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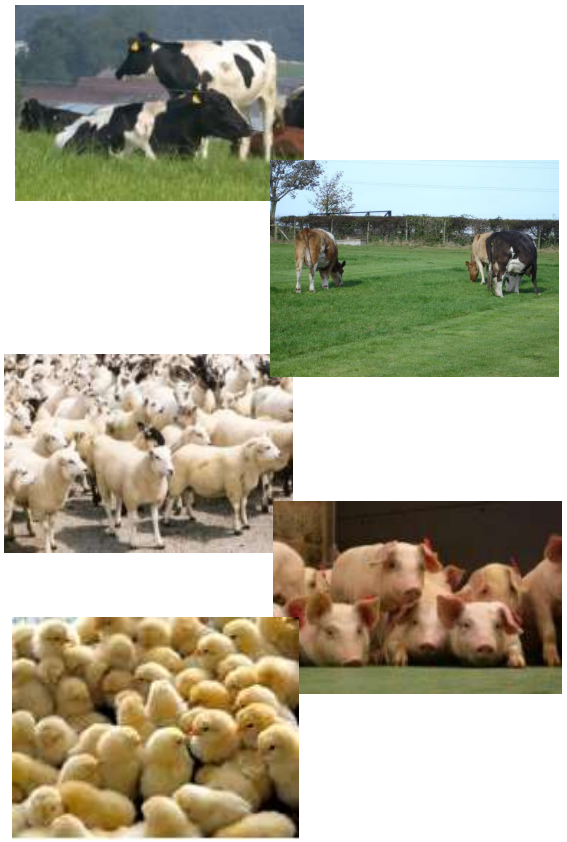
Accurately predicting Nutrients from Livestock



- Nutrition
- Metabolism
- Management system

- Soluble and Insoluble P
- Nitrates
- Ammonia
- Nitrous Oxide
- Methane

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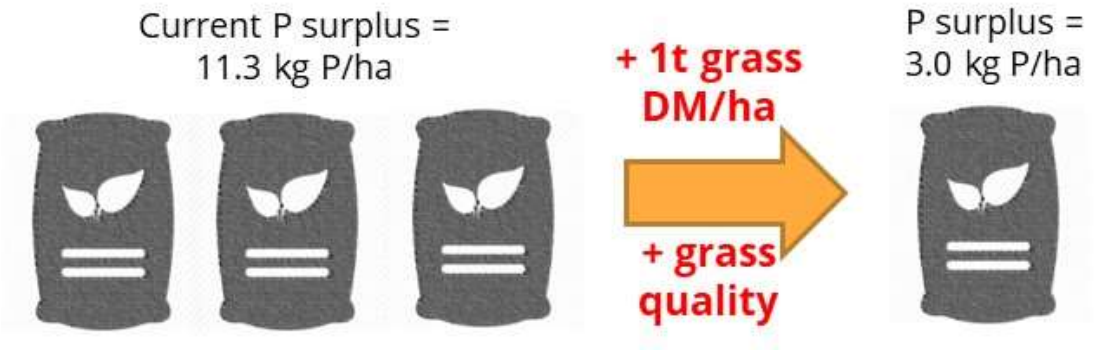
Reducing Phosphorus in Dairy systems

- Reduction in dairy cow concentrate phosphorus level
- Improved grassland productivity = improved P balance



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Reducing P in dairy cow diets

- AFBI research demonstrated that P levels in dairy cow diets can be reduced by 25% with no negative effects.
- This was achieved by reducing P levels in concentrates from approx. 0.62% to 0.40% (fresh basis).
- 'Industry average' for P in concentrates agreed as 0.57% fresh basis (NIGTA led agreement).
- Industry indicates that they have since reduced further.
- Uncertainty what actual levels are at present (and ranges) ?
- Uncertain what the cost of further reductions are?
- Uncertain what impact on overall 'concentrate footprint' is but potential to reduce P levels further.
- Likely that further reductions are still possible, but we need to understand where we are today, cost and footprint implications of further reductions and how these work in 'Low Carbon diets'.

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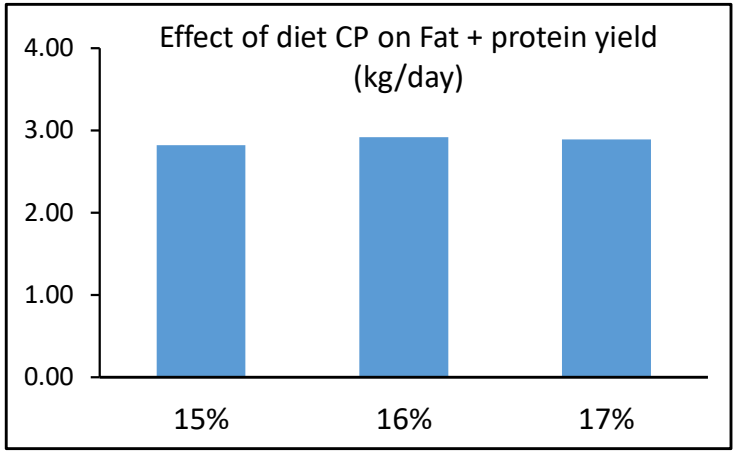
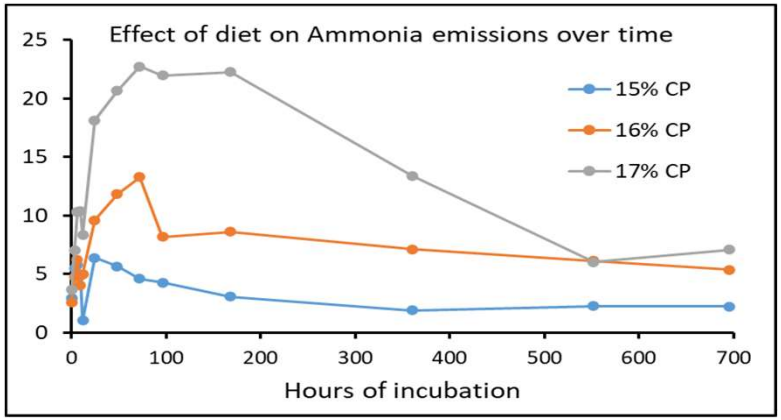
Reducing N in dairy cow diets

- The protein content of dairy cow diets can be reduced with careful rationing (must focus on metabolizable protein, not crude protein)
- Levels can be reduced from 17% to 15.5% with no loss in performance – research is still ongoing
- Ammonia losses from resultant slurry normally reduced





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Modelling Livestock Nutritional Requirements

- ‘Feed into Milk’
- ‘Feed into Lamb’
- ‘Feed into Beef’

➢ **Critical models within:**

- National inventories and NAP
- UK Farmer and industry feed formulation and budgeting systems
- Life cycle analysis and ecosystem modelling

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Pigs and Poultry N examples:

PIGS

- Improved diet formulation (Crude Protein in finisher diets) lowered N excretion and reduced NH_4 by 49% and slurry output by 38%
- Established baseline ammonia emissions from finishing pigs (1.55kg/place year = 45% lower than standard value)

POULTRY

- Established 29% lower NH_4 than currently used in the National Inventory (24g vs. 34g/bird/year)
- Established quantitative relationships between litter/manure DM and ammonia emissions – useful tool to assess ammonia mitigation strategies
- Ongoing research on mitigation strategies to reduce ammonia from poultry production (heat exchangers and manure drying)

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Pigs and Poultry P examples:

PIGS

- 25% reduction possible (0.6% to 0.45%) in dietary P levels in pig diets equating to 15% total P excretion from finishing pigs
- Potential for phytase superdosing of pig diets to improve P digestibility and reduce P excretion

POULTRY

- Research shown potential to reduce overall N and P excretion from broiler production in Northern Ireland by approximately 400 t and 90 t per annum respectively through super-dose phytase inclusion in broiler diets
- Baseline water soluble P content established for poultry systems

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Range of WSP, Total P and WSP:P across poultry systems

	WSP (g/kg)	Total P (g/kg)	WSP:P
1. Broiler breeder 0-18 weeks	3.5 (SD=0.41)	11.8 (SD=1.37)	0.30
2. Broiler breeder 18-60 weeks	3.2 (SD=0.34)	11.0 (SD=1.99)	0.29
3. Free range broilers 0-28d	2.8 (SD=0.70)	8.2 (SD=1.17)	0.34
4. Free range broilers 28d-finish	2.9 (SD=0.46)	8.2 (SD=1.23)	0.35
5. Free range broilers 0d-finish	2.8 (SD=0.36)	6.7 (SD=1.26)	0.42
6. Broilers under indirect heating	2.8 (SD=0.39)	7.0 (SD=0.70)	0.40
7. Turkeys 0-6 weeks	3.8 (SD=0.66)	7.8 (SD=1.83)	0.49
8. Turkeys 6 weeks-finish	3.1 (SD=0.66)	6.0 (SD=1.44)	0.52
9. Pullets	4.2 (SD=1.33)	12.0 (SD=1.68)	0.35
10. Layers - single-tier free range	2.6 (SD=0.39	7.5 (SD=1.53)	0.35
11.Layers - multi-tier free range	1.6 (SD=0.37)	3.4 (SD=0.49)	0.47
12. Layers - housed systems	1.6 (SD=0.37)	2.9 (SD=0.35)	0.55

On Farm Demonstration:

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- Nitrogen
- Phosphorus
- Carbon

- GHG's
- Nitrates and ammonia
- Soluble and Insoluble P

Thank You

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