

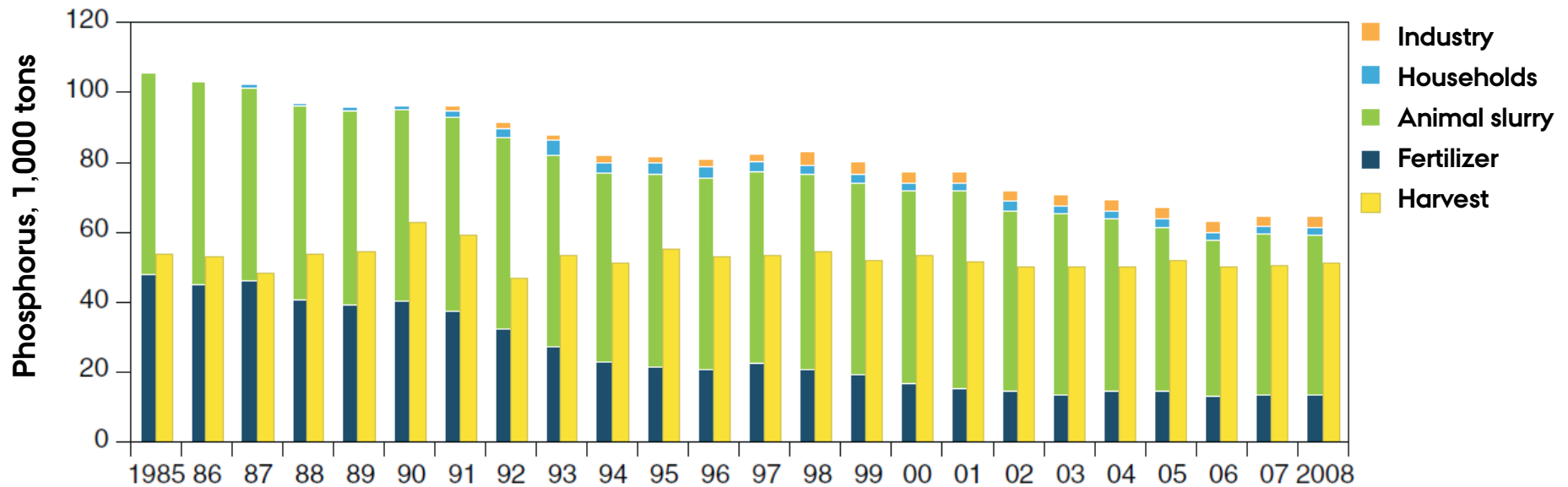
PHOSPHORUS (P) - CAN WE REDUCE EXCRETION ?

NØK 2012

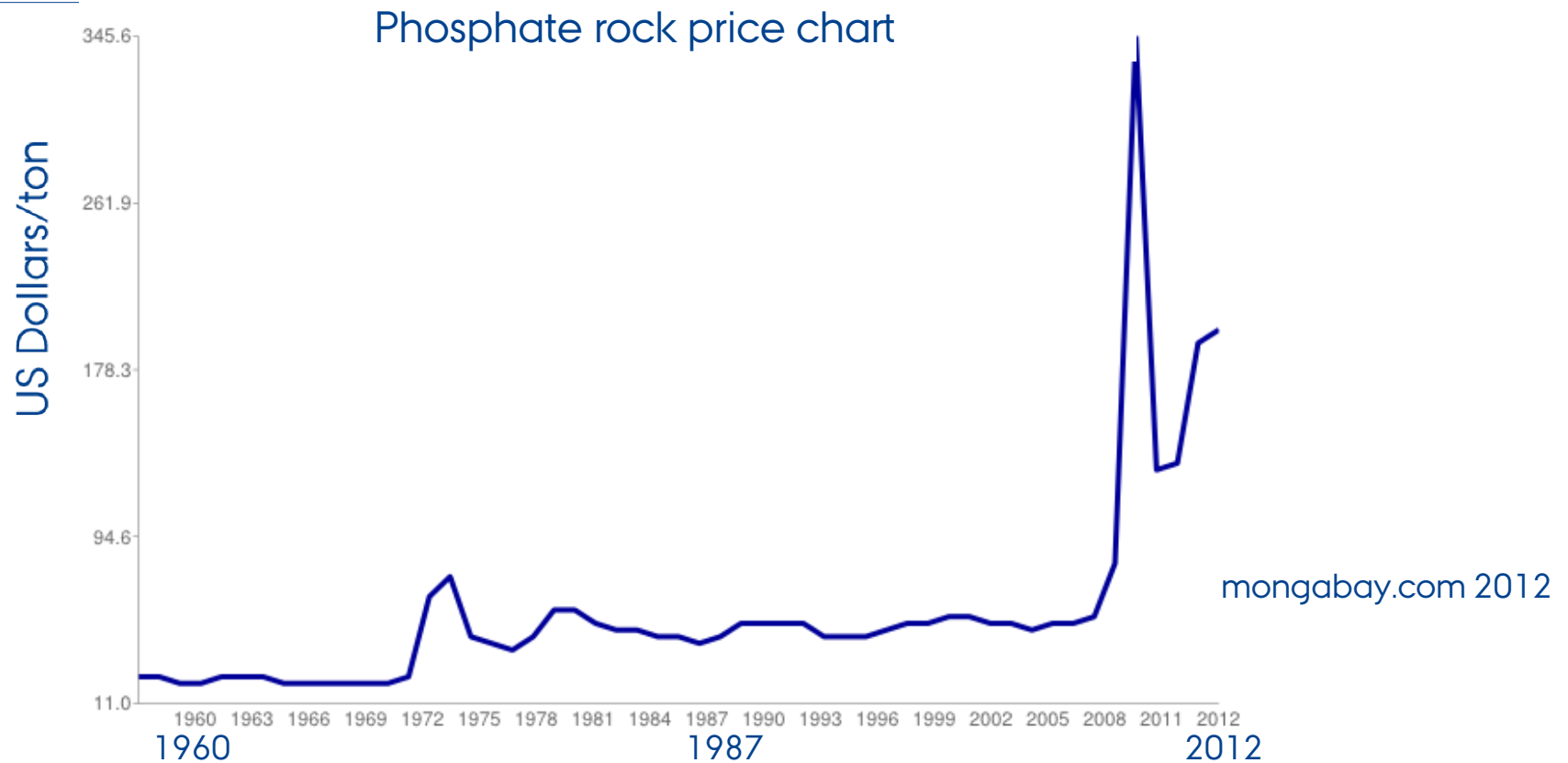
JAKOB SEHESTED
DEPARTMENT OF ANIMAL SCIENCE



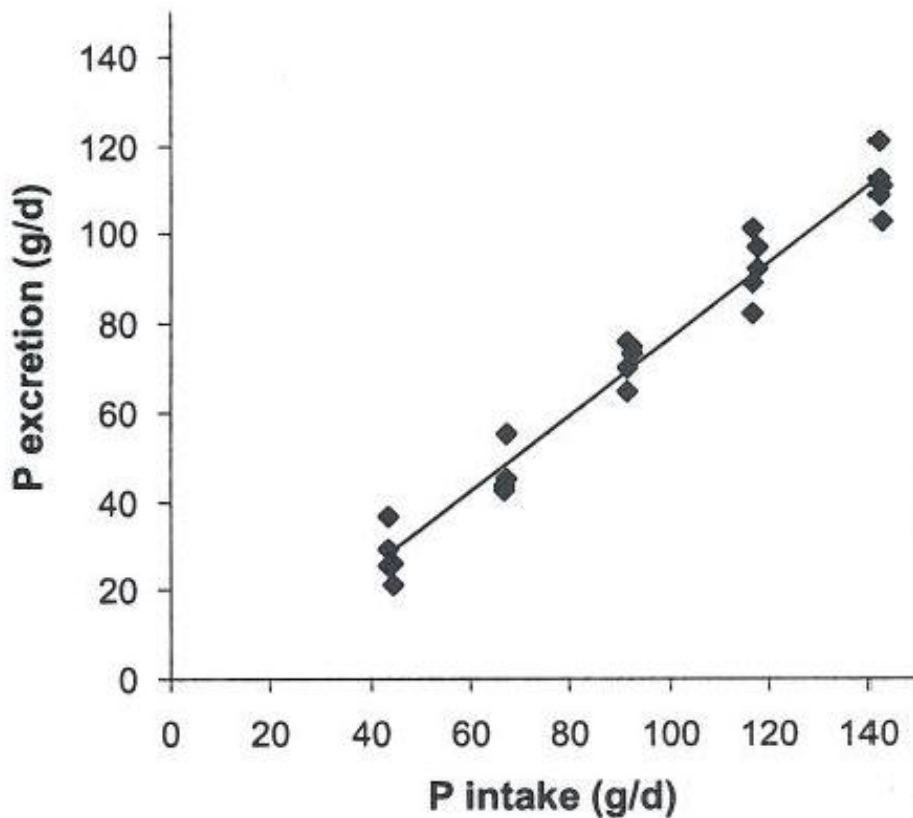
P BALANCE ON ARABLE LAND



LIMITED AND EXPENSIVE RESOURCE



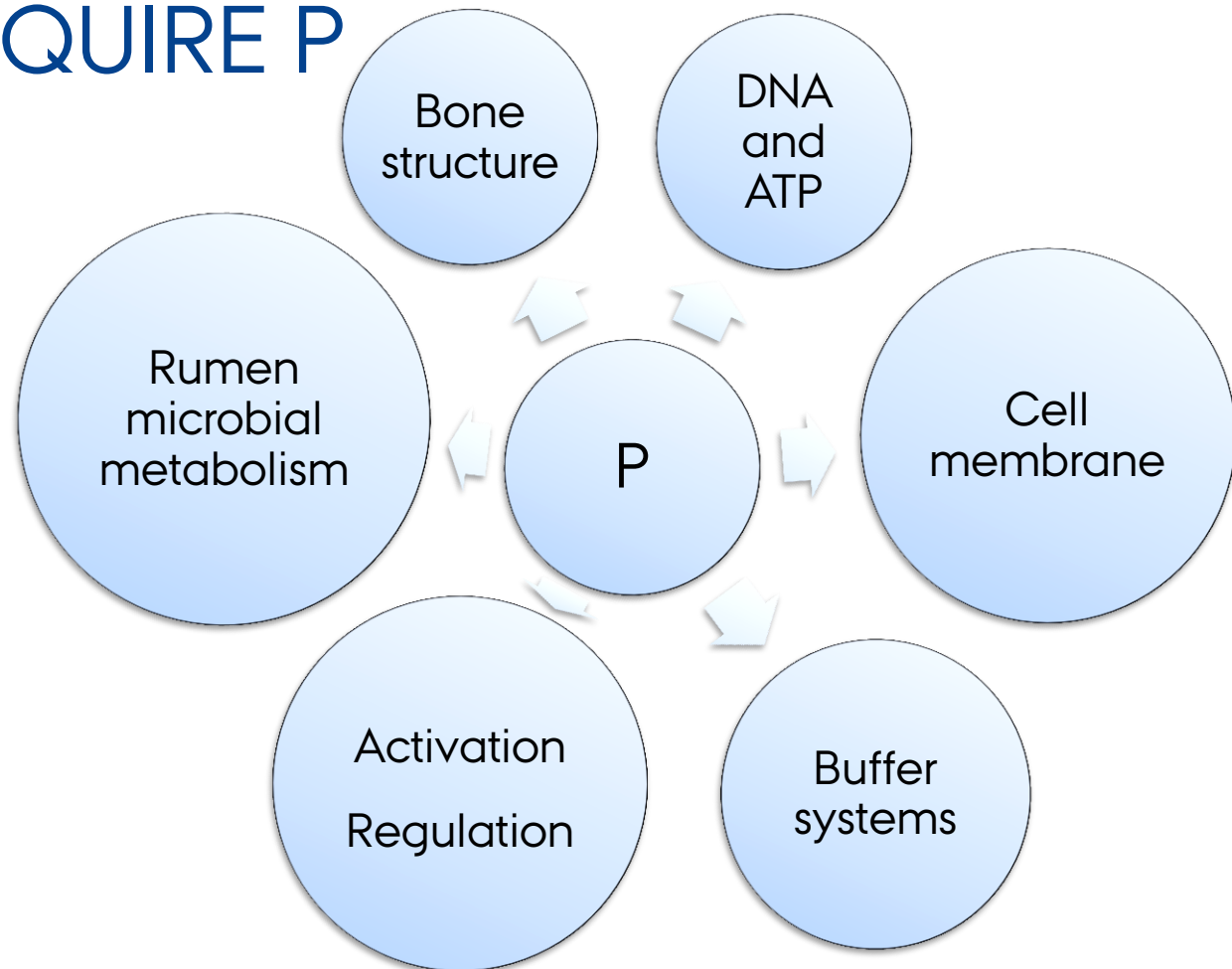
SURPLUS EXCRETED IN MANURE



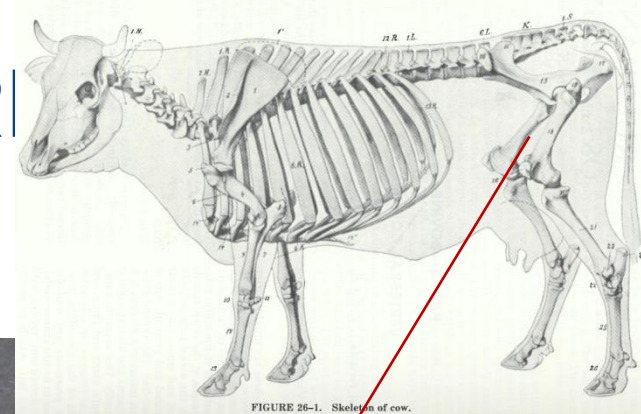
Feed P level 0.24% to 0.78% P

Milk Yield < 23 kg / day

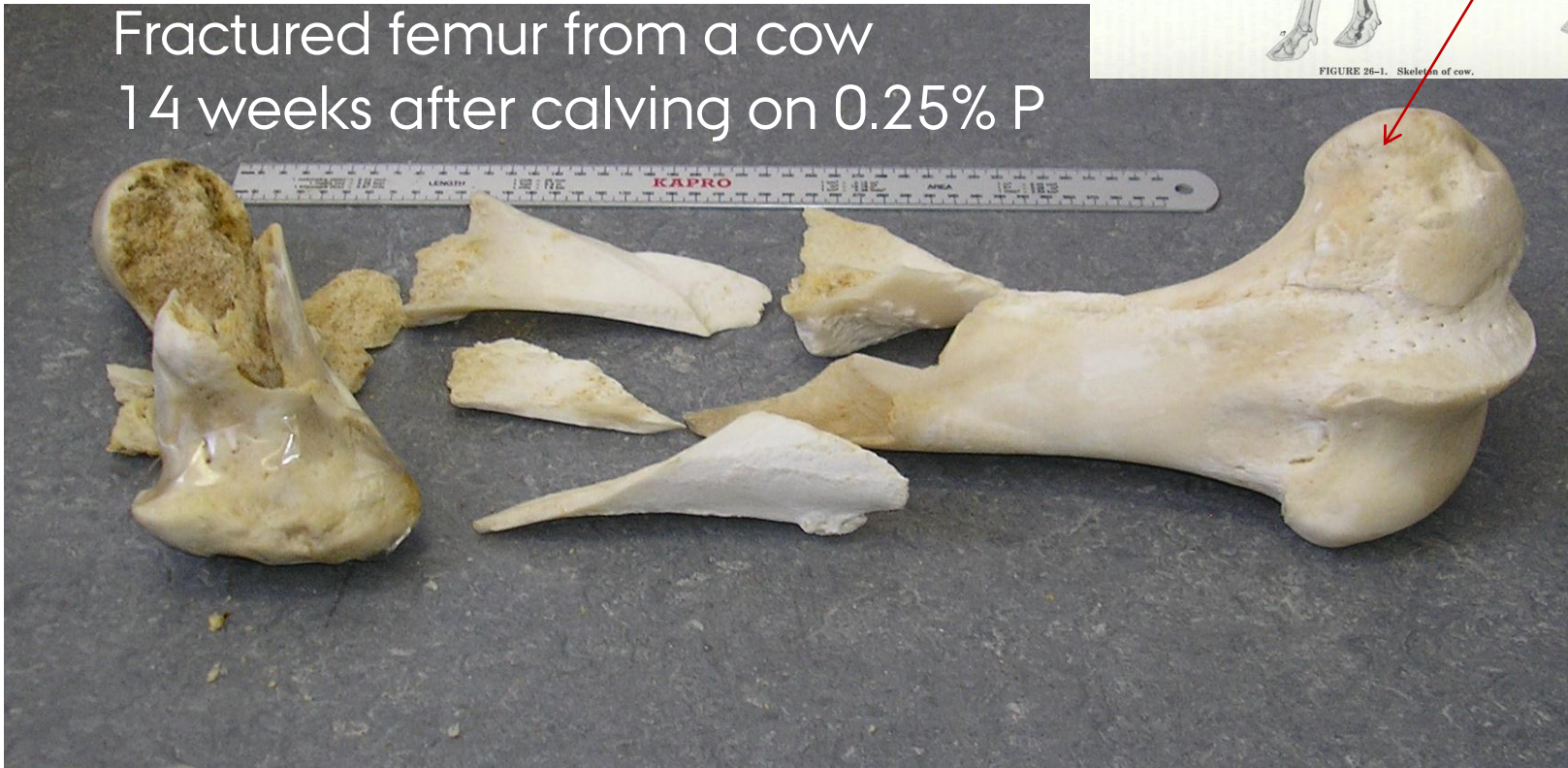
COWS REQUIRE P



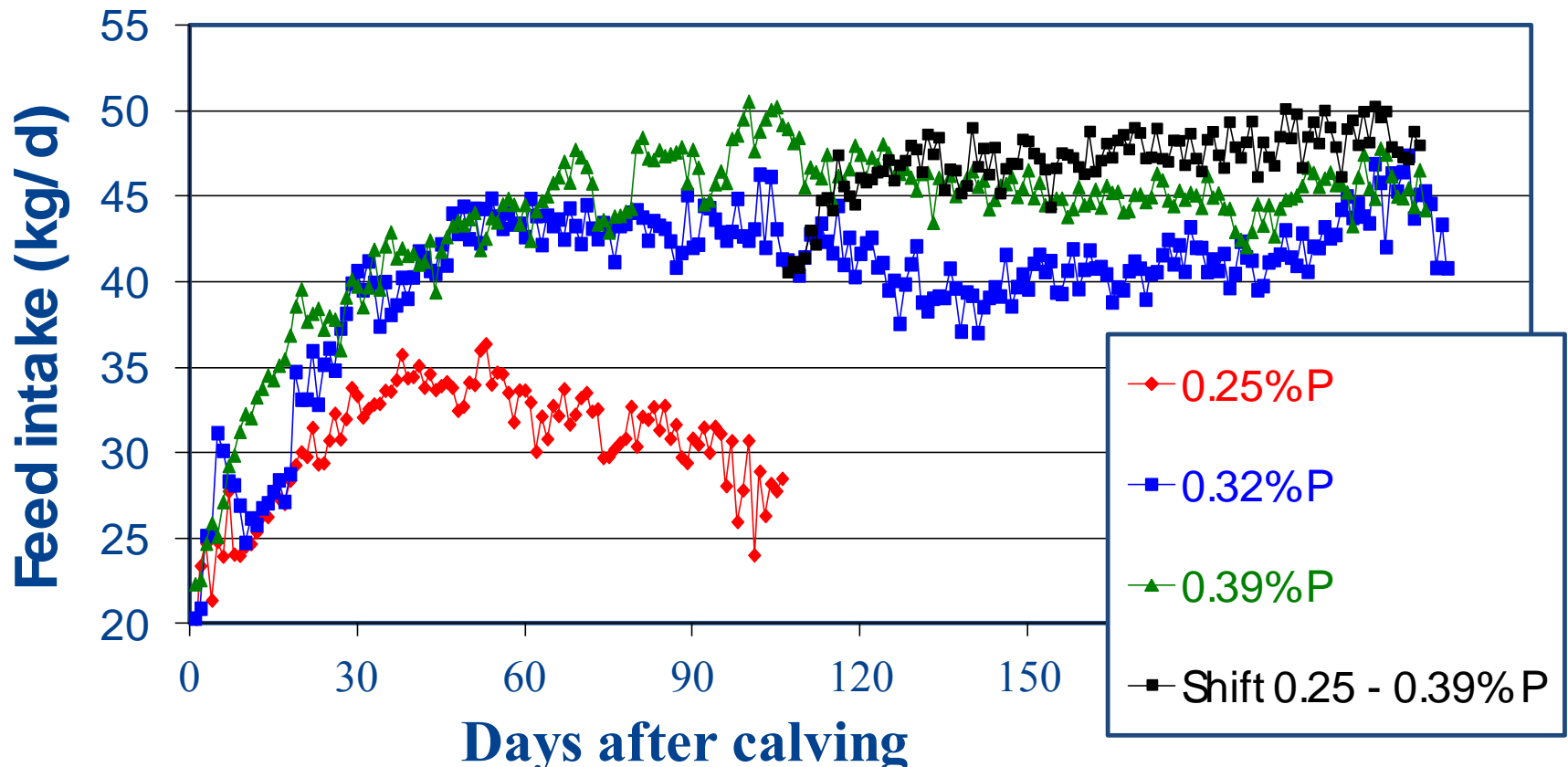
DIETARY P MUST BE LOWER BUT COWS ALSO NEED P



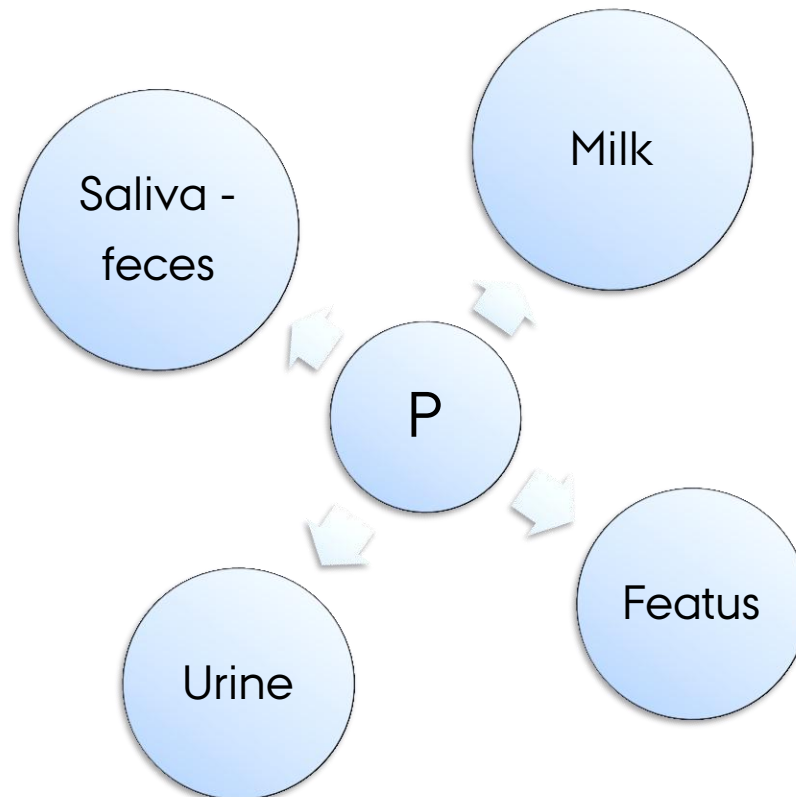
Fractured femur from a cow
14 weeks after calving on 0.25% P



EFFECT OF P ON FEED INTAKE

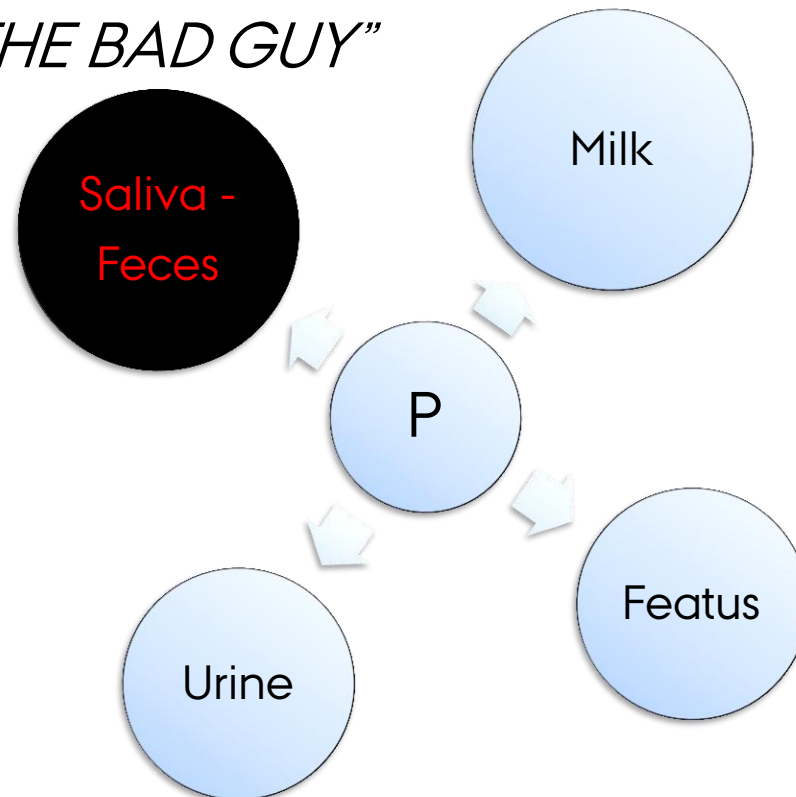


COWS EXCRETE P



COWS EXCRETE P

"THE BAD GUY"



P UTILISATION PER COW-YEAR

Current practice

Feed	7,408 kg at 4.2 g P/kg DM	31.1 kg
-Milk:	9,420 kg at 0.96 g P/kg	- 9.0 kg
-Growth:	40 kg at 6.1 g P/kg	- 0.2 kg
-Fetus:	24 kg at 10.2 g P/kg	- 0.2 kg
-Urine:	3.0 mg P/kg/d	- 0.7 kg
Feces:		21.0 kg

P utilisation: $(\text{Milk} + \text{growth} + \text{fetus}) \times 100 / \text{feed} \approx 30\%$

POTENTIAL IN FEEDING AS RECOMMENDED

	2011 Practice P	2011 Standard P
P in feed, g/kg DM	4.2	3.5 (-17%)
P excretion, kg/cow-year	21.7	16.5 (-24%)
P excretion, g /kg ECM	2.3	1.7 (-26%)
P utilisation, %	30	36 (+20%)

WHAT ARE THE EFFECTS OF REDUCED P FOR COW HEALTH AND PRODUCTION?

- Recommended feed P level is about 3.5 g / kg DM
- Reduced intake and yield observed at $P \leq 0.30\% - 0.32\%$
- Recommendation based on gross feed content
- Content and availability of P varies in feeds

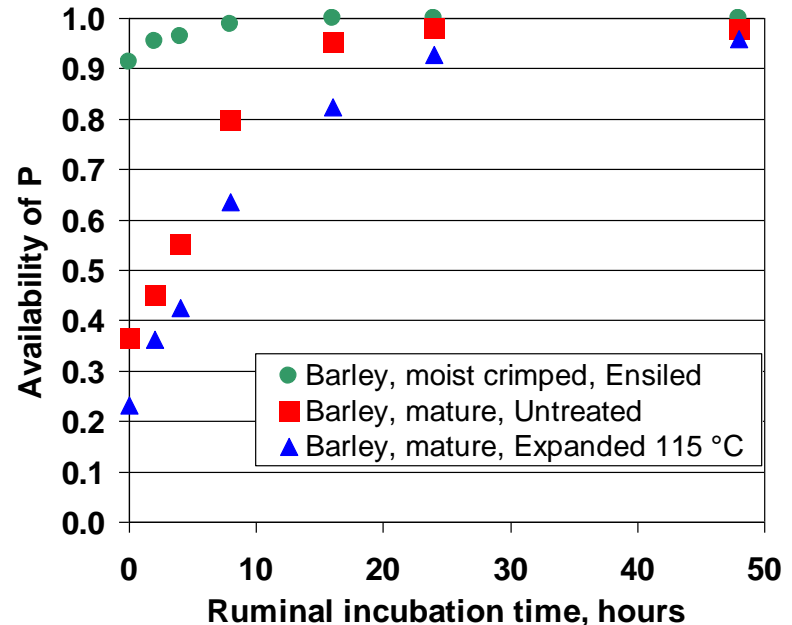
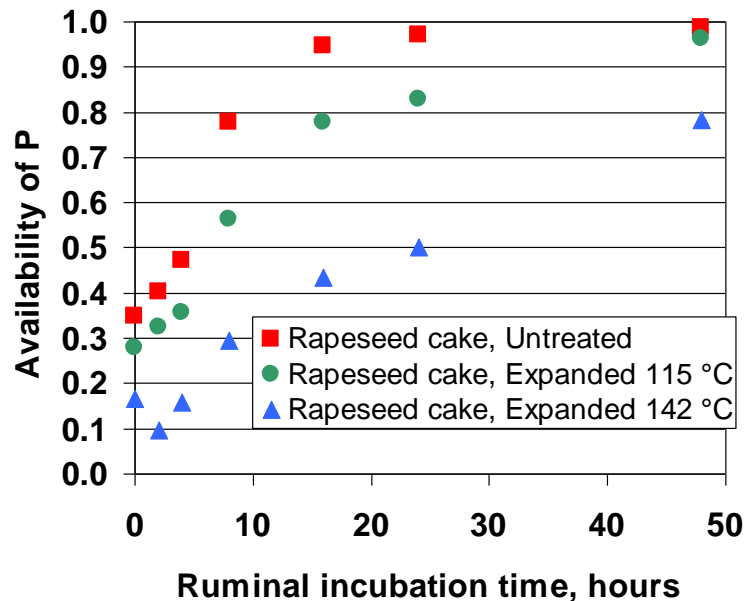
CONTENT OF P IN FEEDS

	g P / kg DM	% crude protein
Maize silage	2.3	7.9
Grass-clover	3.8	17.9
Grain	3.5	10.6
Soybean meal	7.6	48.7
Sunflower meal	12.6	41.7
Rapeseed meal	12.9	38.8

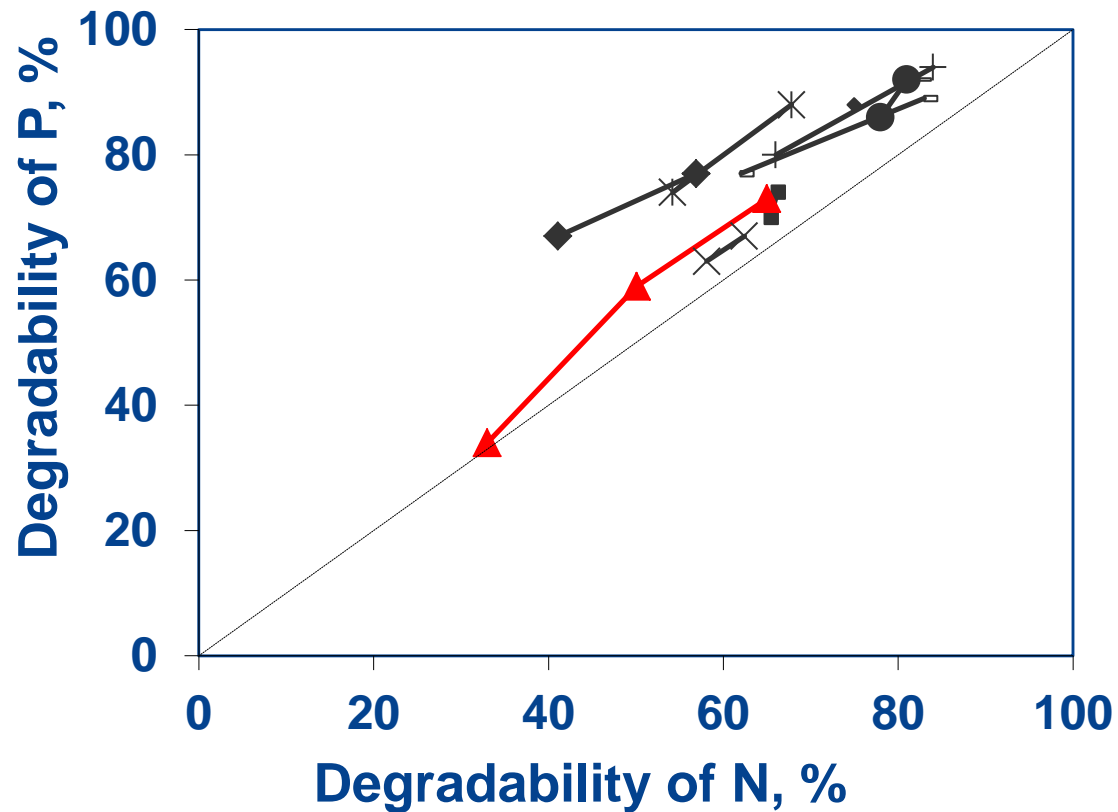
AVAILABILITY OF P IN FEEDS

<u>Rape seed cake</u>	<u>EDP</u>
Untreated	0.73
+ Heating	0.59
++ Heating	0.34

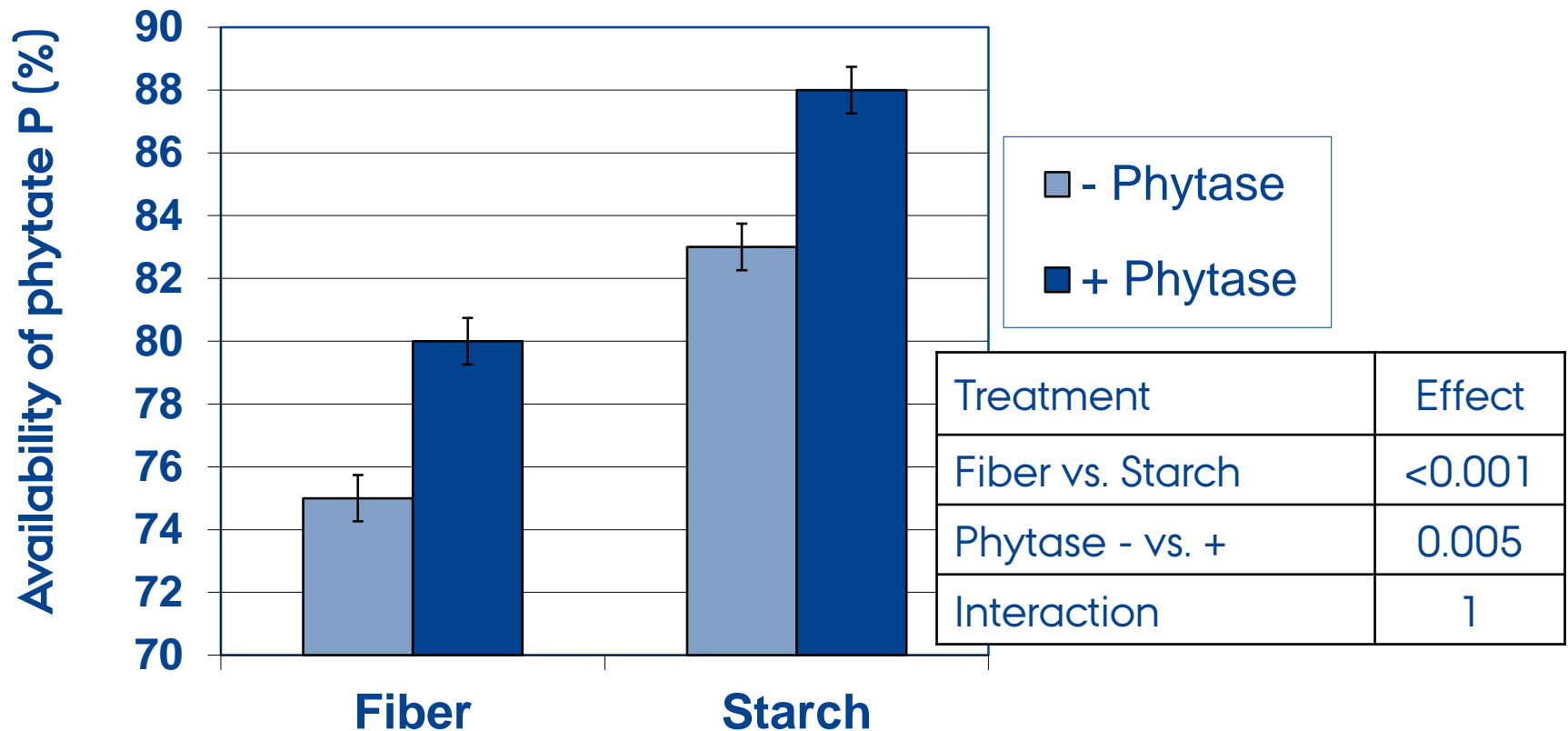
<u>Barley</u>	<u>EDP</u>
Mature	0.77
+ Heating	0.68
Ensiling	0.97



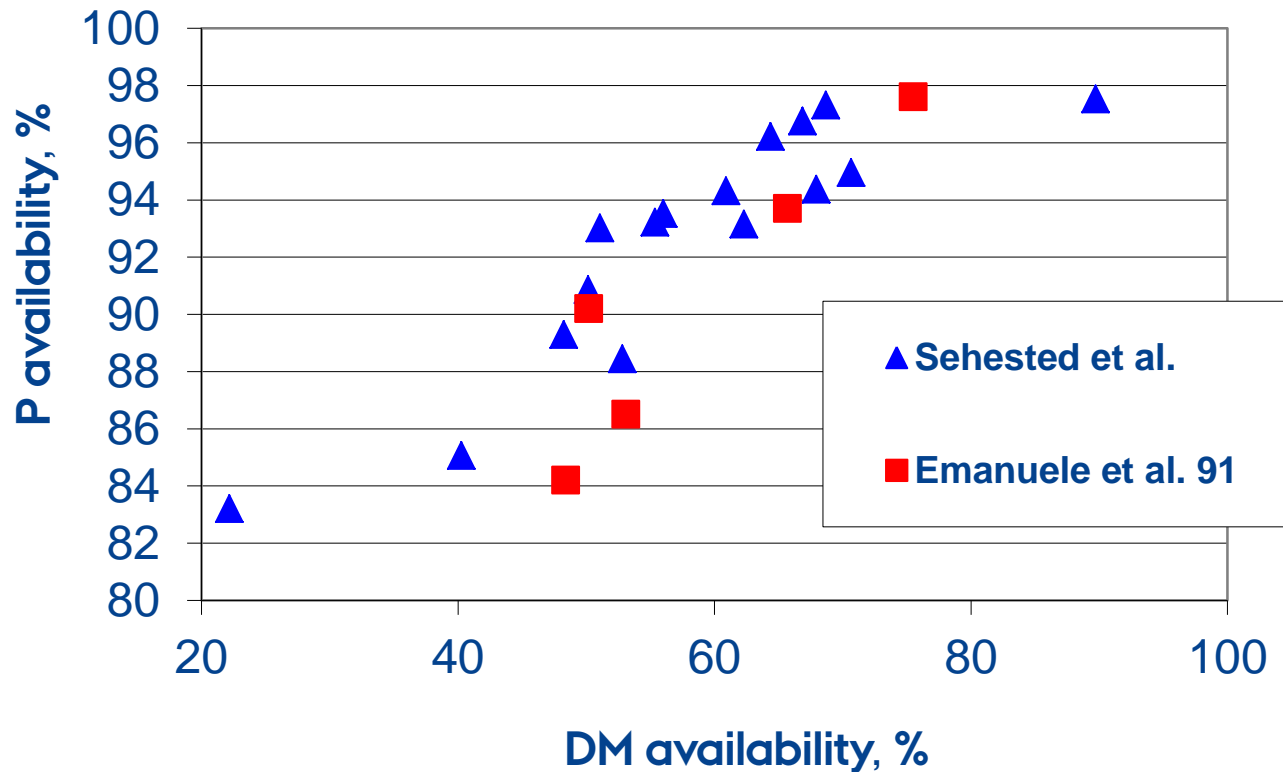
DEGRADABILITY OF P AND N



PHYTATE REDUCES P AVAILABILITY



P AVAILABILITY IN ROUGHAGE



P excretion can be reduced

- › Reduce feed P to recommended level - omit P supplements
- › Feed P according to cows requirement
- › New knowledge is needed on
 - › feed P availability and technology to improve this
 - › technologies to remove P from feeds with high P
 - › bone P mobilisation at calving and P loss by recirculation

Scenario for 2020: 30 KG P PER HA

	2010 Practice P	2010 Standard P	2020 at 2010 practice	2020 at 2010 standard
Feeding and yield per cow-year				
P in DM	0.42%	0.35%	0.42%	0.35%
Feed efficiency	83%	83%	83%	86%
Yield, kg ECM	9,485	9,485	11,000	11,000
P excretion				
kg P /cow-year	21.5	16.3	23.3	16.6
g P / kg ECM	2.3	1.7	2.1	1.5
Limit of 30 kg P per ha				
cows / 100 ha	140	184	129	181
ha / 10 ton ECM	0.76	0.57	0.71	0.50

