

# Importance of the different parts of the rabbit digestive tract

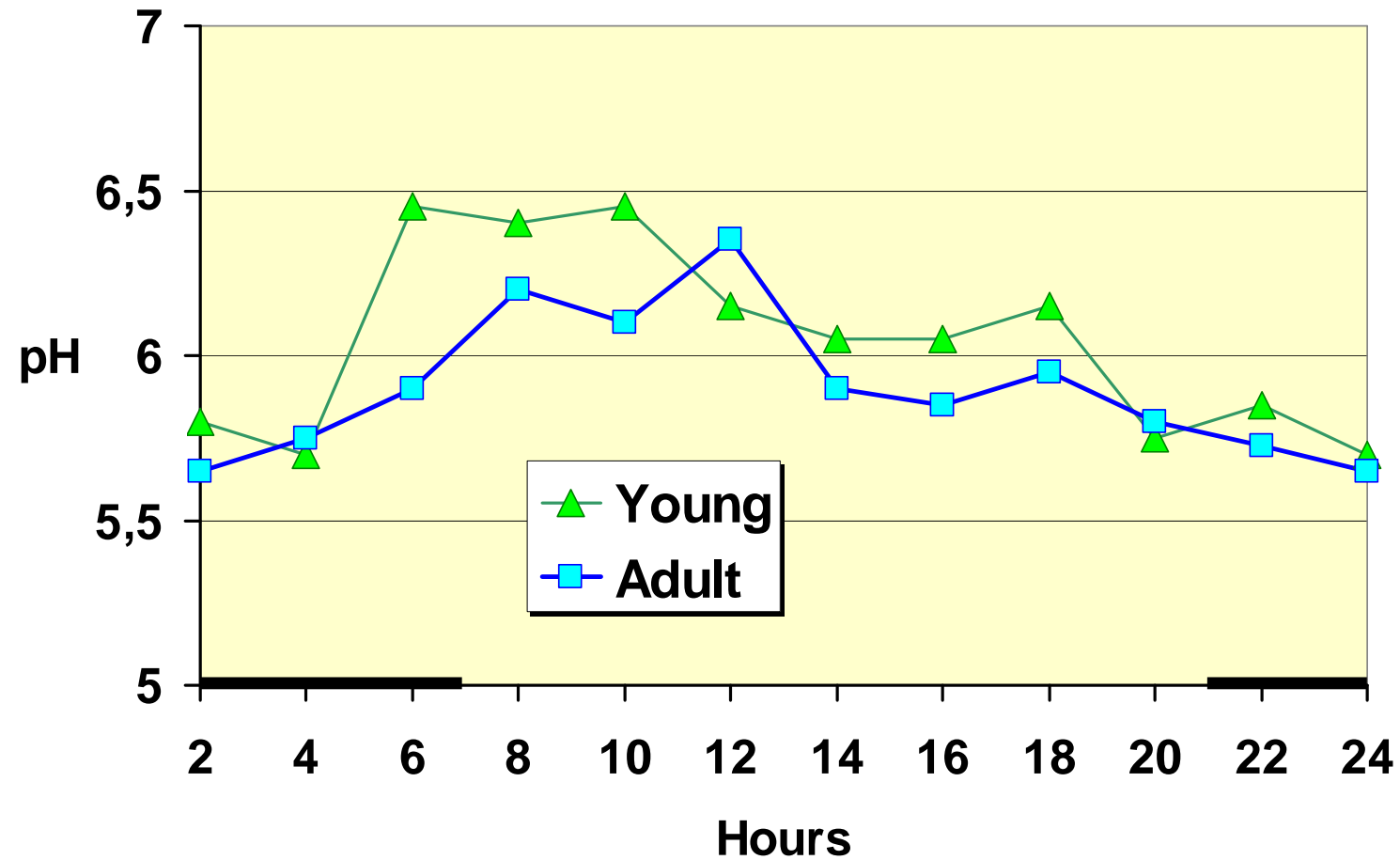


## Evolution of pH in two parts of the rabbit stomach during a 24 hours cycle



According to Gidenne & Lebas, 1984

## Evolution of pH in the cæcum of 6 and 18 weeks old rabbits during a 24 hours cycle

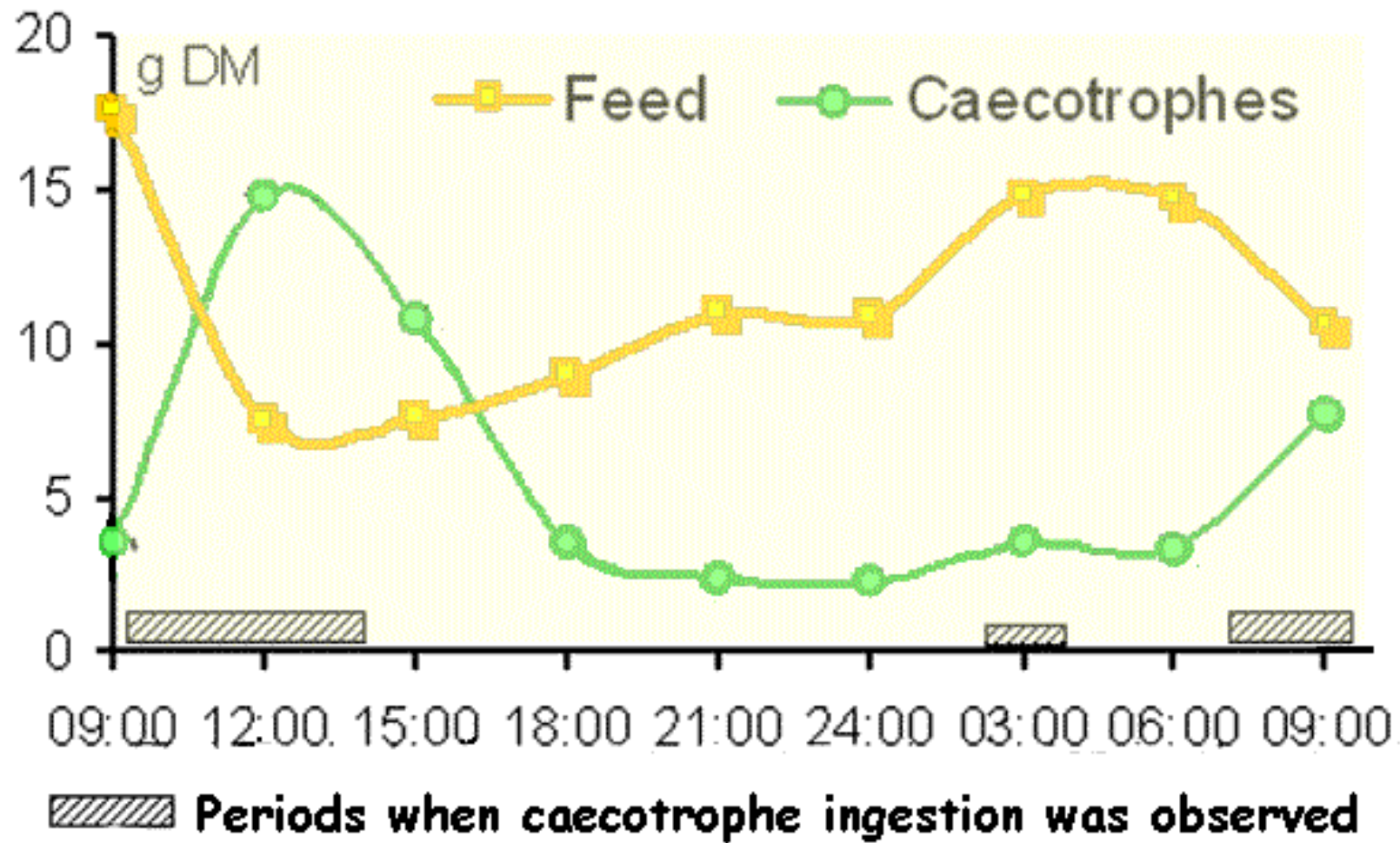


According to Bellier et al. (1995)

**Average chemical composition  
of hard and soft pellets produced by rabbits**  
according to Proto (1980)

	Hard pellets	Soft pellets or caecotrophes
Dry matter %	<b>53.3</b>	<b>27.1</b>
<i>as % DM</i>		
<b>- Proteins</b>	<b>13.1</b>	<b>29.5</b>
<b>- Crude fiber</b>	<b>37.8</b>	<b>22.0</b>
- Lipids	2.6	2.4
- Minerals	8.9	10.4

Evolution of stomach content (g of dry matter) during a 24 h cycle, with the distinction between feed and caecotrophes, in 9 weeks old rabbits (according to Gidenne , 1987)



**Standard feeding behavior of rabbits  
between birth to weaning  
( 0 => ~30 days)**

**MILK INTAKE**

**According to mother's decision, only ONE suckling per 24 h  
(for few rabbit does 2 nursings per day)**

**Suckling duration is very short : a total of 2-3 minutes maximum**

**A young can easily change of nipple, even during a given suckling**

**At 5-6 days of age the milk intake (in 2-3 mn) may represent  
25% of the young individual weight**



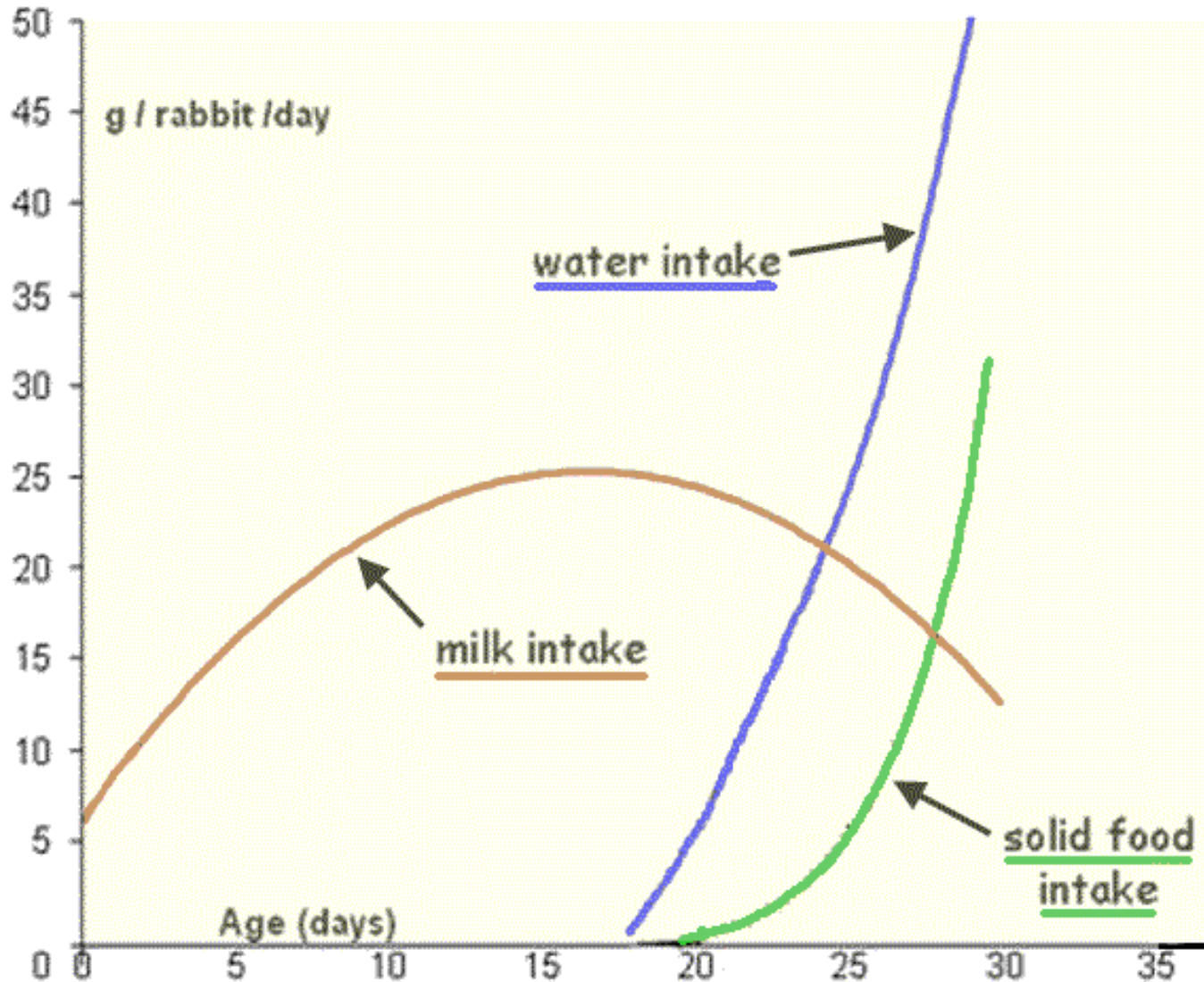
**Water intake begins at about 15-16 days of age  
and solid feed intake begins 2-3 days later.**

Between 18 and 28-30 days (weaning) young continue to receive

- mother's milk once a day
- but makes solid and liquid intakes about 30-40 times a day (day and night)

**Caecotrophes production and intake begins with solid food intake, *i.e.* at about 18-21 days of age**

Evolution of daily milk, water and solid food intakes (all as fed) of young rabbits between birth and 30 days of age adapted from Szendrő *et al.* (1999) and Fortun-Lamothe & Gidenne (2000)



# Evolution of feeding pattern after weaning



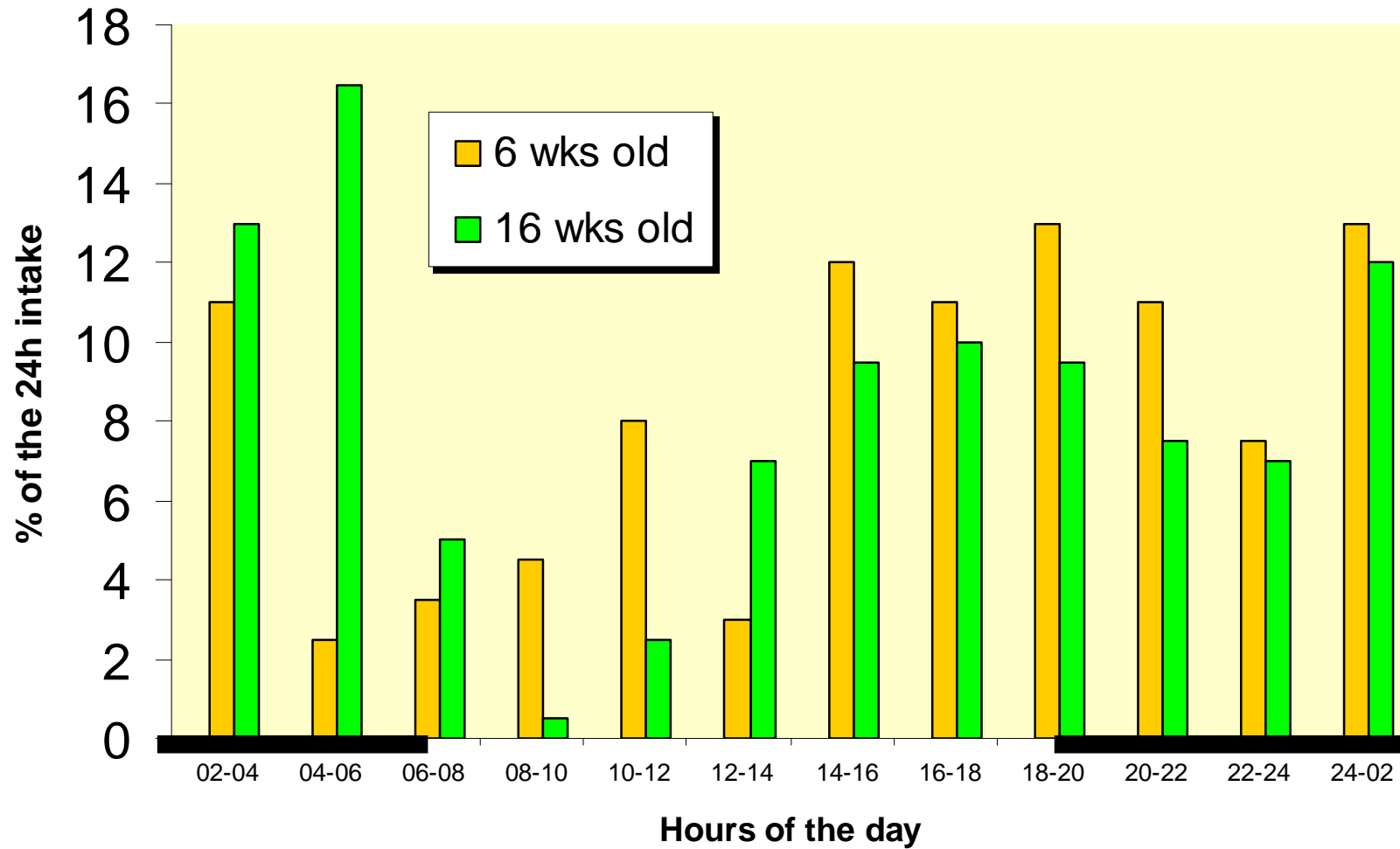
## Evolution of the feeding and drinking pattern of domestic rabbits from 6 to 18 weeks of age.

According to Prud'hon *et al.*, 1975

Age in weeks	6	12	18
<b>Solid feed (<i>pellets 89% DM</i>)</b>			
- Solid feed intake (g/d)	98	194	160
<b>- N° meals / day</b>	<b>39</b>	<b>40</b>	<b>34</b>
- Quantity /meal (g)	2.3	4.9	4.9
<b>Drinking water</b>			
- Water intake (g/d)	153	320	297
<b>- N° drinks / day</b>	<b>31</b>	<b>29</b>	<b>36</b>
- Weight of 1 drink (g)	5.1	11.5	9.1
<i>Water /feed ratio</i>	1.26	1.65	1.86

# Circadian feeding pattern of growing or ~adult rabbits

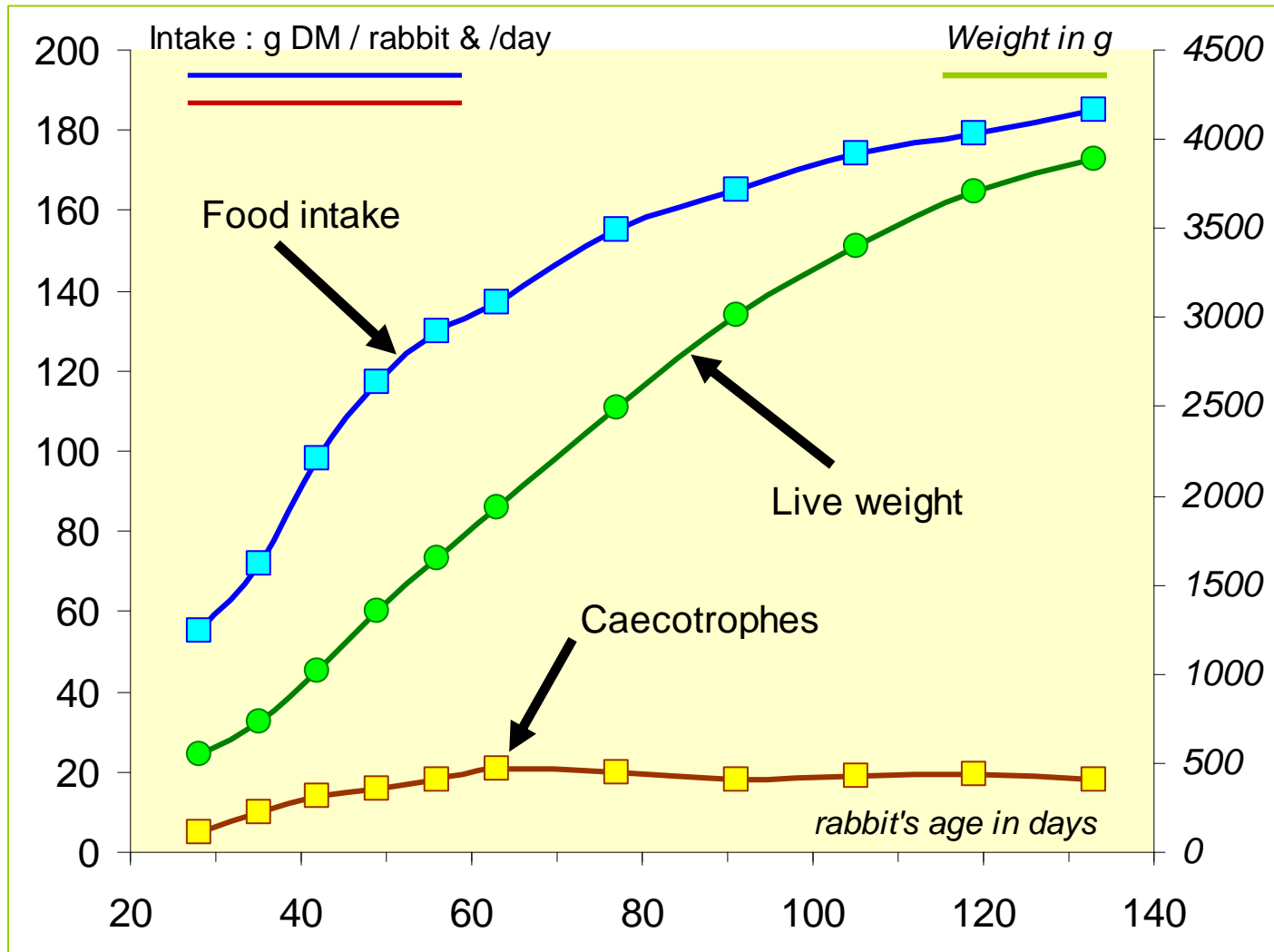
according to Bellier et al., 1995



As it's classical for all animals rabbit's feed intake increase with animal's age up to a maximum observed near of the puberty period (14-16 weeks)

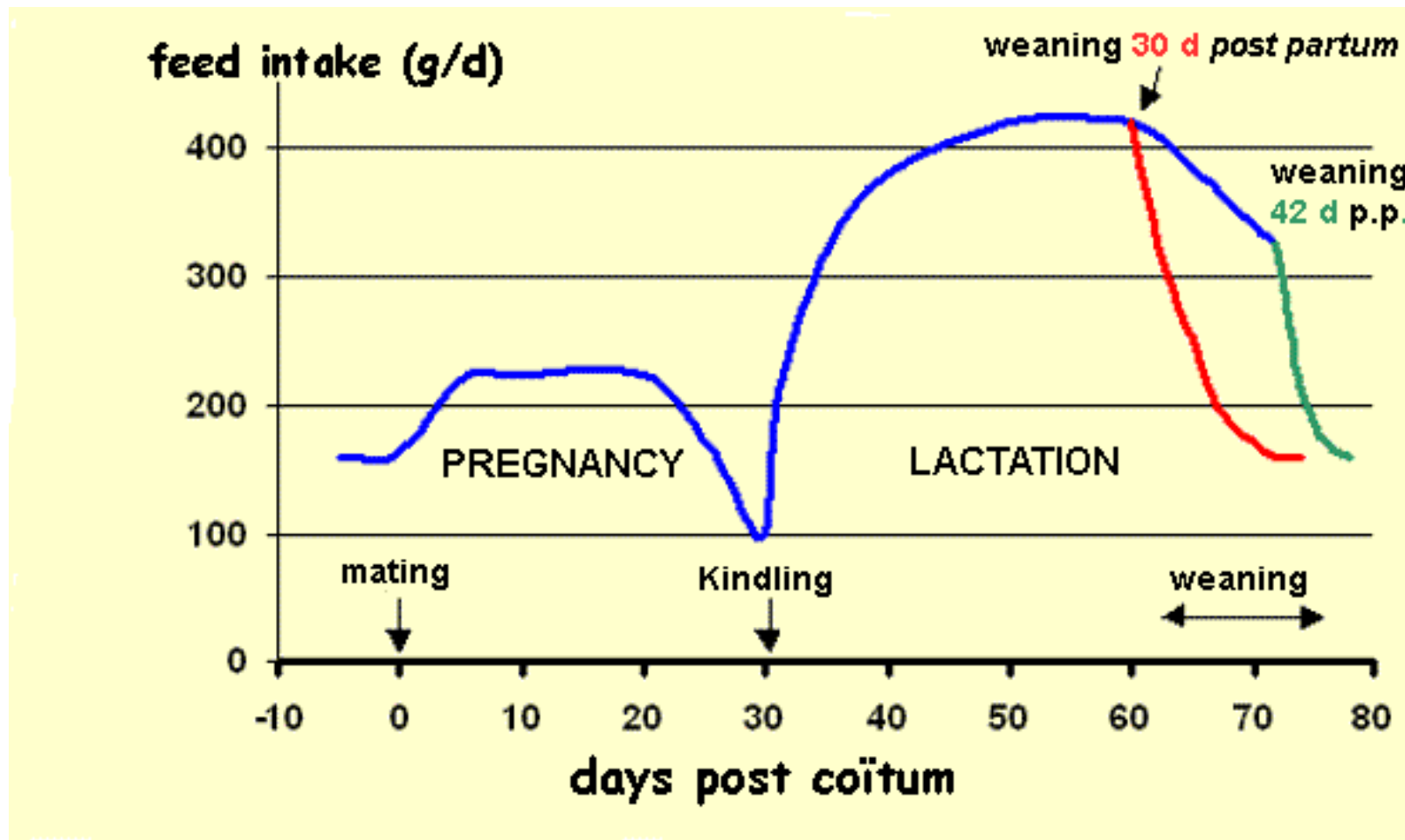
Later, the daily feed intake is mainly modulated by the physiological status of rabbit does. Feed intake of males remind quite constant

# Evolution of daily dry matter intake of pelleted feed & caecotrophes and rabbit's live weight from weaning (28 d) till 140 d (~adult) according to Gidenne & Lebas, 1987.



# Average daily feed intake of a rabbit does (4 kg alive) during gestation and lactation.

According to Lebas, 1975





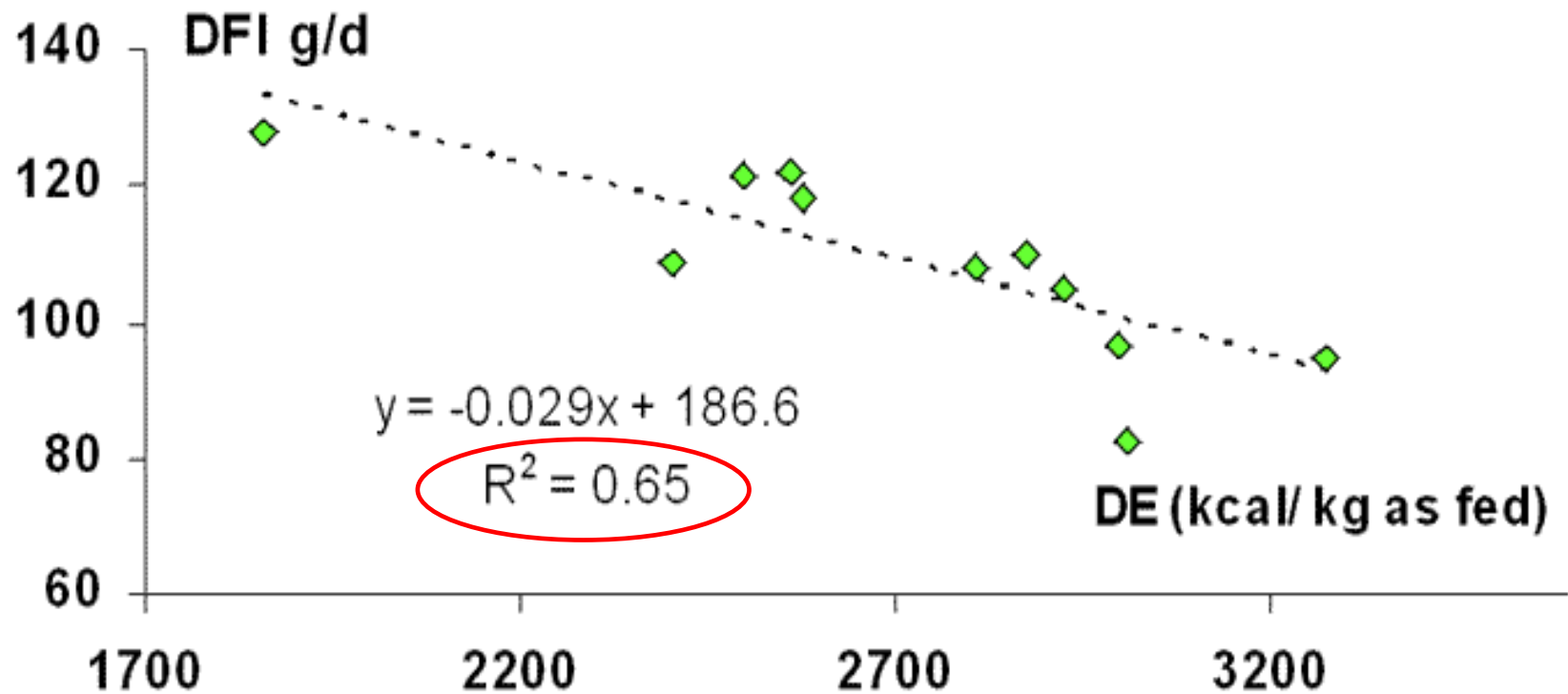
# Effects of external factors

**Effects of diets composition**

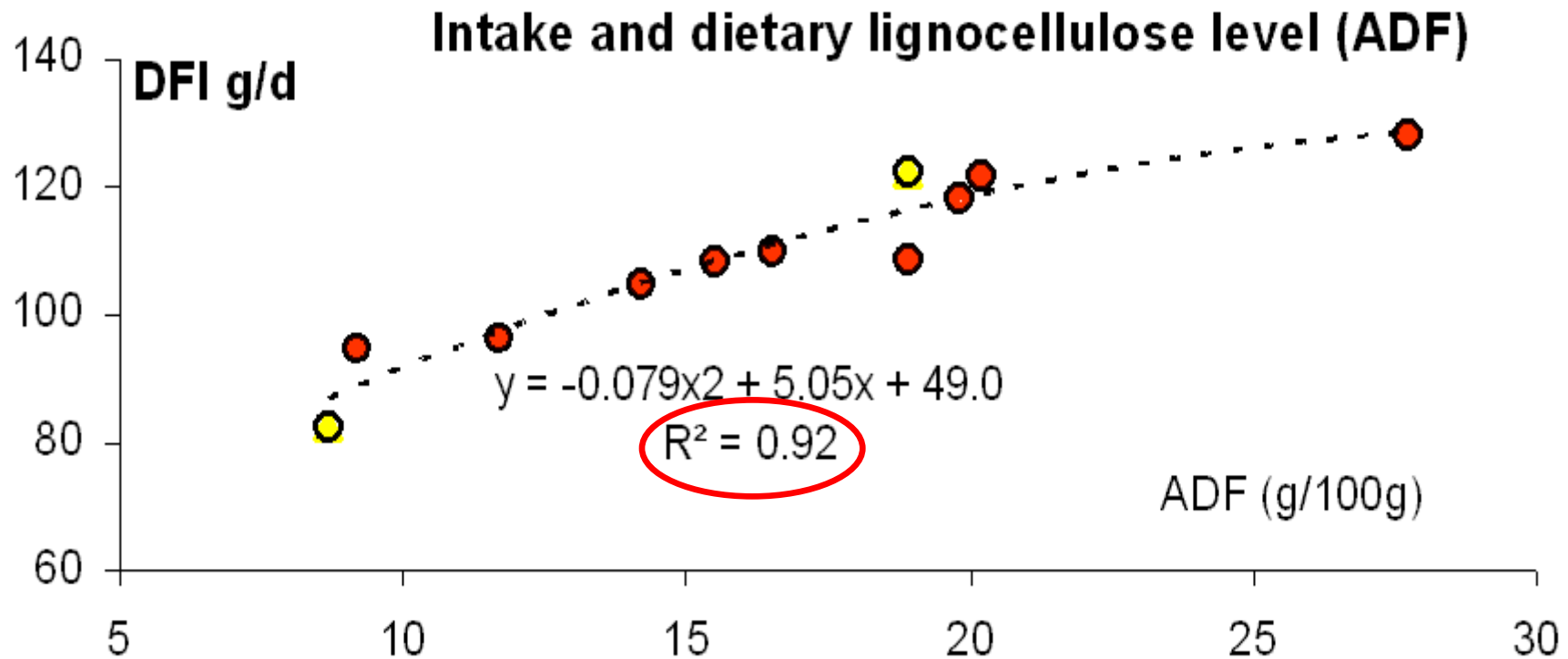


# Effect of diet's digestible energy concentration on rabbits daily feed intake

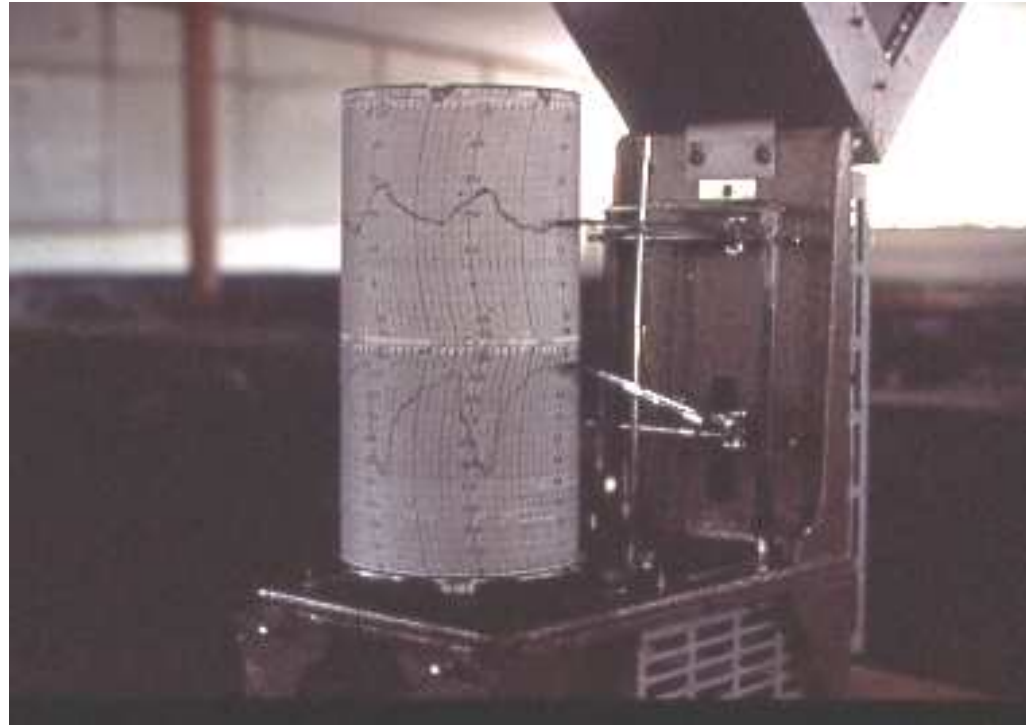
Intake and dietary digestible energy level



## Effect of diet's ADF content on daily feed intake of rabbits



## Effects of ambient temperature on feed intake and performance



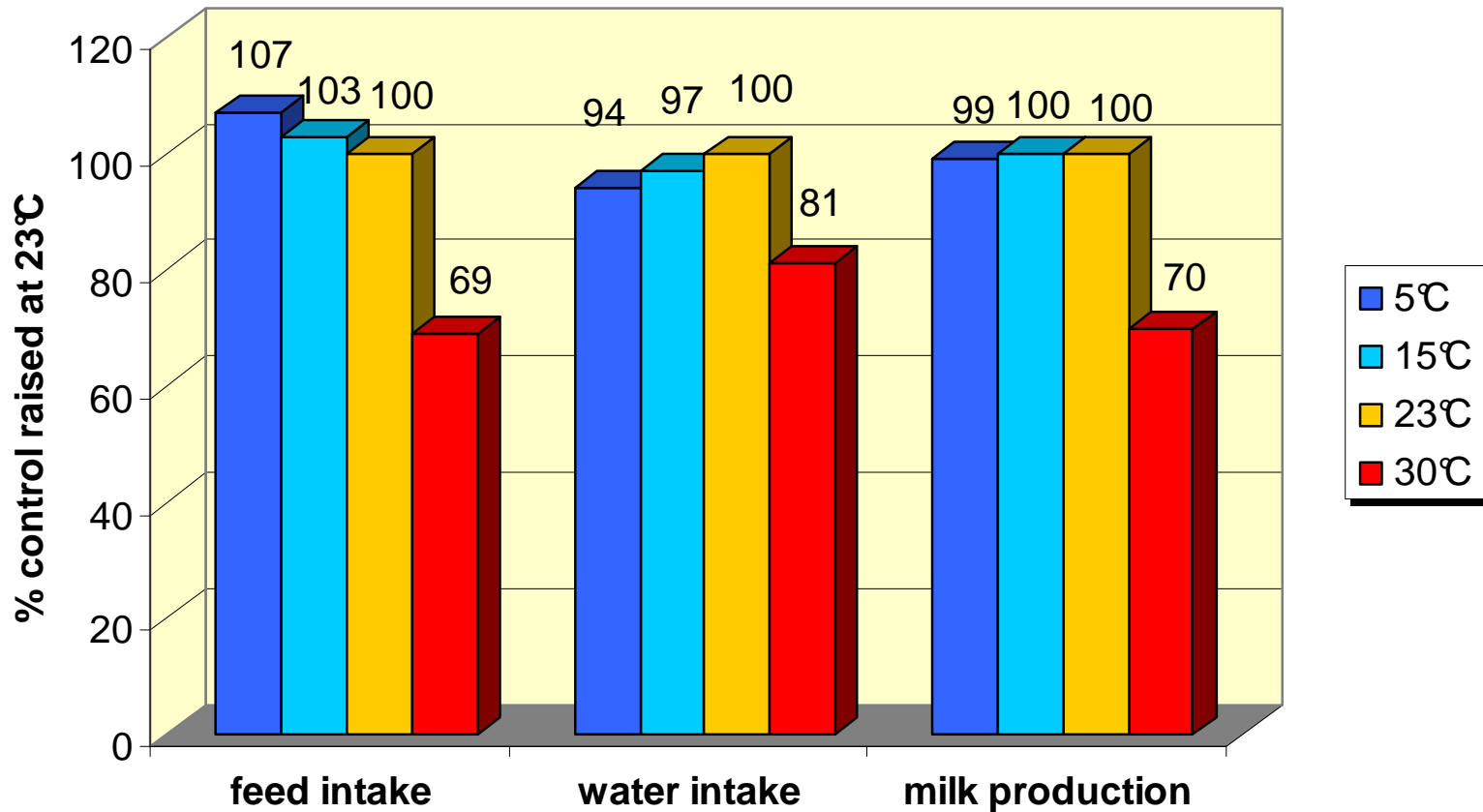
## Effect of ambient temperature on rabbit's feed and water intakes and on growth rate

According to Eberhart (1980)

Ambient temperature	5°C	18°C	30°C
- Pellets intake (g/d)	182	158	123
- Water intake (g/d)	328	271	386
<i>Water / Feed ratio</i>	<i>1.80</i>	<i>1.71</i>	<i>3.14</i>
- Average daily gain (g/d)	35.1	37.4	25.4

# Effect of temperature increase on feed and water intakes, and on milk production of rabbit does

Results are expressed in percentage of the “orange” group raised at 23°C



According to Szendrő et al., 1998

# **In free choice** situation rabbits generally prefer **graminaceous plants**

**In winter, green cereals are very palatable for wild rabbits**



**But if not available they can eat green rapeseed plants**



In winter rabbits eat gladly the bark of some types of trees (apple trees, ...), not necessarily the youngest, but don't attack some others (pear or plum trees, ...)



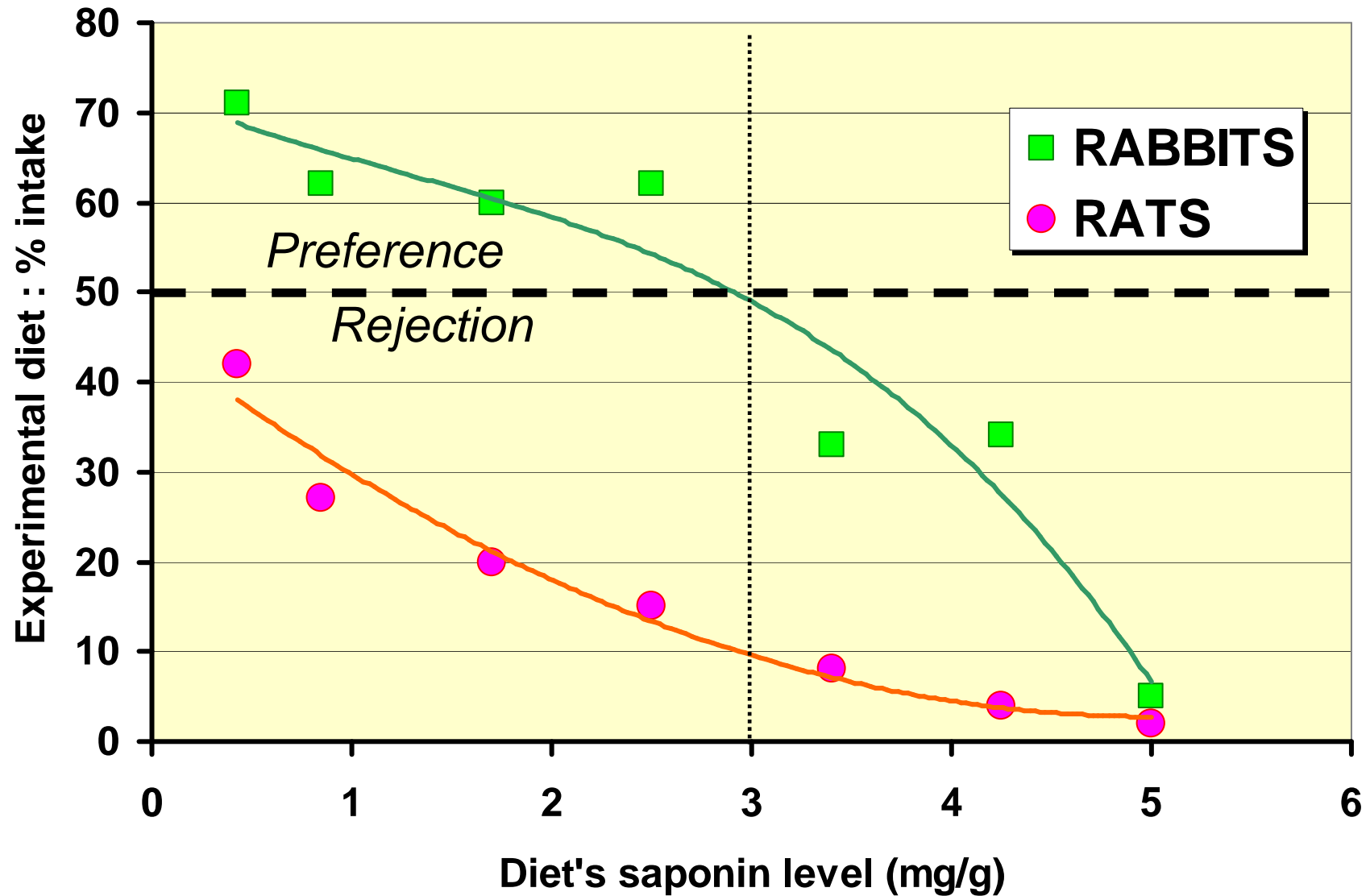
*Senecio inaequidens* is a South African plant which is invading Europe since about 100 years. Very few animals graze this plant but rabbits effectively eat some at the occasion.

After partial destruction by grazing rabbits, the plant grows again but with a composition a little bit different.

And then rabbits reject this new growth and the plant can continue to invade Europe



Relative feed intake of **rats** and **rabbits** in situation of free choice between a control diet without saponin and alfalfa samples with various saponin levels - according to Cheeke *et al*, 1977



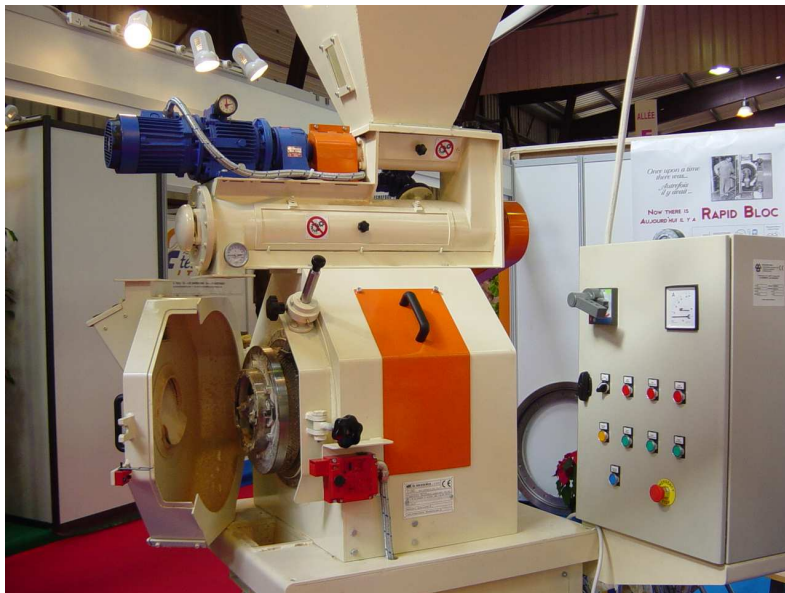
## Relation between free choice preferences and feed intake with a single feed

Results of free choice tests (10 days) and observed feed intake when each diet is distributed alone for 2 - 3 weeks or more – According to Lebas 1982 and 1988

	Free choice	Single diet
Control	{ 35 <b>65</b>	50
<b>Control + Thyme extracts</b>		50
<b>Control</b>	{ <b>80</b> 20	50
Control + formalin 200 ppm		50

**For these reason (and some others) quite all commercial rabbits receive a complete diet pelleted to avoid any possibility of choice.**

**The worst situation is to distribute diets as coarsely ground meal. Effectively, in this case rabbits are able to separate and reject one of the components and then to destroy the “balance” of the diet. In such cases rabbits can die from digestive disorders exclusively because they have done the bad choice. For other reasons finely ground diets are not advisable**



The systematic use of pelleting machines for commercial rabbit feeding is a partial consequence of this animal feeding behaviors



# Conclusions

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- When diet's energy concentration increases or when diet's ADF decreases, rabbit is able to decrease it's daily feed intake in order to maintain it's production (growth , milk, ...) [for digestive reasons an minimum of fiber is necessary]
- Because of the difficulty for rabbits to make the good decision in case of free choice, and of the difficulty to predict this choice, for practical rabbit feeding use of complete pelleted diet is advisable.



*Thanks for your  
attention*

