Plant Protein Seminar

18.-19.11. 2019

Helsinki

FEFAC in a nutshell

- Founded in 1959
- European Association of Compound Feed Manufacturers
- 32 Members:
  - 23 Member Associations and 9 associate/observer members
- 163 mio. t of industrial compound feed in EU-28 in 2018
- 7 Technical Committees to assist the FEFAC Council

THE FEFAC 2030 Animal Feed Industry Vision

Feed Safety Management	Animal Nutrition	Sustainability

FEED INDUSTRY ANIMAL FOOD CHAIN SOLUTIONS

Feed safety management capacity building

Preservation of animal health to reduce need for antibiotics

Accommodate animal welfare demands

Facilitate responsible sourcing

Risk management optimisation along the feed chain

Increasing nutrient efficiency

Develop new resource efficiency indicators

Improve the quality & nutritional value of food products

Co-operation between control authorities & industry operators

Measure the environmental performance of feed production

3

Dairygold

2,850
Milk Suppliers

1,200
Employees

€1Bn
Turnover

Turnover
Dairy 75% Agri 25%

€350m
Net Asset Value

1.4 Bn Litres
Milk Processed

275,000 + Tns
Feed

150,000 + Tns
Fertiliser

€80m +
Retail Sales

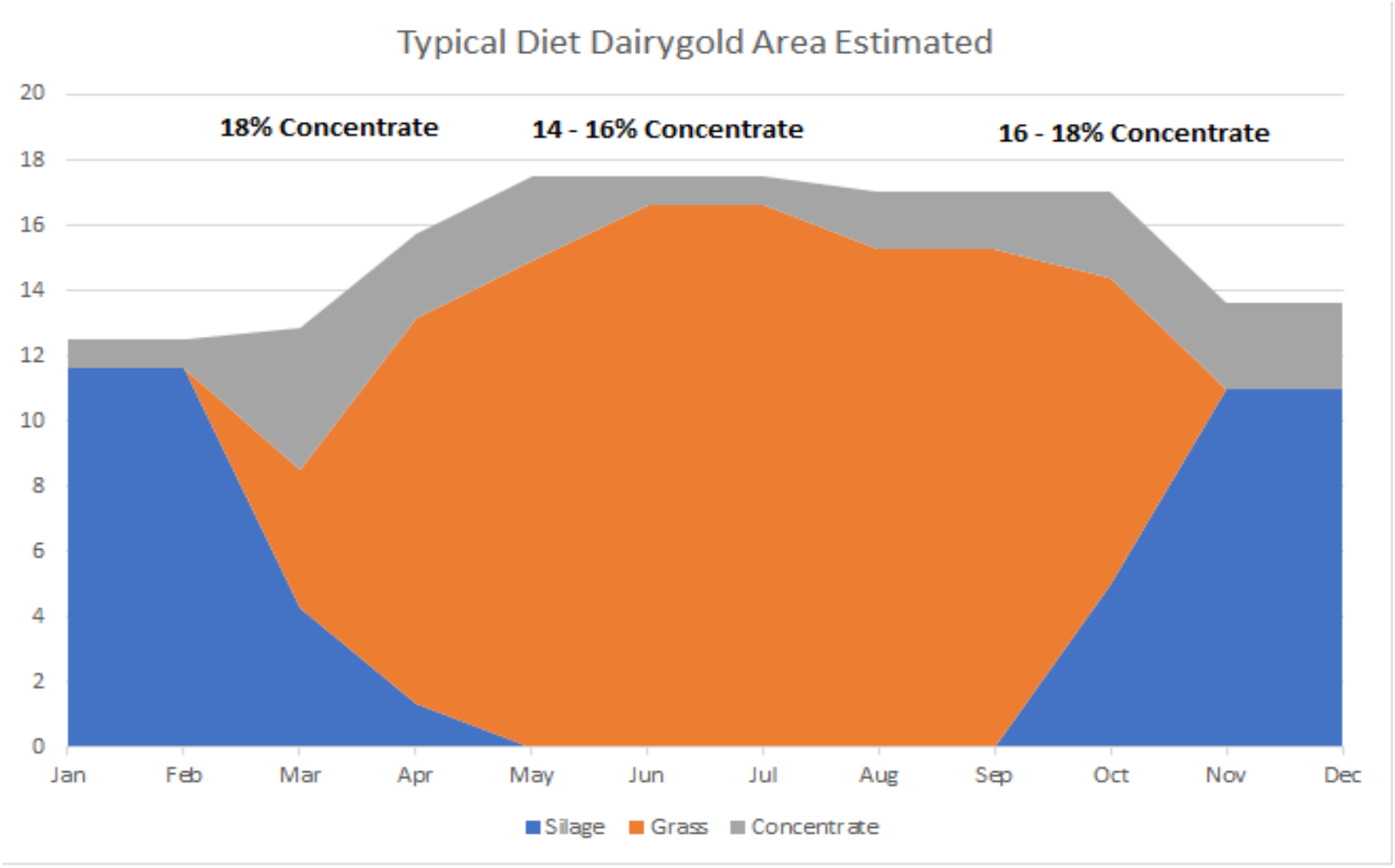
Average Dairygold Production System

- 94 cows producing 5,500 litres (Av. Fat 4.15%, Protein 3.55%, Lactose 4.83%)
- 400 kg of Milk Solids (Fat + Protein Kg) supplied per cow
- Aim to produce excellent quality milk of high solids
- Producing c. 500,000 litres of milk per annum
- Diet is mainly grass/grass silage
- Continued expansion in milk supply expected

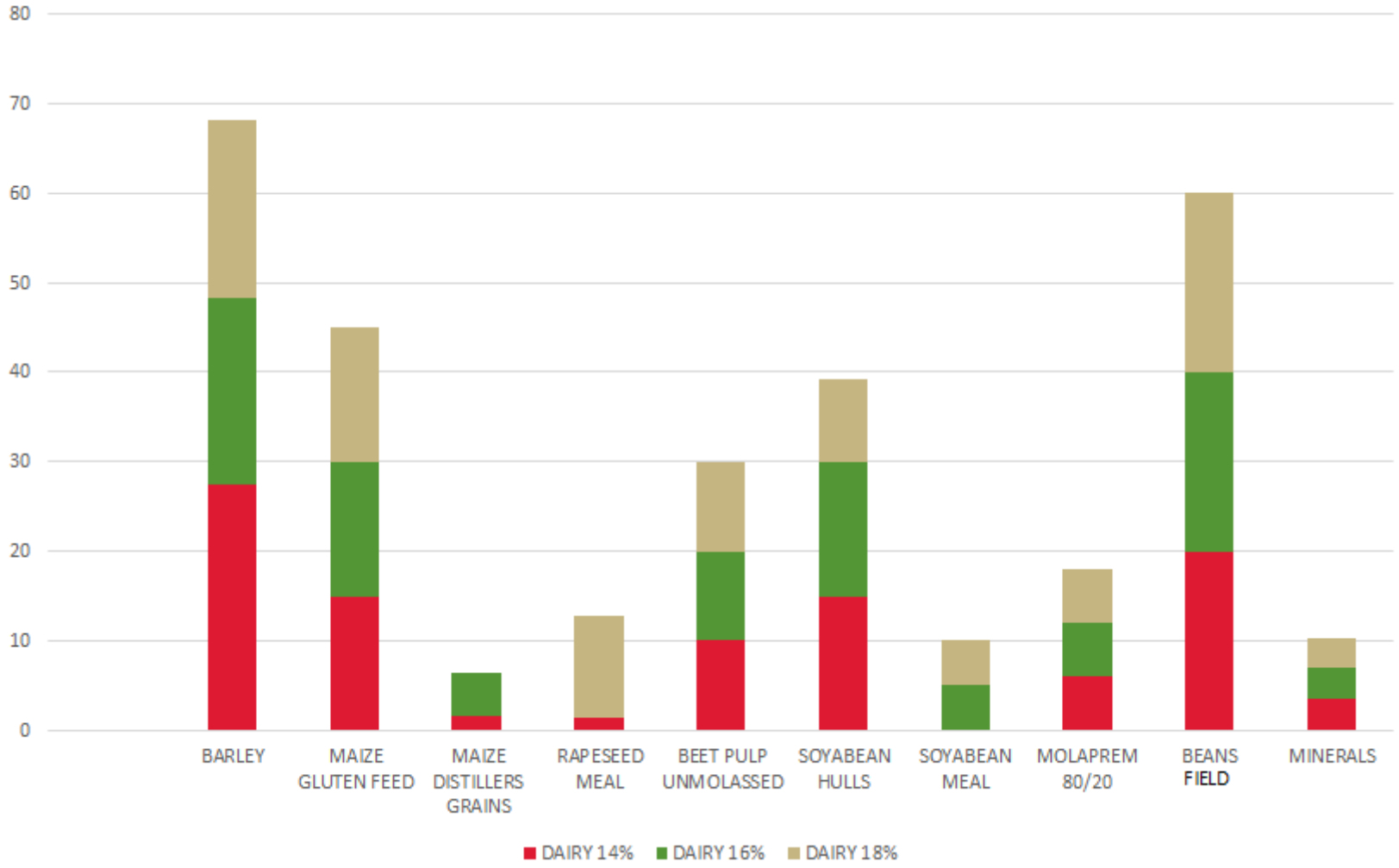
Typical Southern-Irish Calendar of Events - Dairy

Calving	• End February
Turnout to grass	• Early – Mid March • Diet of Grass silage, grass & Concentrate
Magic Day	• 10th April
Grass supply no longer meets requirement	• October onwards
Housing	• Mid November

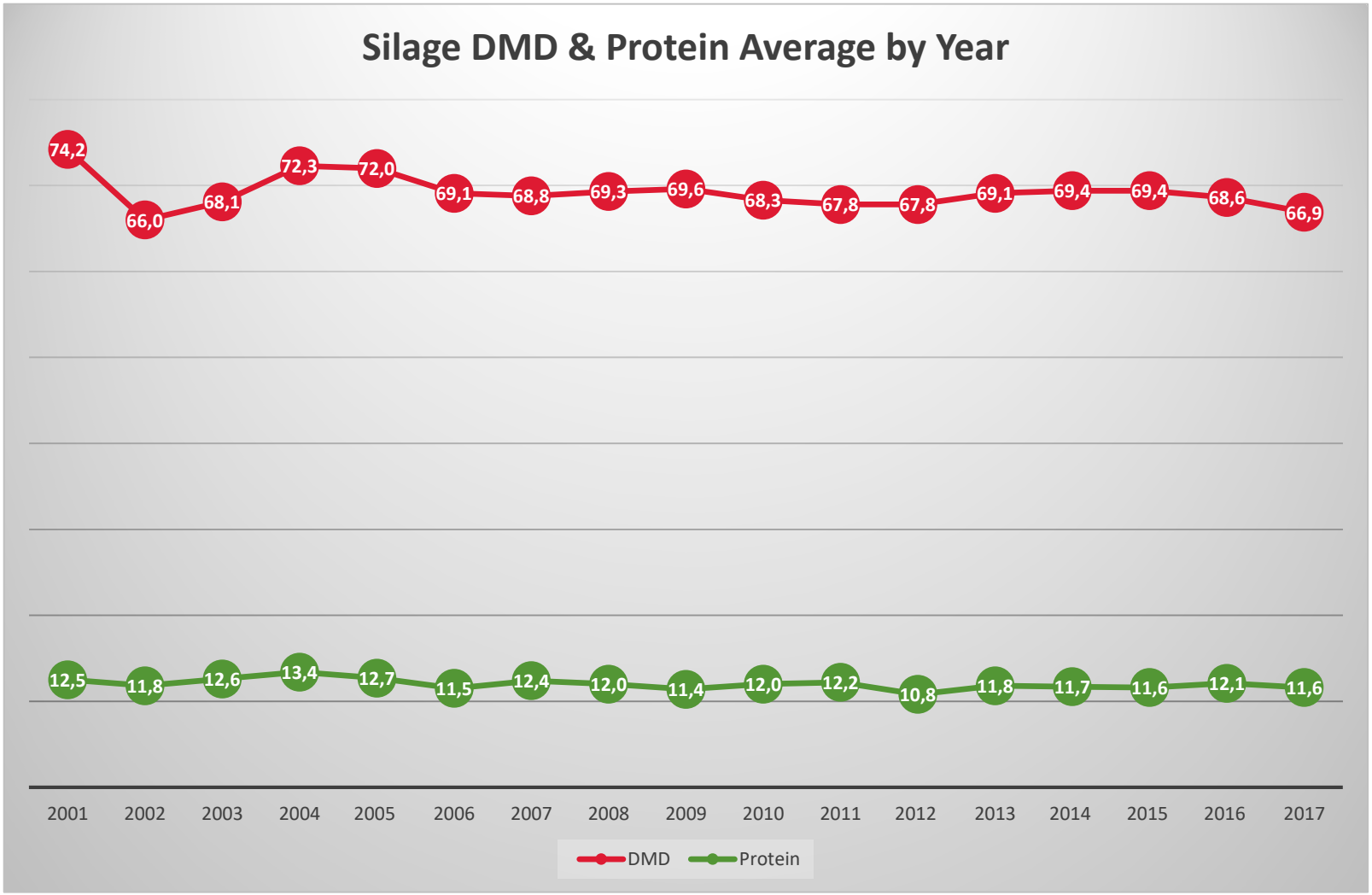
Typical Diet Dairygold Area - Estimated



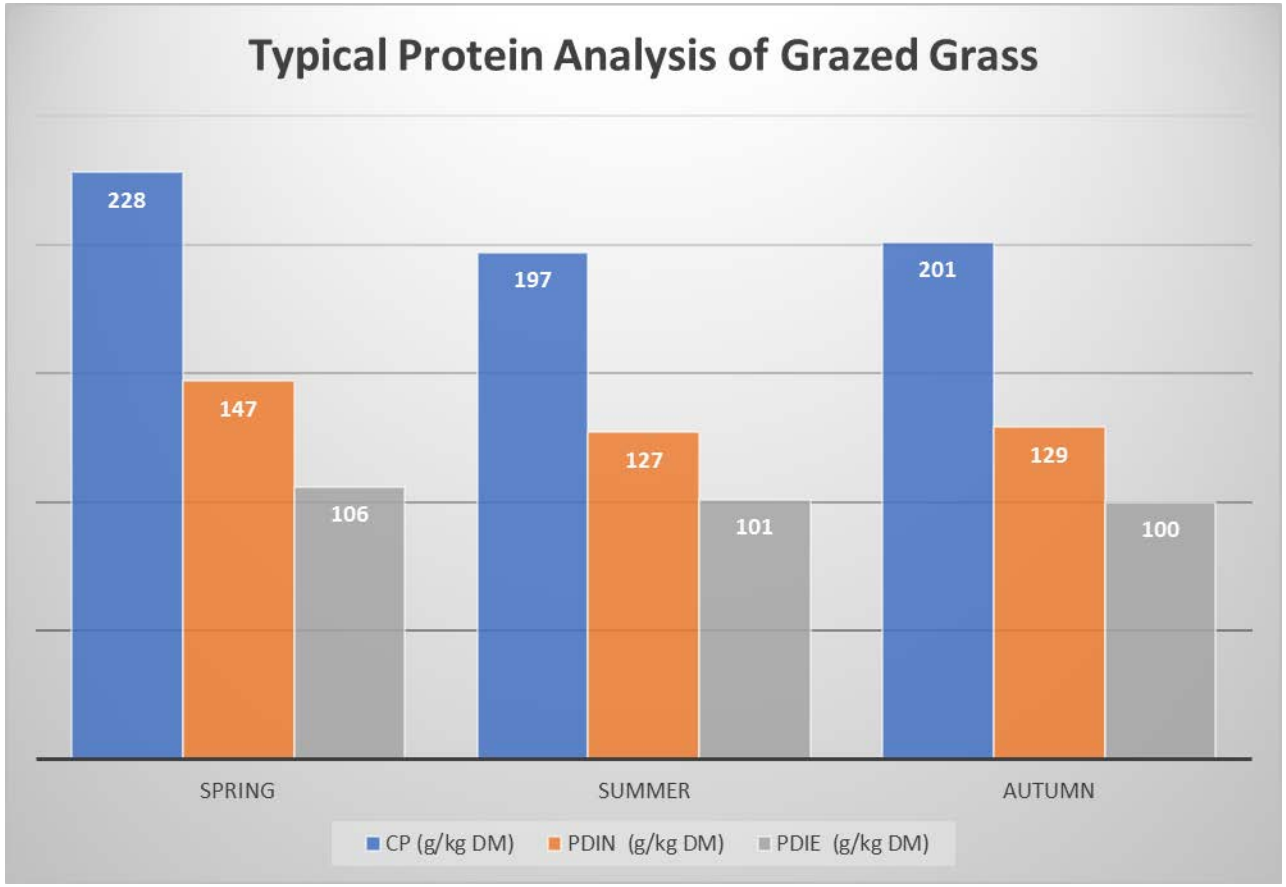
Example Dairy Compound Feed Formulations of Varying Protein Contents



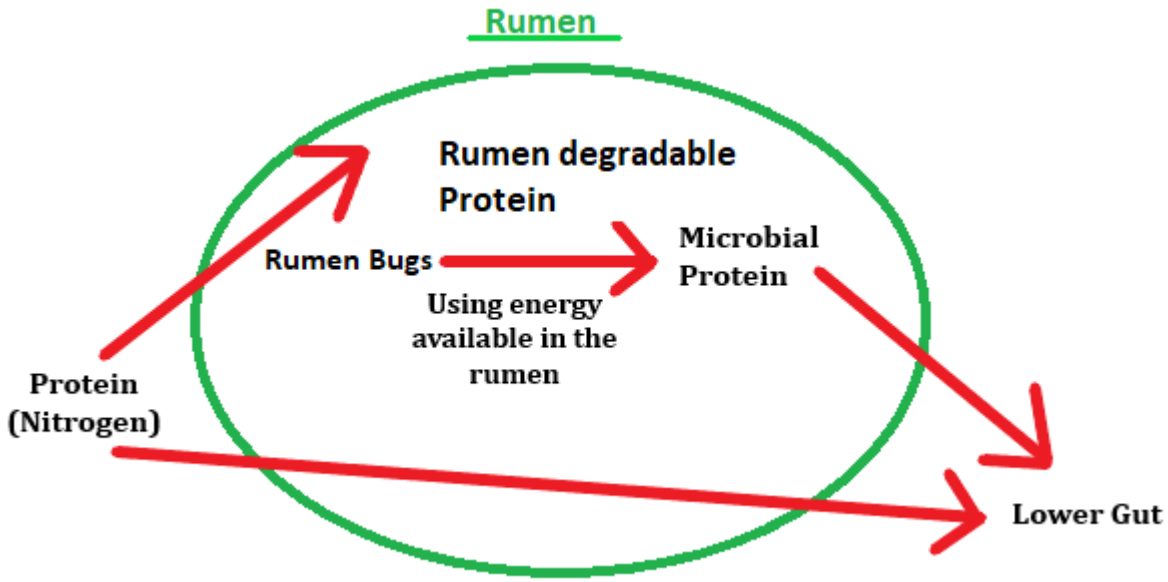
Dairygold Average Grass Silage Analysis by Year



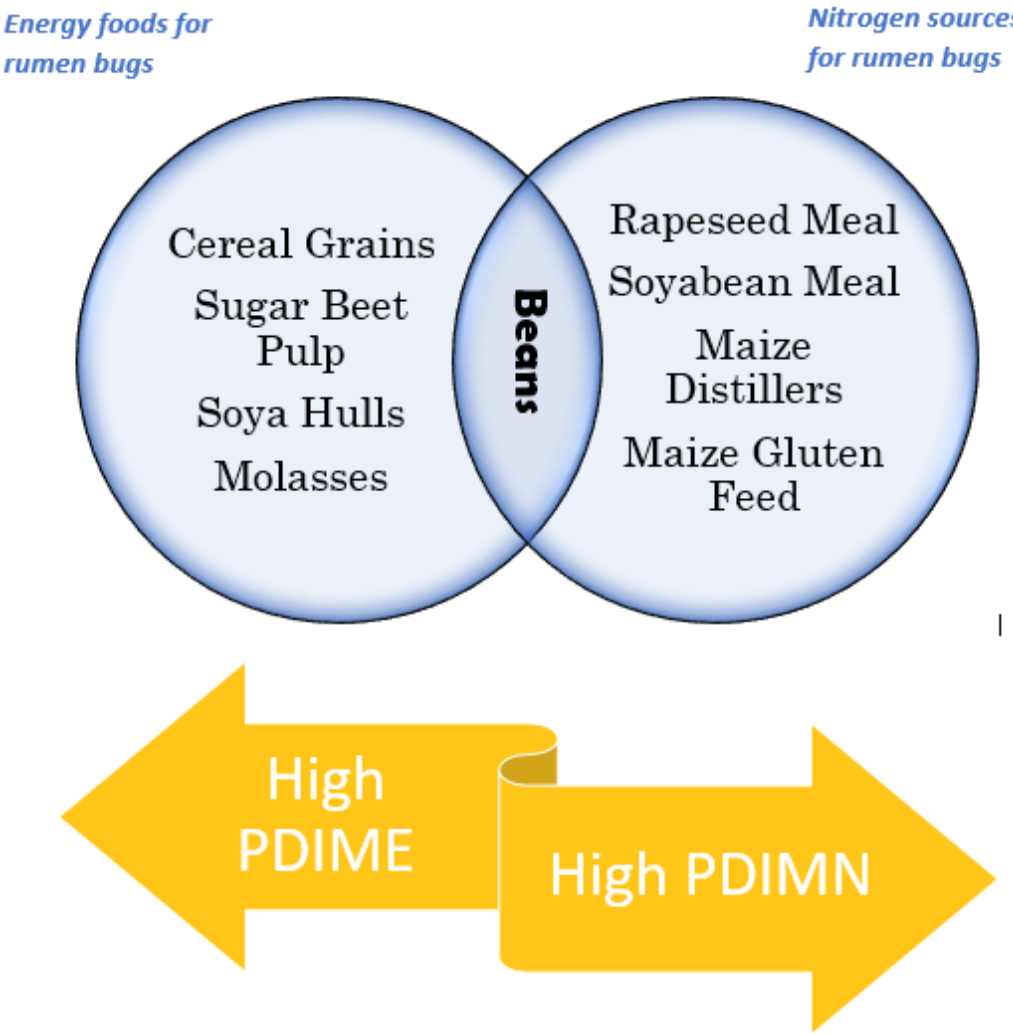
Herbage Composition From Teagasc Moorepark Research Farms From 1989 to 2009.



Protein Nutrition Ruminant

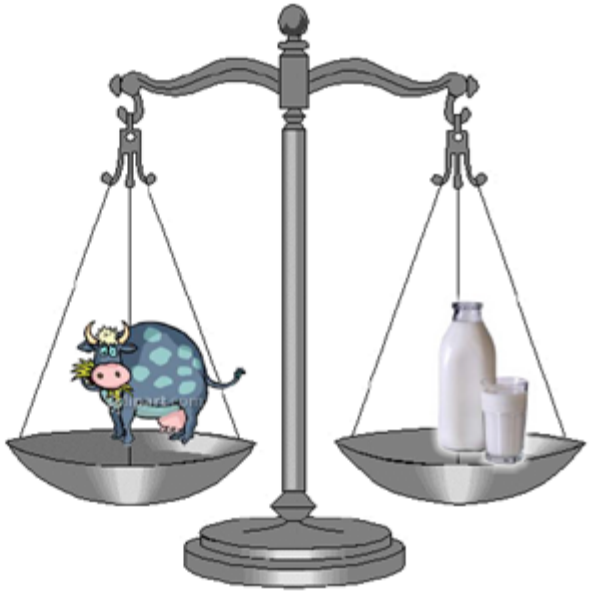


Comparison of Supplements for Grass



Dietary Strategies to Improve Nitrogen Efficiency

1. Reduce dietary Crude Protein concentration
2. Improve intestinal Amino Acid balance
3. Energy/protein sources in concentrates



Evaluation of Concentrate Type on N Excretion Grazing cows

- Research Project 1: Grazing cows ca 30 kg of milk per day
- •High protein concentrate 24% CP 1 kg per day
- •High protein concentrate 24% CP 6 kg per day
- •Low protein concentrate 9% CP 6 kg per day

Evaluation of Concentrate Type on N Excretion Grazing cows

	HP1[1]	HP6[2]	LP6[3]	SEM
Pasture DMI (kg/d)	15.4[a]	13.9[ab]	13.4[b]	0.96
Total DMI (kg/d)	16.2[a]	18.9[b]	18.4[b]	0.92
Diet DMD[4] (g/kg)	782	792	774	23.6
Milk yield (kg/d)	27.6[a]	32.3[b]	29.6[ab]	1.47
Milk total protein (g/kg)	3.22	3.21	3.17	0.05
Milk protein yield (g/d)	888[a]	1000[b]	934[ab]	40.4
Milk fat (g/kg)	4.06	4.24	4.21	0.26
Milk fat yield (g/d)	1097	1212	1192	84.6

Mulligan, F.J. et al., Supplementary Concentrate Type Affects Nitrogen Excretion of Grazing Dairy Cows, J. Dairy Sci. 87:3451-3460

Nutrition and N excretion

Least squares means and SEM for nitrogen intake and nitrogen excretion data for dairy cows in Experiment 1.

	HP1[1]	HP6[2]	LP6[3]	SEM
N intake (g/d)	499[a]	618[b]	482[a]	28.5
Milk N (g/d)	144	152	141	9.8
Fecal N excretion (g/d)	132	154	154	16.5
Urine N excretion (g/d)	223[a]	312[b]	186[a]	30.6
Total N excretion (g/d)	355[a]	467[b]	340[a]	26.6
Milk N / N intake (%)	28.9[ab]	25.3[b]	29.5[a]	1.87
N excretion / N intake (%)	71.1[ac]	74.7[ab]	70.5[c]	1.88
Urine N / total N excretion (%)	62.3[a]	66.3[a]	53.7[b]	5.38

[abc], Within a row, means lacking a common superscript differ ($P < 0.05$).

[1]HP1, diet based on grazed pasture plus 1 kg of high protein concentrate.

[2]HP6, diet based on grazed pasture plus 6 kg of high protein concentrate.

[3]LP6, diet based on grazed pasture plus 6 kg of low protein concentrate.

Effect of Protein Level & Type on Milk Production at Grass

Table 1. Ingredient inclusion rate of concentrates offered during the experiment

	Concentrate[1]			
Ingredient (% of DM)	HP	LP	LP + HMBi	LP Corn
Barley grain	47.5	50.0	50.0	0
Corn grain	0	0	0	50.0
DM (%)	86.7	85.8	86.2	85.9
Energy (UFL[2]/kg of DM)	1.12	1.10	1.10	1.14
Chemical composition (%)				
CP	19.2	15.0	14.5	15.7

Results

Effect of supplementary concentrate type on DMI, diet digestibility, and milk production variables

Item	Diet[1]				
	HP	LP	LP + HMBi	LP Corn	SEM
Intake (kg of DM/d)					
Pasture	14.2	12.8	13.5	12.6	0.74
Total	19.4	18.0	18.7	17.8	0.80
Diet DMD[2] (g/kg)	0.78	0.77	0.76	0.78	0.01
Milk output (kg/d)					
Milk	28.3[a]	25.4[b]	28.4[a]	28.2[a]	0.75
4% FCM	23.11[ab]	21.44[b]	25.36[a]	23.04[ab]	1.20
Fat	0.92[ab]	0.86[b]	1.01[a]	0.92[ab]	0.05
Protein	0.94	0.87	0.94	0.92	0.03

Whelan, S.J. et al., Effect of supplementary concentrate type on nitrogen partitioning in early lactation dairy cows offered perennial ryegrass-based pasture J. Dairy Sci. 95 :4468–4477

Strategies to Promote Area of Field Beans Grown

- Payment of a premium for crop
- Promotion in Co-Ops Tillage publication '*Trust in Tillage*' and also our tillage Area Sales Managers
- Launch in 2019 of *Gold Farm* range of beef feeds

EU BASIC PAYMENT SCHEME (BPS)/GREENING PAYMENT

PROTEIN AID SCHEME

Obstacles to Using Field Beans

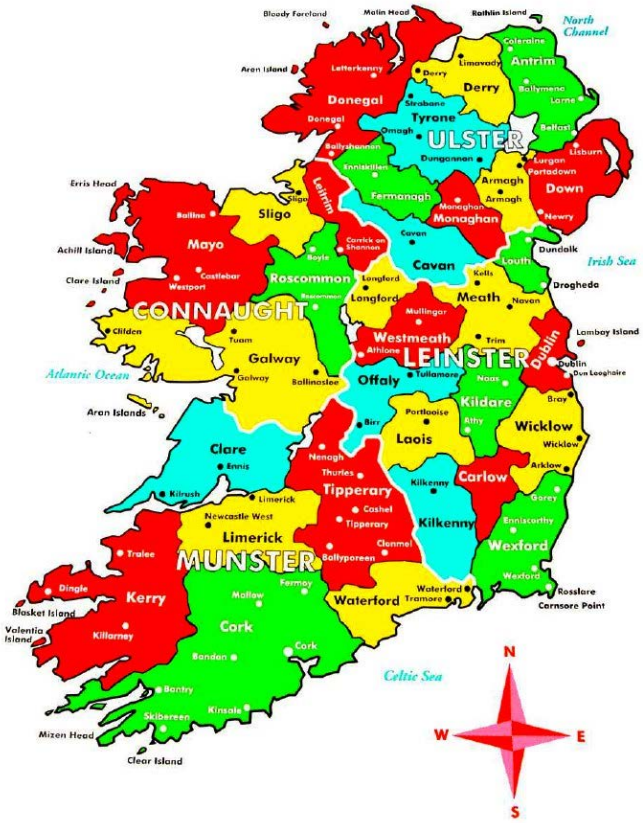
- Variable yield
- Uncertain weather at harvest
- High PDIN/PDIE ratio in beans
- Low protein density relative to soya/rapeseed
- Maximum inclusion rate in diets

Obstacles to Using Cereals/Low Protein Supplements

- Rate of fermentation of starch in the rumen
  - Possible issue with synchrony of fermentable energy release and rumen degradable N intake from grass.
  - Possible issue with ruminal acidosis
- Adequacy of protein content for higher producing cows
- Opportunity to improve biological value of the protein using ruminal protected amino acids

Summary

- In Ireland, our conserved forages are typically low in protein content but are fed for relatively short periods to lactating cows and often, in conjunction with grazed grass.
- Field Beans are unlikely to suffice as a sole protein in the concentrates used to supplement grass silage diets
- Strategies used to date to encourage growth of field beans have helped increase supply but alternative proteins are still required
- Supplementation of cows at grass ideally requires a different approach whereby we supply fermentable substrates to the rumen bugs to help them capture the excess rumenally available nitrogen in the grass
- This approach, along with a focus on improving the amino acid balance of the protein, allows us to get maximum performance at lower protein concentrations with resultant benefits to the environment



Thank You