

# **OPTIBEAN**

*optimising faba bean breeding, production and useage*

Industry and academic co-funded research backed by the UK Technology Board,  
Sustainable Protein call

**- Replacing imported Soya with home grown protein**

**48 month project**

**Legato 2<sup>nd</sup> Annual meeting**

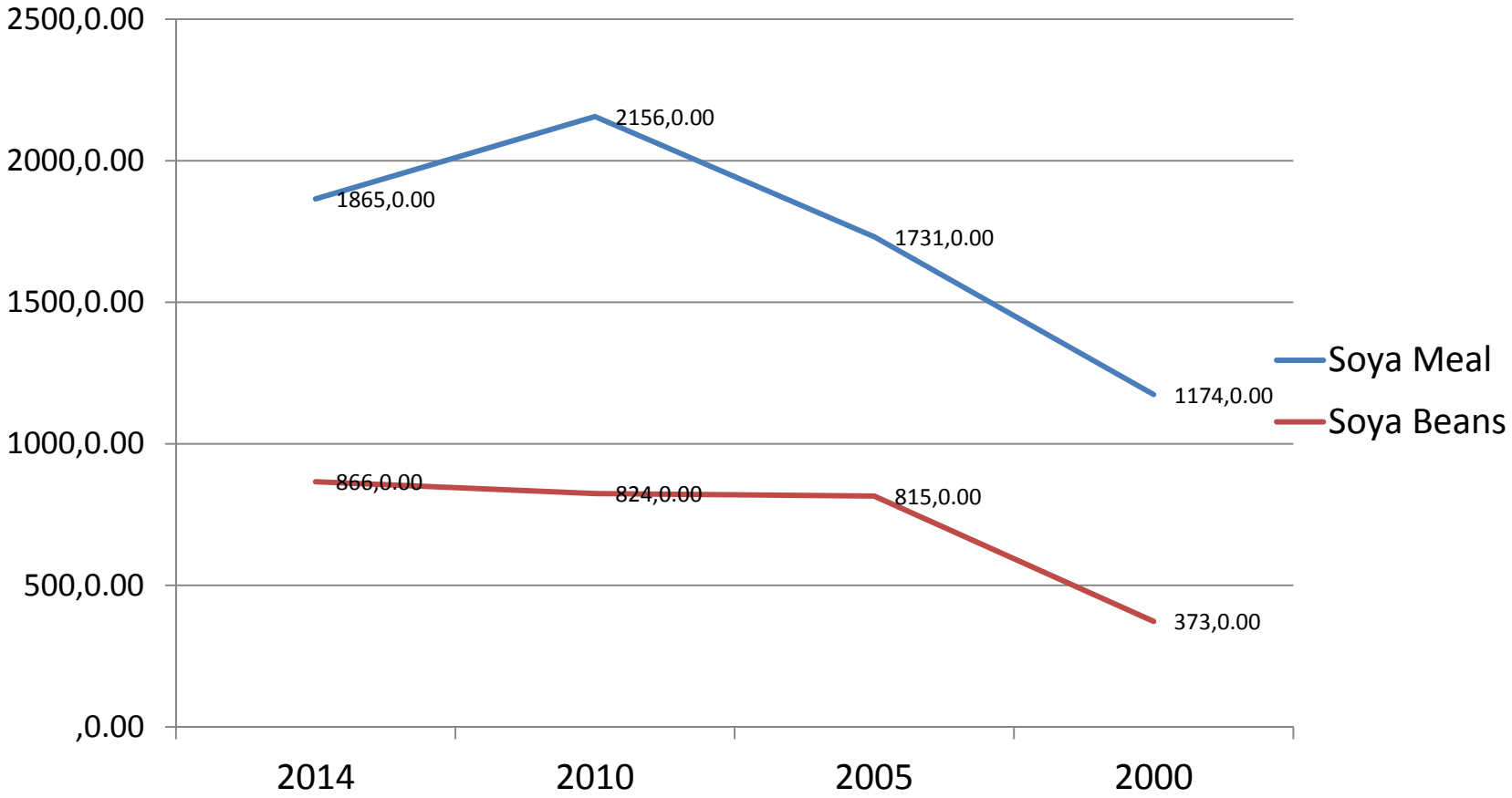
**1<sup>st</sup> December 2015**

**Peter Smith, Arable Crops  
Director, Wherry & Sons Ltd**

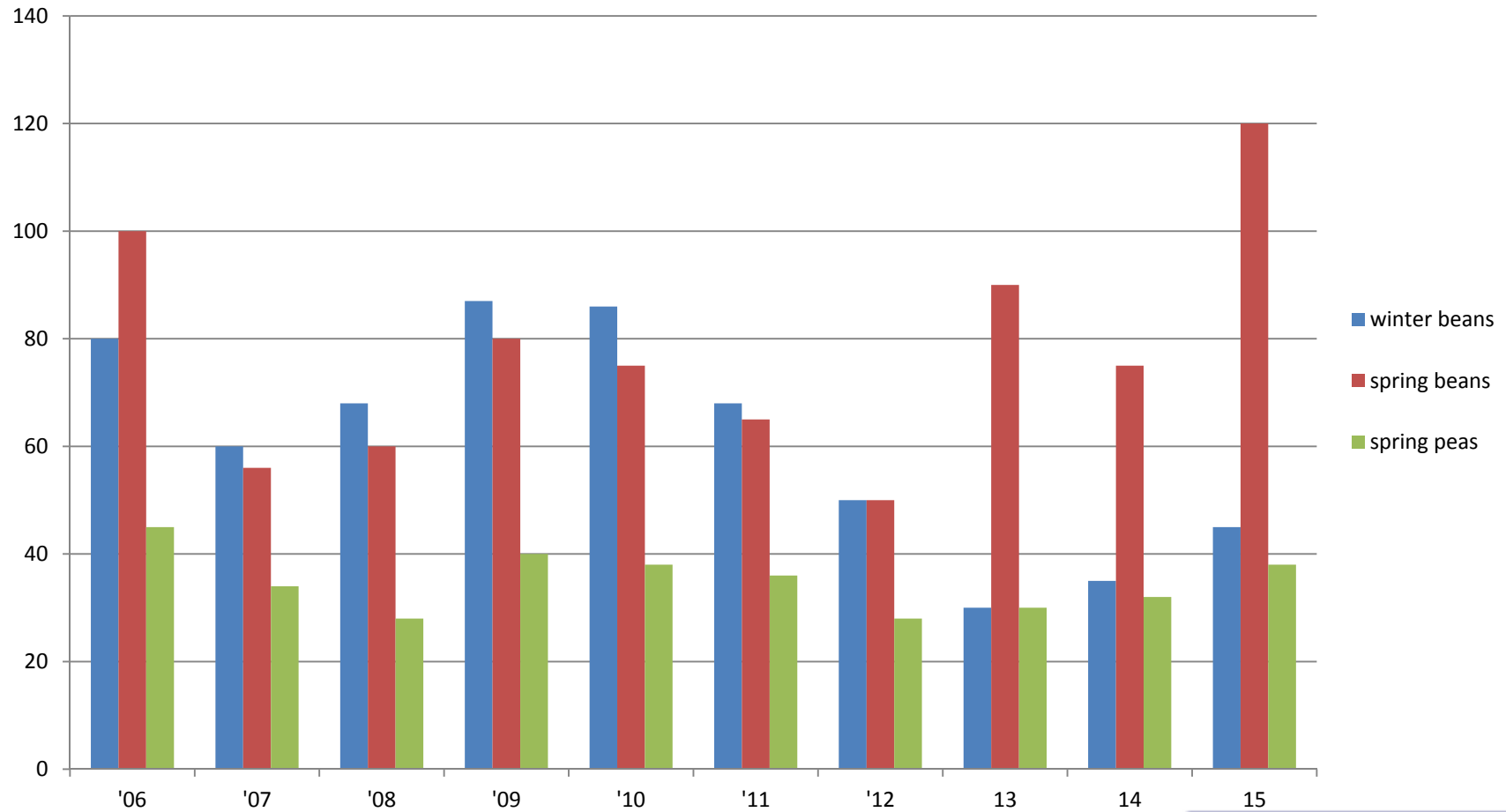




# UK Soya imports



# UK Pulse Area



# **OPTIBEAN**

*optimising faba bean breeding, production and usage*

*Can we breed better beans*

**Work Package 1:  
Breeding for Improved Yield and Yield Stability**

*Can we grow better beans*

**Work Package 2:  
To develop an optimised agronomy package for field beans**

*Can we feed more beans*

**Work Package 3:  
To develop new feed mixtures for Salmon, Turkeys, Chickens, Ducks and Pigs using UK produced faba beans to reduce the inclusion of imported soya meal**

# Traditional constraints

- Price home grown protein relative to Soya
- Lower nutritional value vs SBM
- Lack of consistency of supply
- Lack of spare bin at feed mill for peas or beans
- Lack of knowledge and appetite from feed mills
- Inconsistent yield performance of faba beans
- Shortfall of targeted applied R&D linked to the whole supply chain



# Overcoming constraints

- Difficult to access end users with alternative protein types
- Breeders can only produce what the market will use or demand, this type of joint cross market project enables education, increased awareness, opportunity for end users and breeders to access their respective markets
- This enables a classic **Push : Pull** principle to engage



# Nutritional analysis of UK Faba Beans from 2012 Harvest

ADJUSTED TO 15% MC

	VARIETY	BUZZ	WIZARD	HULLED	FUEGO	TATTOO	FABELLE
	SEASON	WINTER	WINTER	WINTER	SPRING	SPRING	SPRING
	TANNIN TYPE	CONVEN	CONVEN	CONVEN	CONVEN	TANNIN FREE	LOW VICINE & CV
<b>ORIGINAL MOISTURE</b>	g/100g	17.11	15.67	15.08	18.89	17.64	20.47
<b>ADJUSTED MOISTURE</b>	g/100g	15	15	15	15	15	15
<b>FAT</b>	g/100g	0.88	0.85	0.94	1.22	1.51	1.23
<b>of which:</b>							
<b>SATURATES</b>	g/100g	0.1	0.1	0.1	0.1	0.2	0.1
<b>MONOSATURATES</b>	g/100g	0.2	0.2	0.2	0.3	0.3	0.2
<b>POLYUNSATURATES</b>	g/100g	0.57	0.52	0.6	0.94	0.94	1.23
<b>CRUDE PROTEIN (N X 6.25)</b>	g/100g	25.34	26.27	26.51	27.28	28.35	31.86
<b>ASH</b>	g/100g	3.29	3.4	3.13	3.4	3.66	3.94
<b>CARBOHYDRATE (by difference)</b>	g/100g	65.07	57.58	54.8	70.2	63.34	71.48
<b>AVAILABLE CARBOHYDRATE</b>	g/100g	40.3	32.93	37.77	39.87	37.04	39.45
<b>DIETARY FIBRE</b>	g/100g	24.77	24.65	17.03	30.33	26.3	32.03
<b>TOTAL SUGARS</b>	g/100g	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
<b>SODIUM</b>	mg/100g	48	38	30	38	40	56
<b>ENERGY</b>	kcal/100g	260	236	256	269	266	286
<b>ENERGY</b>	kJ/100g	1108	1005	1090	1162	1130	1218







# Optibeam Farmed Salmon Trial





Waitrose

# Aquascot/SSC Salmon trial



- Trial on 2 x 450,000 pens of Salmon, starting weight 450gms, target harvest weight after 15 months 4.5kg.
- Soya taken out of the diet completely on the grower diet
- Faba beans 18% inclusion rate
- Similar growth rates noted, no health issues, no negative EPA/DHA scores. Flesh quality tested well.
- **Conclusion: “Comprehensive growth trial and key quality parameters conclude salmon can perform on ‘high bean’ grower diets with ‘complete replacement of soya’ as good as on industry standard diet with variable soya levels”.**





Waitrose



# Aquascot/SSC Salmon trial





Waitrose

## Broiler Trial

– (Chicken meat production)

- Three separate trials measured against standard feed:
- **Conventional beans**
- **Tannin free beans**
- **Low vicine/convicine beans**





Waitrose

## Broiler trial summary

- Bean types gave different outcomes
- Conventional and low tannin beans performed poorly on weight and FCR
- Low Vicine/Convicine gave physical performance and hock markings results not significantly different from the control.
- 17% reduction in Soya usage possible
- **Conclusion: *There is potential to replace Soya in broiler feed with the LV/CV types.***





# Egg production trial

- Tannin free beans x2 trials
- Low Vicine/Convicine x1 trial





Waitrose

# Egg Production Trial

- Trials using tannin free beans showed small but insignificant response in egg weight
- Low Vicine/Convicine beans produced acceptable FCR and increased numbers of large eggs.
- ***Conclusion: Egg production was not affected by bean inclusion of 10% (which reduced Soya usage by 50%). Increased Egg Mass. No behavioural issues. Overall a good result.***





Waitrose

Trial 1 & 2 – One of the first set of trials on Weaners (7-30Kg) using Faba beans (conventional)

Trial 3- Commercial trial using Tannin free beans





# Pig trials with Faba beans

Waitrose



- Faba inclusion varied from 0-30% throughout the trials
- **Weaner trials**, No significant difference compared to diet with Soya, some palatability issues at the higher faba inclusion levels
- **Finisher trial**, No significant differences, diets tended to push more OSR out rather than Soya at the higher levels
- **Conclusion: An inclusion of up to 20% Faba works effectively in pig rations, with tannin free preferred in this instance but not essential.**



## Duck production trial

Waitrose

Trial 1 – 8 to 12% inclusion of conventional faba beans  
Trial 2 – 10 to 20% inclusion of tannin free faba beans





# Duck production trial

Waitrose

- 4 houses X 3500 birds, 2 diets, 0-21 days and 21 days to end
- No significant difference in LWG
- Faba feed had higher feed intake and slightly higher FCR when using conventional beans
- ***Summary: Overall both conventional and tannin free faba beans work effectively when fed to Ducks, although tannin free beans showed a slightly improved FCR.***



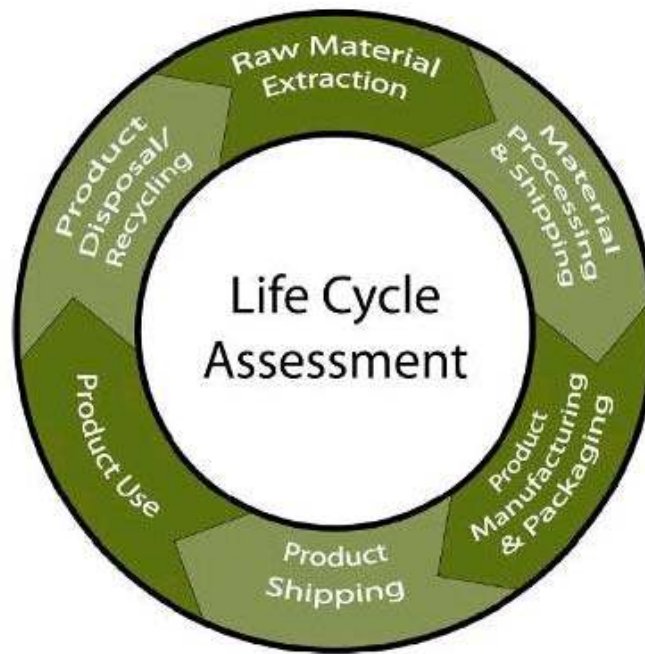
# Life Cycle Analysis

The CO<sub>2</sub> emissions of imported Soya from South America on redefined land equate to 22421kg of CO<sub>2</sub>/tonne

The CO<sub>2</sub> emissions of UK grown Faba beans equate to 249kg of CO<sub>2</sub>/tonne



The same data for UK feed wheat equates to 461kg of CO<sub>2</sub> /tonne



Many UK supermarkets including Waitrose are committed to reducing food miles and CO<sub>2</sub> emissions on the food that they sell, the use of UK grown Faba beans is a positive step towards this

# Thank you

**OPTIBEAN PROJECT PARTNERS;  
WHERRY, PGRO, AQUASCOT, NIABTAG, STONEGATE, MOYPARK,  
DALEHEAD FOODS, GREEN LABEL FOODS, LINCS TURKEYS,  
GARFORD FARM MACHINERY.  
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