

Opportunities and Barriers for Forage Legumes

Clive Sutton - DLF Seeds

David Rhodes - DLF Seeds

DLF Seeds - who we are

- DLF Group ranks in the ten largest seed companies in the world by revenue
 - Leading UK grass seed/forage company
 - Forage seed breeders in their own right
- Position reached through a long-term growth strategy, and focus on temperate clover and grass seeds
- Globally established in the northern and southern hemispheres
 - Remains owned by farmers
- DLF have a long term commitment and strategic plan to develop protein sufficiency globally through forage development
- The R&D, budget and commitment is there

Sustainable Pillars for change & growth

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs

Classic ‘Pillars’ definition

- Economic
- Social / cultural
- Environmental
- (Political)

Alternative definition

- Profit
- People
- Planet

Opportunities and Barriers for Forage Legumes

DLF Forage legume seeds

- Clover Protein
 - White (25%)
 - Red (20%)
 - others
- Clover-grass blends (20%)
- Alfalfa (18-20%)

Non-DLF legume crops

- Peas (8%)
- Beans (25%)
- (Soyabean meal 47%)

Soyabean Protein Today - Clover-Grass Protein Tomorrow

- Most UK livestock farmers produce their own forage
- Few are self-sufficient in forage protein supply and rely on imported soyabean products
- Soya is infamous for being managed under conditions few would call ‘sustainable’
- Soya is regarded by many farmers as a needed but not loved import
- Lack of self-sufficiency and dependency on imported protein increases trade dependence, price volatility and risk
- The desire & opportunity to improve sustainable self-sufficiency in forage protein exists throughout the European zoneand wider

Clover and Clover-Grass opportunities

- Clover-based grass mixtures produce energy and protein, use relatively little bought-in nitrogen and improves overall forage digestibility
 - More efficient milk & meat production
 - More competitive production on the world market
 - Growers become self-sufficient in protein and boost their profitability
- Farmers appreciate it for many reasons
 - Clover-grass works perfectly well in crop rotation and leaves labile nitrogen that is readily taken up by maize or any type of catch crop
 - Clover-grass is a good tool for improving soil structure and outstanding in sequestering carbon dioxide (CO²) into soil organic matter
 - Adding clover to grass will always improve digestibility
 - Clover-grass is a robust crop with few agronomic challenges
- Clover-grass is extensively used in organic farming

DLF: More protein for clover grass

- DLF currently working to increasing the protein yields of clover-grass crops
- The NCHAIN project has amassed collections of the rhizobium bacterium which lives in symbiosis with white clover, supplying it with nitrogen (protein)
 - The goal is to identify rhizobium strains that will provide a higher white clover yield
 - The next step combines the best rhizobium strains and then form the perfect future clover grass
- The project also includes SEGES, York University, and the company Legume Technology, and it will terminate at the end of 2019

OPPORTUNITY:

- DLF are increasing protein yields through agronomy, clover & grass variety selection and rhizobium strain identification

What about monogastric meat production? (pigs and chickens)

- Beef and dairy farmers can largely fulfil their protein requirement by growing clover or lucerne as part of their forage demand
- What about pig and chicken?

BARRIER: Monogastric animals do not normally eat forages as their gut microflora is incapable of breaking down cell wall components

However large Danish research programs (www.biovalue.dk; OrganoFinery) are establishing methods that can extract crude protein from forage ready for monogastric animal feed.....

OPPORTUNITY:

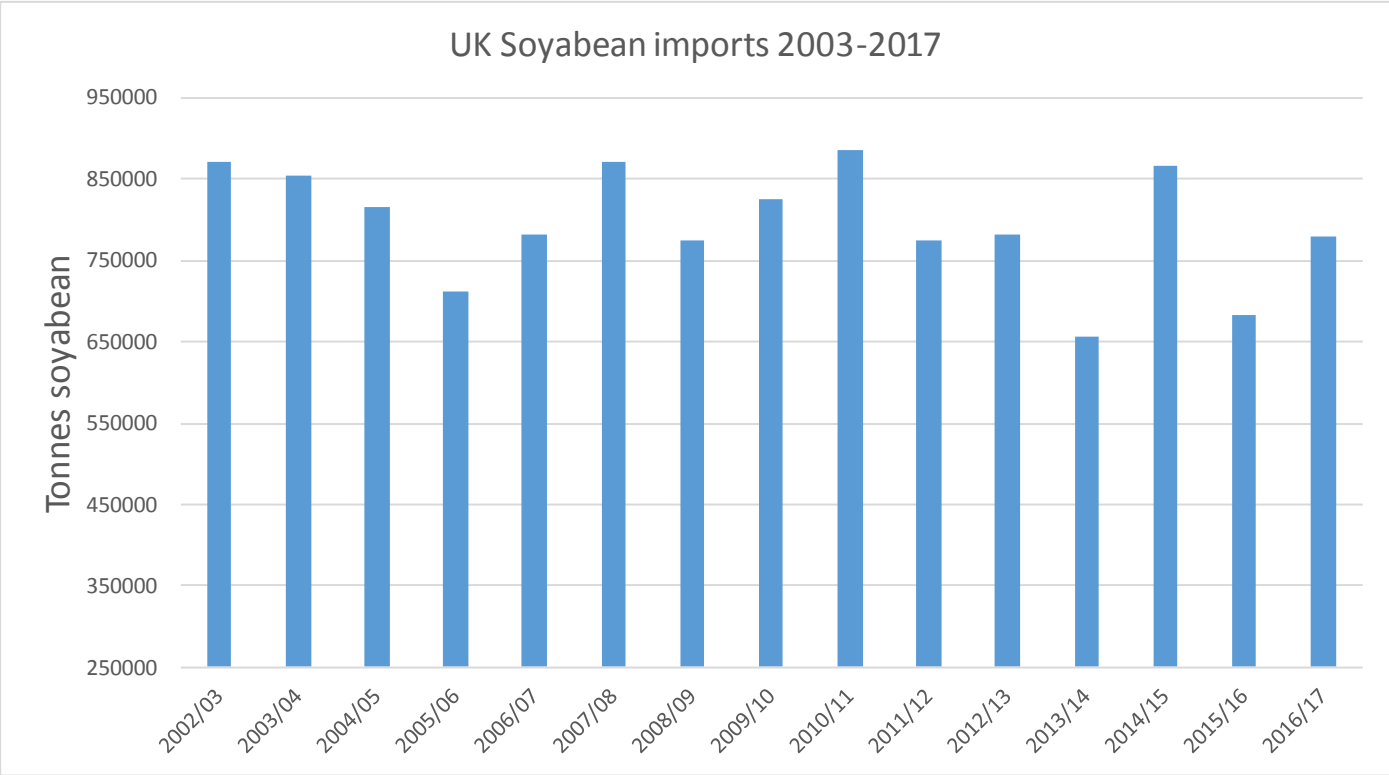
- Secondary processing of home-produced forage extracts protein

Extracting protein from forage

The rationale behind these investigations:

- Conversion of land use from cereals to grass/clover production would significantly reduce greenhouse gas emission and N-leaching
- The amino acid composition in grasses and clovers grass resembles more what pigs and chicken need than that found in soyabean
- Present techniques can extract crude protein from forage in a paste with a protein content of 47% of the dry matter, similar to the protein content of soyabean meal
- Remaining fibre fraction contains about 17% protein and can be utilised as ruminant feed
- A combination of high yielding forage grass and clover can yield 14 t DM/ha or 2,500 kg of protein/ha
- Denmark imports 1m tonnes soya to service the pig & chicken industry
 - **Technology advancement required, scientifically & logistically challenged**
 - **Opportunity for 400kha of arable crop replacement in DK - much with environmental benefit**

UK Soyabean imports



DLF Alfalfa - a source of leguminous protein

- Alfalfa (aka lucerne) is a global forage protein crop
 - No one can really explain why so little lucerne is grown in the UK
 - Alfalfa's deep roots make it very drought tolerant
 - Historically alfalfa was only grown on light, free-draining soils. Breeders now have varieties suitable across much of the UK.
 - **Barrier** becomes **OPPORTUNITY**
 - Climate change suggests more risk of prolonged adverse weather patterns
 - Look forward - see the **OPPORTUNITY**
 - DLF Seeds have a testing network in throughout Europe, Russia and North America, and can choose the best varieties for the various markets and climate zones
- **OPPORTUNITIES** abound...

Alfalfa (lucerne) - Old dog , new tricks??

INDUSTRIAL OPPORTUNITIES

Bio Fuel/Gas (AD suitability?)

Electricity generation/power

Dehydration Industry

Industrial enzymes

Paper pulp (Sweden)

Bio-remediation

Fractionation

Protein production

Pharmaceuticals

Novel compounds

Biotech - GM

FORAGE OPPORTUNITIES

- Replace dairy/beef/sheep feed imports
- Rotational stewardship implications
- 4+ year crop -Break crop/cash crop
- Agronomy rotational tool
 - Weeds (blackgrass tool)/Pest/Disease
- Environmental benefits
- Bio-remediation
- Companion crops option (grass/herbs)
- Equine market specialisation
- Lamb fattening on dryland
- Sector development/market ownership
- Seed treatment technology

Replacing soya in livestock feeds with UK-grown protein crops: prospects and implications? (CAS Report 19)

*P.J. Jones, D. Thomas, M. Hazzledine and C. Rymer
Centre for Agricultural Strategy, University of Reading, July 2014*

Up to 50% of all soya meal used in livestock feeds could be replaced by domestically-grown crops

Planting more land in the UK to protein crops would not increase net protein supply

However, improvement in clover-grass protein quality, digestibility and yield will enhance on-farm self sufficiency and replace imported protein substitutes, and replacing arable crop with high-protein leguminous forage would gain momentum in the face of climate change-stimulated land use options

Opportunities and Barriers for Forage Legumes

Opportunities

- Financial
 - Replace direct soya imports on farm
 - Trade terms/risk
 - Protein reliance
- Social acceptance
 - Throughout UK food chain
 - Consumer
- Environmental benefits
 - Structural stewardship
- Political acceptance

Barriers

- Reluctance to accept change
 - On-farm re-structuring
 - Financial adjustment
 - Social challenges
- Technology advancement
- Political/Brexit uncertainty
 - Farm support

Opportunities and Barriers for Forage Legumes

Thank you

- Clive Sutton

Business Development Manager
DLF Seeds Ltd



- David Rhodes

Technical Manager
DLF Seeds Ltd

