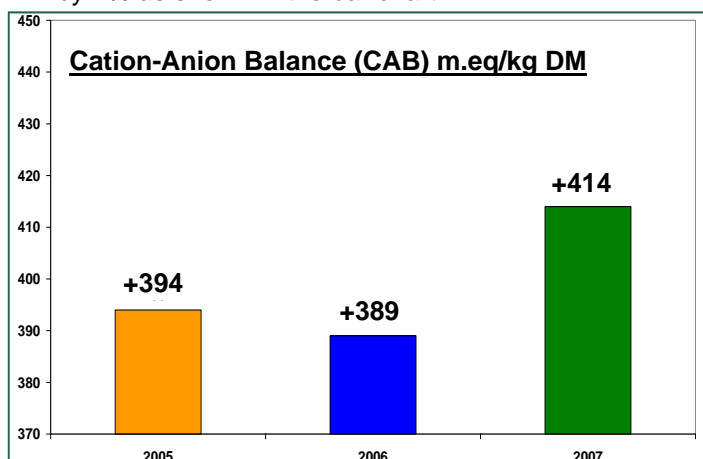


## GRASS SILAGE MINERAL PROFILE-2007 AFFECTED BY ADVERSE WEATHER

Initial results from over 500 Grass Silage samples from the 2007 crop shows the mineral profile to be adversely affected by the wet weather in May and June. Compared with the 2006 mineral survey results, the headlines for the 2007 Grass Silage Crop are:

### CATION-ANION BALANCE CONTINUES TO RISE

- Major mineral levels for Calcium, Phosphorus, Magnesium and Sulphur are very similar to 2006 levels.
- Electrolyte mineral levels have all increased:
  - Potassium has increased by 4% to 2.68%.
  - Sodium has increased by 24% to 0.31%.
  - Chloride has increased by 9% to 1.02%.
- Cation-Anion Balance (CAB) continues to rise, as a result of increases in Potassium and Sodium from +389 in 2006 to +414 meq/kg DM in 2007.
- Over the past 3 years (2005-2007) CAB has gone up by 7% as shown in the bar chart.



- Background to the rise in CAB is likely to result from the targeting of slurry at silage ground. Slurry is a good source of both Potassium and Sodium.
- Weather patterns also play a part. The cold spring in 2006 tended to depress mineral levels in 1st Cut silage. This year spring was earlier with unseasonably high temperatures in April, which would have warmed soils and increased mineral uptake by grasses.

### HIGH CAB CONSEQUENCES

- High positive CAB will increase alkalinity of blood and body fluids (urine), which will reduce the efficiency of Calcium absorption from gut and release from bone.
- Potassium, which has the greatest influence on CAB will depress Magnesium absorption. Magnesium is required to stimulate PTH (Para-Thyroid Hormone) which controls Calcium absorption.
- Reducing Calcium supply will inevitably increase the risk of Hypocalcaemia at calving, particularly for older cows and those with a high potential for milk production.

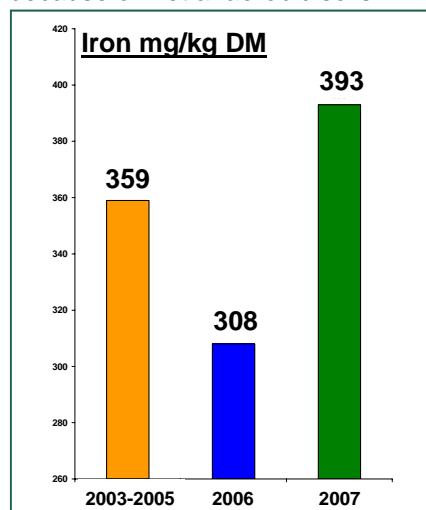
- Milk Fever is the ultimate expression of Hypocalcaemia but sub-clinical symptoms include retained cleansings, poor milk initiation, metritis, depressed dry matter intakes and ketosis.

### ACTION POINTS

- Check soil Potash indices in the autumn and apply Potash fertilisers accordingly, include slurry in the estimate of Potash requirements.
- Analyse silage for electrolyte minerals ( $K^+$ ,  $Na^+$ ,  $Cl^-$ ,  $S^-$ ) and calculate CAB value.
- Adjust forage ratios in pre-calving diets to ensure CAB and Potassium levels are less than +150 meq/kg and 1.5% respectively.
- Target Magnesium intake at 50g/cow/day (min).
- Use anionic salts (Magnesium Chloride, Magnesium Sulphate, Ammonium Chloride) to reduce CAB if altering forage ratios fails to reduce CAB.
- Boost Calcium supply at calving with Calcijet P+, a liquid supplement containing Albion chelated Calcium and Magnesium, together with Phosphorus salts based on Propylene Glycol.

### IRON LEVELS ROCKET

- Wet harvesting conditions has inevitably resulted in increased levels of soil contamination.
- Iron levels have increased by 28% (308 mg/kg in 2006 and 393 mg/kg in 2007). This is the highest mean annual Iron level we have ever reported.
- Aluminium levels have almost doubled (163 mg/kg in 2006 and 281 mg/kg in 2007).
- Titanium levels, which are used to assess soil contamination, increased by 22%. With the Iron increase higher than this value, we can conclude that about half the Iron increase is due to higher soil contamination levels with the remainder due to an increased Iron uptake by grasses because of wet anaerobic soils.



- Average forage Iron levels over the period 2003-2005 was 350-360 mg/kg.
- The drier Spring in 2006 resulted in less soil being picked up.
- The wet conditions for harvesting grass in 2007 have produced a quite exceptionally high Iron level.

## ACTION POINTS

- Check Iron levels in silages and estimate total Iron level in lactation diets.
- High Iron is detrimental to cow health and production through:
  - Oxidation. Iron, particularly from soil contamination, becomes progressively more reactive in silage clamps (no air and acid conditions) with time. Increases Oxidative Stress in cows.
  - Competition. High Iron levels will swamp the absorption sites in the gut which are common not only to Iron, but Copper, Zinc and Manganese.
- To combat Oxidative Stress ensure Anti-Oxidative nutrients (Vitamin E, Selenium and Copper) are well supplemented.
- To combat Competition use Albion MAAC chelates of Copper, Zinc and Manganese which are absorbed at different sites in the gut to Iron.

## TRACE ELEMENT LEVELS STEADY— BUT MOLYBDENUM INCREASES

- Manganese, Zinc, Copper, Cobalt and Selenium levels are similar to 2006 mean values.
- Molybdenum has increased by 27% (0.93 mg/kg in 2006 to 1.18 mg/kg in 2007), again due to an expected higher uptake by grasses from wet anaerobic soils.
- Molybdenum level is within the 0.91-1.20mg/kg DM range reported over the past 5 years. This year it is at the higher end of the range due to the wet conditions.
- As a result of the higher Molybdenum values the Available Copper Status has declined from 64 to 55%. This means that compared with “average” grass the 2007 grass silage crop contains only 55% of the Available Copper content which could be reasonably expected.

## ACTION POINTS

- Analyse silages for minerals and trace elements.
- Use the T&J Mineral Check service to produce a customised mineral designed to balance TMRs and dairy diets.
- Because of the increased levels of Iron and Molybdenum use Albion Copper MAAC at a rate of 20-25% supplementary Copper to maintain a supply of available element.
- In situations where both Iron and Molybdenum are high in the total diet, use both Copper Sulphate and Copper Acetate to suppress these antagonists in the rumen.

## SUMMARY

- The main trends in the 2007 Grass Silage crop are:
  - higher Potassium
  - higher CAB
  - higher Iron
  - higher Molybdenum
- Forage mineral reports should be used to identify element balance and the extent of any antagonisms.
- Risk of milk fever and its attendant problems at calving is increased.
- Potential for oxidative stress damaging cow health will be higher for this winter season.
- Pressure on Available Copper supply is also higher, leading to more fertility problems.
- To ensure cow health, fertility and production is protected from these potential problems, use the T&J Forage Mineral Analysis Service and Mineral Check, together with Albion MAAC chelated minerals.

Forage Year	2006	2007	% Difference 2007 v 2006
No. of samples	566	512	
Calcium %	0.56	0.59	---
Phosphorus %	0.26	0.27	---
Magnesium %	0.16	0.17	---
Potassium %	2.57	2.68	+4
Sodium %	0.25	0.31	+24
Chloride %	0.94	1.02	+9
Sulphur %	0.18	0.19	---
CAB meq/kg	+389	+414	+6
Iron mg/kg	308	393	+28
Aluminium mg/kg	163	281	+72
Manganese mg/kg	121	118	---
Copper mg/kg	6.9	7.1	---
Zinc mg/kg	28.1	30.6	---
Cobalt mg/kg	0.15	0.16	---
Molybdenum mg/kg	0.93	1.18	+27
Iodine mg/kg	1.01	0.68	---
Selenium mg/kg	0.07	0.10	---
Available Copper Status %	64	55	-14
Soil Contamination – Titanium mg/kg	10.7	13.1	+22

Period 1st June to 10th September for both years.  
Results are expressed on a Dry Matter basis.

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