

# Impacts of 'Unapproved in Europe' GMs on Feed and Livestock Production

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# Introduction

- The uptake of biotechnology in major grain and oilseed exporting nations is gathering pace. Today, Europe's feed supply security is under serious threat due to the mismatch of Europe's speed of authorisation of new technologies and the intense rate of agricultural development. This mismatch in timing potentially jeopardises the sustainability of Europe's feed and food industries both for GM and Non-GM based production chains. Feed imports are lost due to Low-Level (LL) presence of not yet approved EU events (US maize, Corn gluten feed, dried distillers grains, Canadian rapeseed meal).
- The new RoundUp Ready 2 Yield event for soybeans represents the latest GM event to threaten European feed security but is only the tip of the iceberg, there are currently 70 GM events for maize, rape and soya in the approval pipeline a figure which is expected to move rapidly to more than 100 over the next two years, only 17 events are authorised in the Europe for food and feed use. European feed supply security is threatened by the EU 0-tolerance policy due to the potential presence of RR2Y trace levels in feed imports. If the authorisation process continues to take longer than in major export countries Europe will isolate itself from the global market place. Europe is dependent on raw material supplies and without them, feed supply security is lost.
- The European Union has adopted a zero tolerance stance towards the import of biotech events not yet approved in the European Union. With the uptake of new technology by the major global producers it is impossible for EU feed and food chain operators to guarantee 100% content free of not yet approved biotech events simply due to the complexities of processing and logistics of grain and oilseeds.
- Monsanto's first generation RoundUp Ready technology already enjoys a market share of 95% of GM soybean acreage. The new Roundup Ready 2 Yield (RR2Y) seeds provide a strong yield increase (8-11%/hectare) as well as herbicide tolerance. Uptake is expected to happen as fast as Monsanto can multiply the seeds. Any substitutes that could be used to replace Europe's consumption of soybean meal (SBM) are simply not available in quantities sufficient to replace even 10% of Europe's consumption of soybeans.
- New global consumer markets have emerged such as China. Europe has surrendered much of its soft commodity market leverage to the mass populace of Asia. Brazil, Argentina and the US, traditionally the major suppliers to the EU, are no longer obliged to cater to strict European requirements whilst there are bigger and faster growing markets to supply.



# Report structure

The following report is aimed at addressing the most pressing issue currently facing the European Meat Industry. Focussing on the impacts resulting from a loss of soybeans and soybean meal due to the forthcoming release of a herbicide tolerant seed technology marketed under the brand name RoundUp Ready 2 Yield (RR2Y). It should be noted that RR2Y may currently be the most pressing issue, but authorisation will only result in a short-term fix. RR2Y is the first of a long queue of new traits coming to the market.

All animal protein sectors, including egg production, aquaculture and dairy, will be impacted by a reduction in Europe of the supply of firstly soybean meal and afterwards all other crops being planted around the world with new traits not authorised within the European Union. However, to illustrate the gravity of the situation, this report will focus on the situation brewing due to RR2Y for the pork and poultry producers. Short-term impacts will be evaluated. This 'case study' should be considered an indicator of the potential issues facing Europe as it falling further behind biotechnology development in the rest of the world.

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## Part 1 – The Feed Industry

- Europe's relevance as a global importer of soybean meal and soybeans
- Importance of soybean meal as a protein source
- Penetration of GM soybeans in exporting countries
- Expected penetration of RR2Y

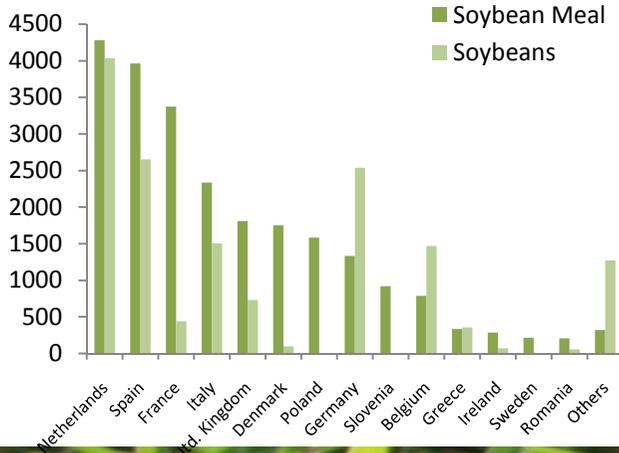


# Europe as Importer

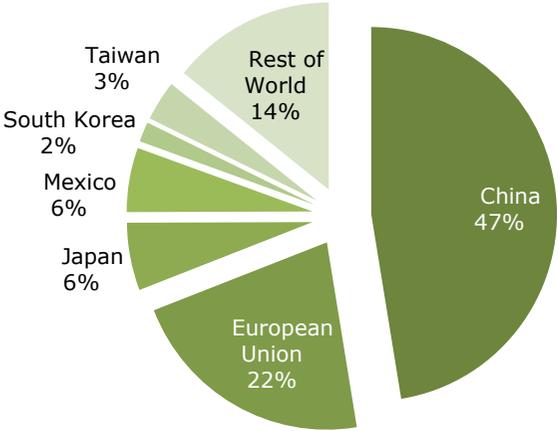
Soybeans are supplied to Europe either as whole soybeans (a large proportion of which comes from the US) which are then processed to soybean meal and soybean oil within EU-27. Alternatively they are shipped in as crushed soybean meal and soybean oil, ready for use in food and feed mainly from Argentina and Brazil.

The EU is the world's largest importer of soybean meal, which has provided leverage to specify production practices in the past. Now that China has taken a more significant role as the world largest importer of both whole beans (see Fig 1 opposite) and soybean oil, Europe has lost much of its historic market leverage. However Europe continues to import large volumes of Soybean meal (Fig 2) which are focussed on Europe's major feed and meat producing nations (Fig 3).

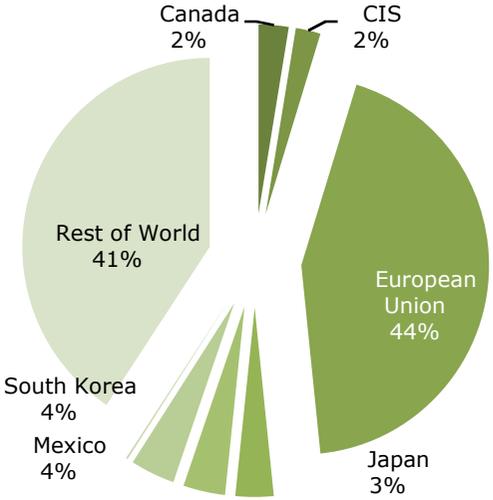
**Fig 3: Imports of Soybeans and Soybean Meal**



**Fig 1: 07/08 - Soybean Trade**



**Fig 2: 07/08 Soybean Meal Trade**



Source: FAPRI 2008, USDA, EUROSTAT 2008

# Relevance of SBM in Protein Meal

Soybean meal has the highest protein content of any comparable plant based protein crop (on average 44-48% protein) and contains all the indispensable amino acids, such as methionine and lysine, which are particularly important in high performance diets (see Fig 5).

However, substitutes for soybean meals are derived from rapeseed, sunflower etc. – as shown in the pie chart opposite and have much lower protein content levels. However, all of these alternatives have much higher levels of fibre. Substituting these other protein meals for soybean meal in the diets of pigs and poultry results in a much greater volume of manure and nitrogen emissions (ammonia). Hence, the substitutes have a potentially far greater impact on the environment. Animal health is also compromised as ammonia levels become harder to control in the animals breathing space and respiratory diseases are followed by the onset of a variety of other diseases.

Fig 4: World Protein Meal Consumption 2007 Metric Tons

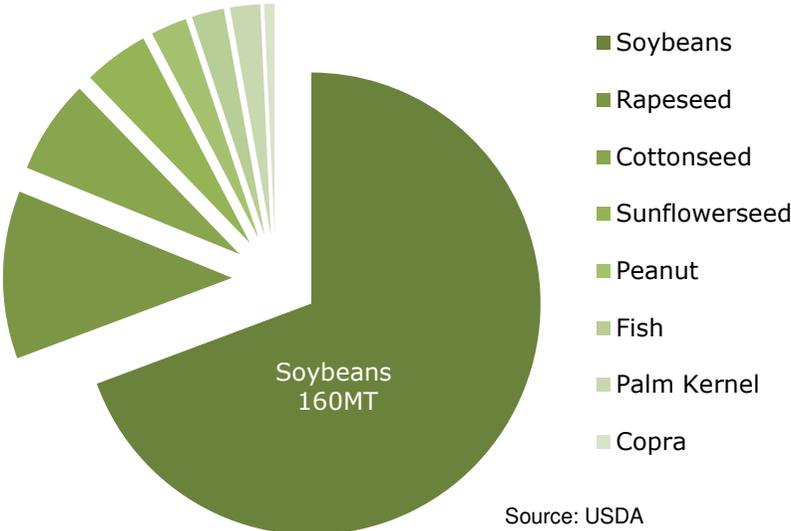
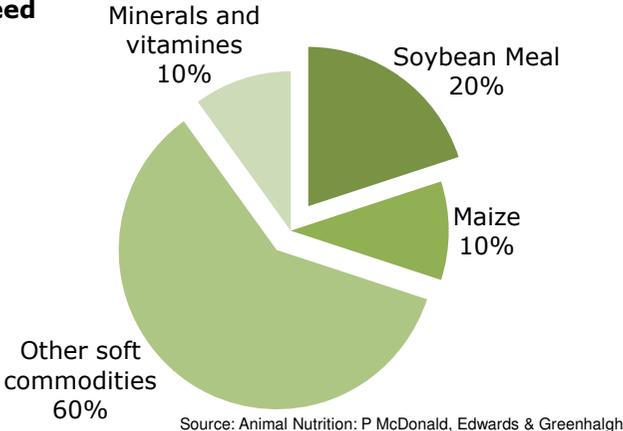
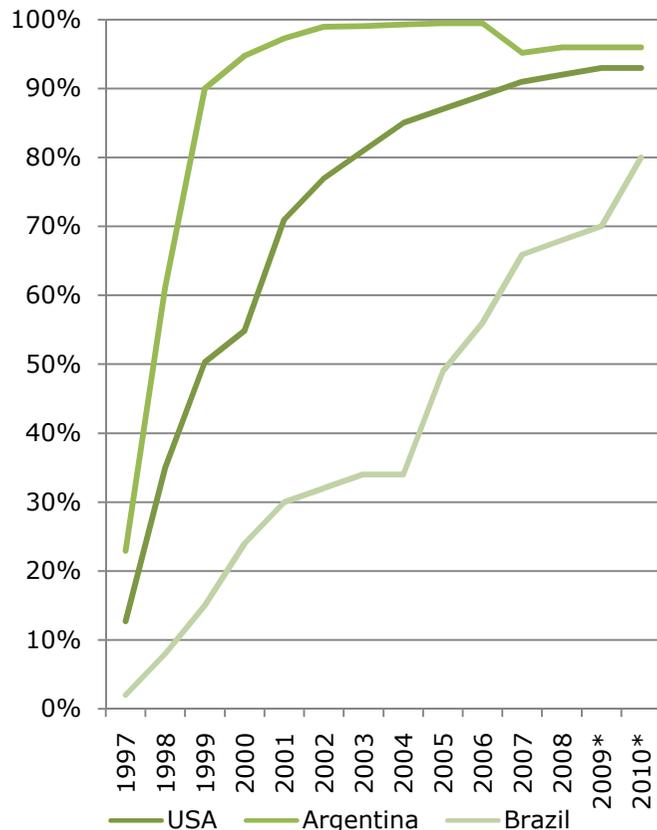


Fig 5: High Performance Pig Feed



# GMO Soybean Planting & the Availability of Non-GM

**Fig 6: % of Soybean Acreage planted with GM seeds**



The three countries represented in the graph opposite (Fig 6) (the United States, Argentina and Brazil) produce more than 90 percent of the world's soybean exports.

With GM soybeans as the dominant type of seed planted, it has become much more expensive to separate non-GM SBM from GM SBM. According to the Argentine trade association, it would cost around \$40 per tonne of SBM or maize to keep non-GM separate (0.9% labelling threshold) from products containing GM.

Brazil, once the major supplier of non-GM SBM has rapidly gone over to GM planted area and with the percentage of acreage devoted to GM soybeans above 65% it will become increasingly difficult and expensive to keep non-GM SBM and GM SBS completely separate throughout the marketing/processing chains.

Until 2004 the average market premium for non-GM SBM (above the price for GMO) was US\$5/ton. In 2005 and 2006 this rose to about US\$10/ton. With a supply shortfall in 2007 demand pushed the premium up to between US\$60 & US\$80/t. Should the demand for non-GM SBM increase we can assume that the accompanying premiums will also rise. Non-GM SBM have now become a niche market and are therefore commanding large price premiums.

In addition it will become impossible for Brazil and Argentina to guarantee absence of non-approved GM-events once the new stacked GM soybeans have been planted for field trials – i.e. seed multiplication (see following page 9: fig 7).

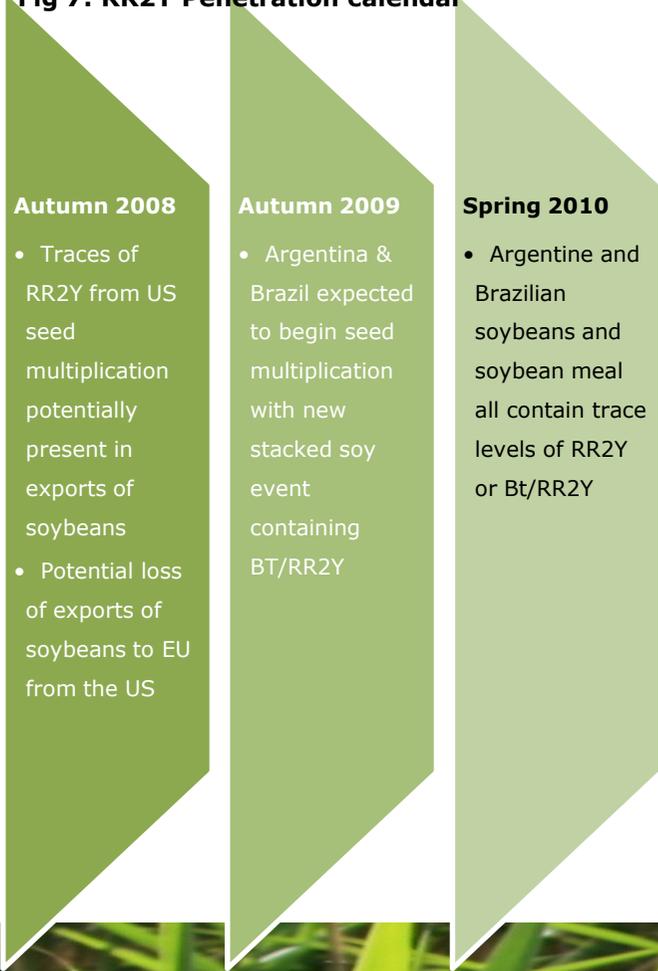
The European supply chain have made extensive efforts to manage the supply of soybeans and soybean meal to ensure that unapproved GM events are excluded. However the zero tolerance police has proved to be so stringent as to render complete exclusion impossible.



Sources: Planted areas based on USDA/FAS November 2007 Table 11 Soybean Area, Yield and Production. Biotech-enhanced percentages for the US based on USDA National Agricultural Statistics Service estimates; Argentine and Brazilian percentages are based on data from the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

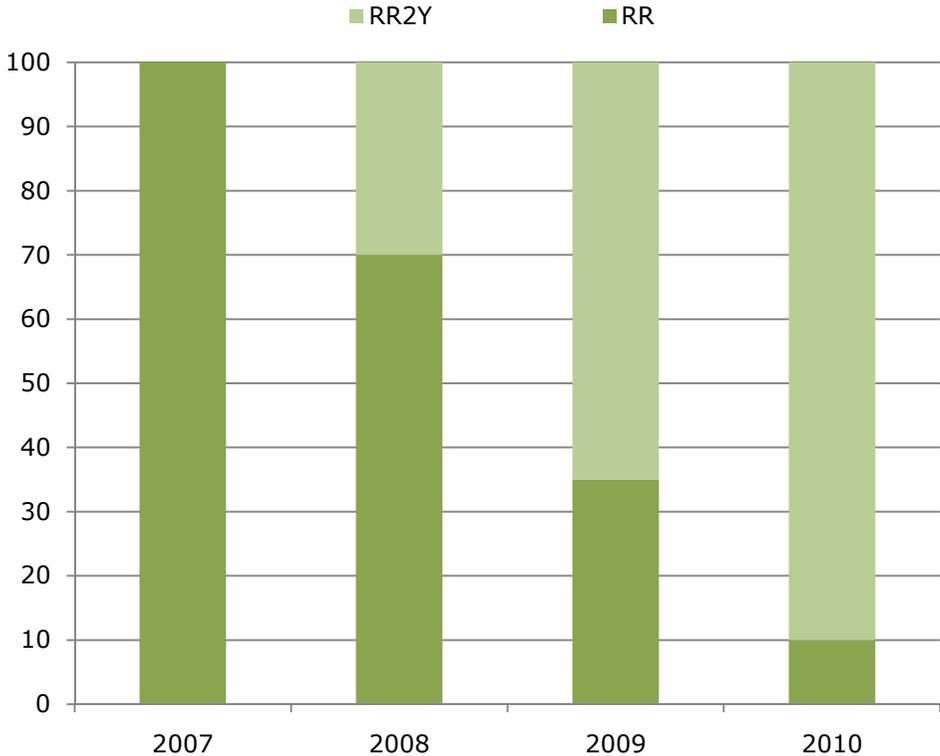
# RR2Y - Penetration

**Fig 7: RR2Y Penetration calendar**



The RR2Y trait represents the tip of the iceberg while a great number of traits are currently in approval processes for planting between 2009 and 2010. By 2010, the availability of non-GM & authorised GM SBM from Brazil, Argentina or the USA will be less than 10% of current supplies. Uptake of the RR2Y technology is expected to be extremely rapid, limited only by the rate of seed replication. The yield improvement is substantial compared to first generation RR, and with high fuel and fertilizer prices, growers are unlikely to choose traditional RR varieties simply to comply with European regulations. By 2010 South-American producers are expected to use stacked events (Bt/RR2Y) which are not yet in the EU authorisation process. Contrary to the situation in the EU stacked GM varieties do not need new approvals in key export countries.

**Fig 8: GM Soybean Meal with % split between RR (first generation) & RR2Y (second generation) for US, Argentina and Brazil**



Source: CB&C Ltd

## Part 2 – The Maize Comparison

- EU zero tolerance cost impacts for feed and meat
- Comparison between maize derivatives and soybean meal situation



# EU Zero Tolerance Cost Impacts for feed and Meat

Since the uptake of new maize seed technology (Herculex) in 2006 in the US, Dried Distillers Grains (DDG) and corn gluten (by-products of maize processing) imports have rapidly decreased (see chart opposite Fig 9). DDG's and corn gluten are successfully as cost effective high performance animal feed source (protein and energy) mostly in dairy feeds.

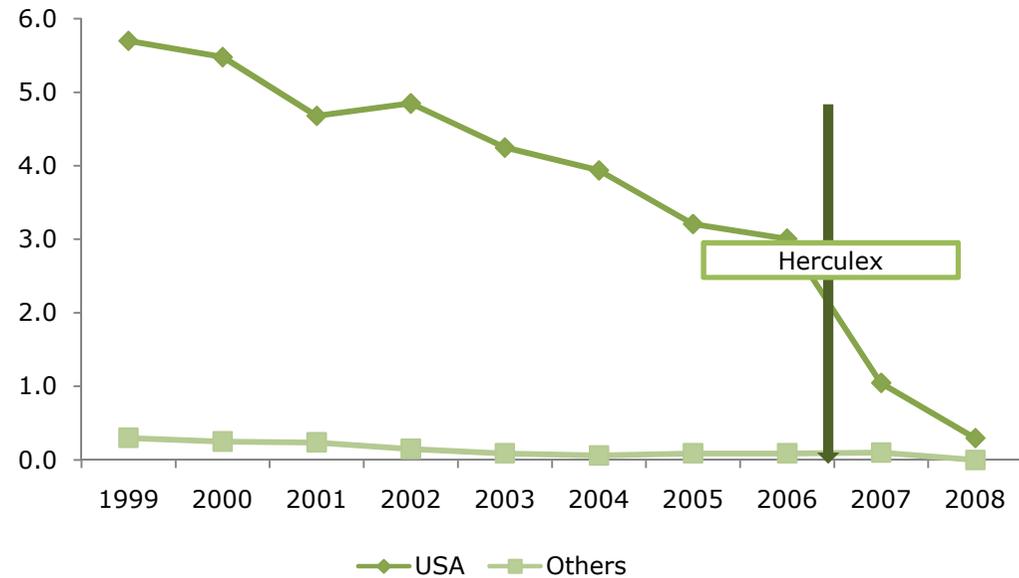
In 2007, concerns about Bayer/Syngenta's GA21 trait led to tight restrictions on maize imports from Argentina and further impeded supplies.

- Corn gluten feed imports were subsequently reduced from 5 million tonnes to zero.
- DDG imports were reduced from 1.5 million tonnes to zero.

The situation was further compounded as maize exports from the Ukraine into Europe also came to a halt, leaving Brazil as the only remaining major importer of maize into Europe. The price of Brazilian maize is €50 to €70/t higher compared to Argentine maize - thus increasing the cost of feed, the expense of producing meat and ultimately reducing the competitiveness of European meat production. The direct and indirect cost consequences are shown opposite.

The timing of the reduced supply was extremely unfortunate as world supplies of maize and other grains suffered from detrimental weather, significantly reducing harvest sizes.

Fig 9: Imports of DDG & Corn Gluten in EU27



### Direct substitution cost for EU maize and CGF/DDGS 2007/2008

- EU to import 11m tonnes of Brazilian "non-GM" maize + €50 per tonne = €550Mio
- EU to substitute 4.5m tonnes of CGF/DDGS+€70 per tonne (maize/rapeseed)= €315Mio

### Indirect cost impact on EU cereals due to feed import restrictions

- EU compound feed used 71m tonnes of EU cereals + €10 per tonne = €710Mio
- **Total EU extra-cost feed 2007/08 = €1,575Mio**
- **Total EU extra cost feed "0-tolerance" 2006/2007 = €950Mio**
- **Total added cost disadvantage "0-tolerance" = €2,525Mio**

n.b. Total cost for substitution have been calculated on publicly available price quotations for key feed materials (USDA, DGAGRI et al), the indirect leverage on cost increases for other feed materials have been calculated on the basis of market expert advice and historic evidence of leverage effect when export/import bans key ingredients were imposed.



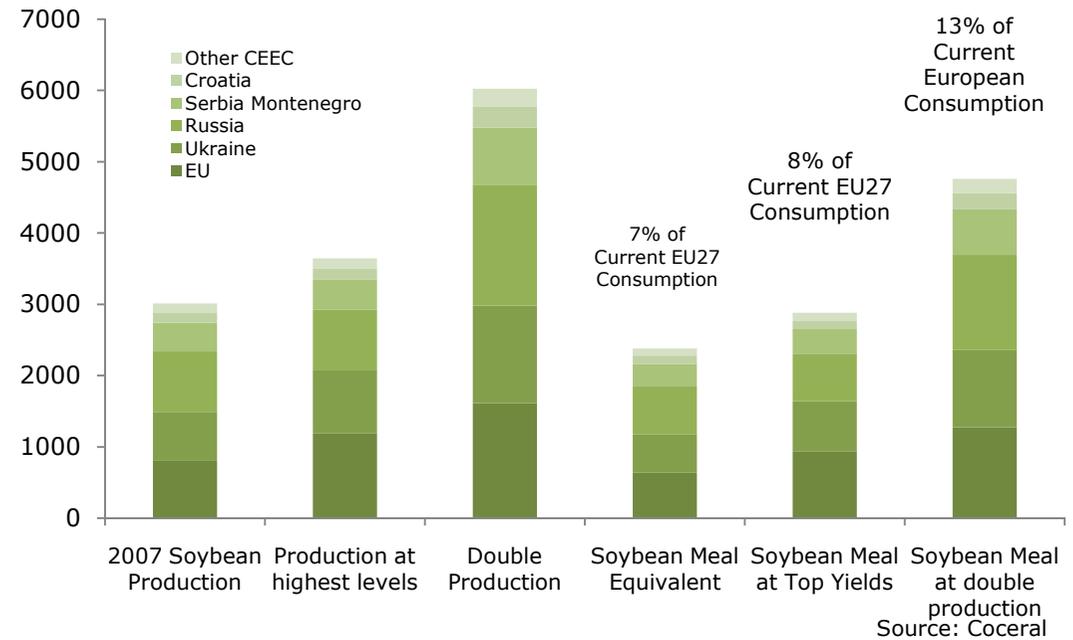
# Comparison between Maize and SBM Situation

Europe has strong supplies of cereals and maize which represent a source of raw materials for feed. However the by-products of the US corn based ethanol industry offer raw materials which are also cheaper than using high value cereals better utilized in the food industry. Hence the loss of access to this raw material impacts the competitiveness of European meat production.

Europe is almost entirely dependent on soybean imports for the high protein content of feed. Protein is the cornerstone building block for producing meat. 90% of EU-27 soybean meal currently comes from Brazil and Argentina. Soybean production within Europe and the CEECs is growing. However, as shown opposite (Fig 10), even if these countries were able to double their production, they could still only hope to fill 13% of Europe's current demand of soybean meal. This demonstrates the gravity of the looming situation and the impact of removing the core protein supplement from the feed to meat chain.

Soybean meal is essence in pig and poultry nutrition supplying essential amino acids for growth. Even though small quantities of soybean meal can be substituted by other protein sources such as rapeseed meal and sunflower meal, the level of substitution is limited due to the supply of amino acids and fibre levels in the other protein sources. Not getting the correct balance of amino acids results in the excretion of surplus waste protein, which is excess nitrogen pollution. It is also inefficient livestock production.

**Fig 10: Soybean and Soybean Meal equivalent production possibilities in Europe & CEEC (1,000MT)**



**To assess the economic impact felt from the potential loss of soybean meal, assuming no market access for US-Soybeans (25% of EU soybean and 9% of SBM supply)**

**Immediate costs:**

- Price difference Brazil/Argentina versus USA €22/t x 6.4\* Mio t = €170Mio
- \*6.4 Mio t = EU imports over winter season to replace US sourced Soybeans/SBM

**Indirect costs:**

- Leverage effect on other protein feeds = €350Mio

**Total European cost disadvantage = €520Mio**

Source: FEDIOL/FEFAC/COCERAL



Part 3 – The Meat Industry

- Narrow margins in the meat industry show vulnerability
- Inability of the meat industry to pass on costs



# Narrow margins in the pork & poultry industry show vulnerability

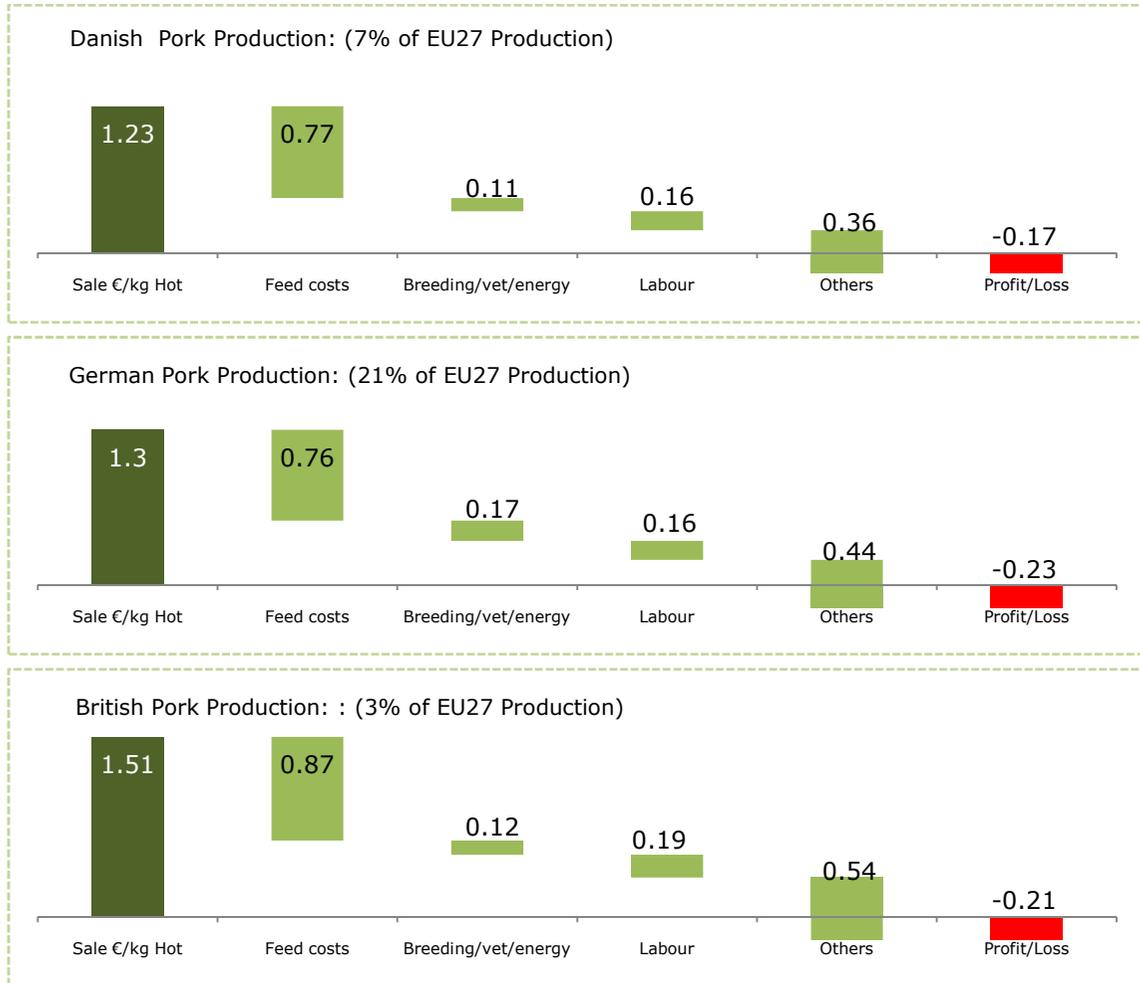
The margins seen in pork production throughout Europe are extremely narrow. There is little leverage held by the producer to demand better prices for their produce despite increasing costs of production. This was made painfully evident during 2007 (see Fig 11) when feed costs became more expensive due to supply shortages. Production of pork fell during 2007 and into 2008 as producers exited the industry. However many producers have held on in anticipation of a correction in the feed price. Profit margins during 2007 and in the first half of 2008 have been negative across Europe as is shown in the bar charts opposite.

This demonstrates the vulnerability of the pork producers margins to increasing feed costs. Soybean meal typically representing 22% to 25% of feed value for high performance pig feed. Hence the vulnerability of the pork industry to any increases in soybean meal prices. Should soybean supply be compromised we can assume the majority of pork producers will be suffering losses and then the exit rate of producers leaving the industry will be rapid.

The poultry margins are similarly vulnerable to increases in cost base as the feed costs represent 60-75% of the production costs. However during 2007 prices were stronger due to the loss of supply from Asia due to Avian Flu outbreaks.

Meanwhile Brazils strategy for shifting the percentage of Brazilian exports more in favour of higher value meat instead of feed materials is developing well. Europe's restrictive import policy on GM feed imports and crippling impact on its domestic meat production is an excellent signal for Brazilian meat exports.

Fig 11: 2007 Pork Production



Source: Danish Meat Association

# Inability of the meat industry to pass on costs

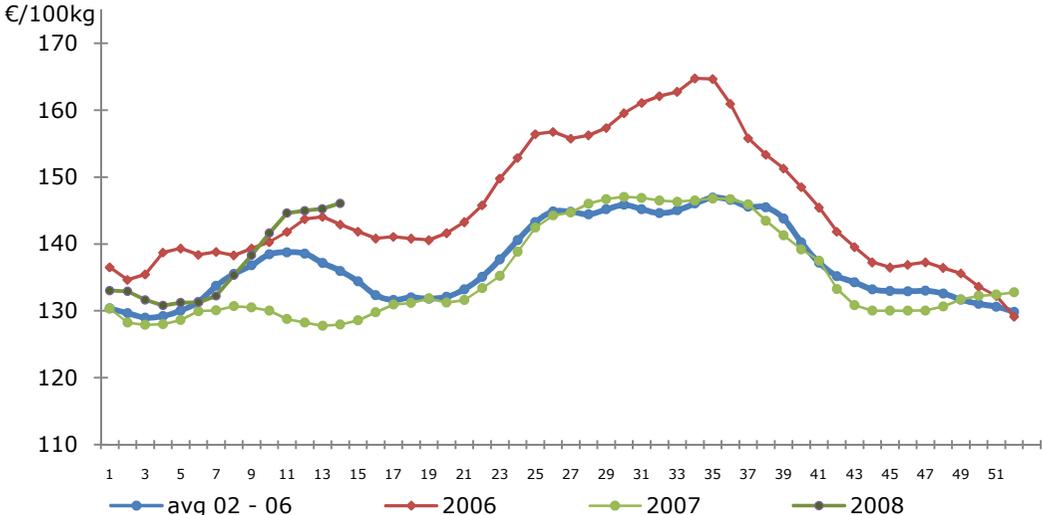
Increasing feed costs and retailers keeping producer prices low have been two factors that have made meat producers highly sensitive to increases in costs.

With the market leverage heavily loaded in the favour of retailers – meat producers have little ability to pass on any increases in production costs. This became very evident during 2007, feed raw material prices were extremely high – there was an increase of 150% + on 2006 prices – however, pig carcass prices remained below 2006 prices. Pig meat prices are heavily influenced by global trade prices and with increasing supplies on the market from the US and Canada prices during 2007 were low.

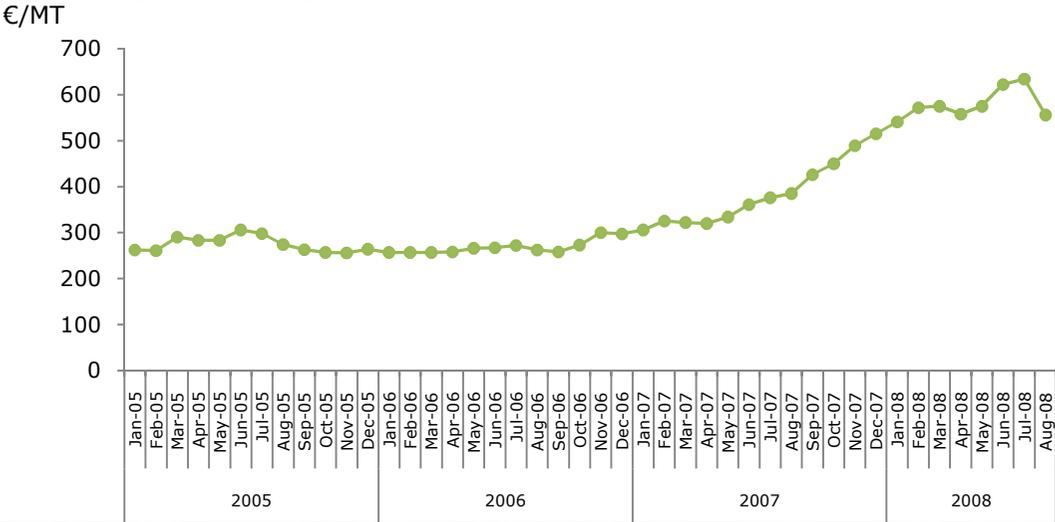
The retail market environment in Europe is one of extreme competition with only a small number of national players in most member states. A key to any retail competitive strategy is price. With this emphasis on supplying quality for less money primary producers have consistently struggled to create profit in such a tough environment.

The impact cost calculations of the feed and meat sector provide a clear indication that the EU 0-tolerance policy has had significant impacts on profitability of the EU livestock sector: approximately 17% of the extra feed costs of €15Billion (marketing years 2006/2007) can be attributed to 0-tolerance policy which translates in to a share of approximately 10-15% in the total loss per pig carcass recorded by the meat processing industry in the marketing year 2007/08 (as demonstrated by the calculations by NPA-UK).

**Fig 12: Development of the average Community price for pig carcasses**



**Fig 13: Soybean Meal (Rotterdam CIF)**



Source: Oilworld 2008

Part 4 - Outlook

- Conclusions & outlook
- Forthcoming biotech events calendar



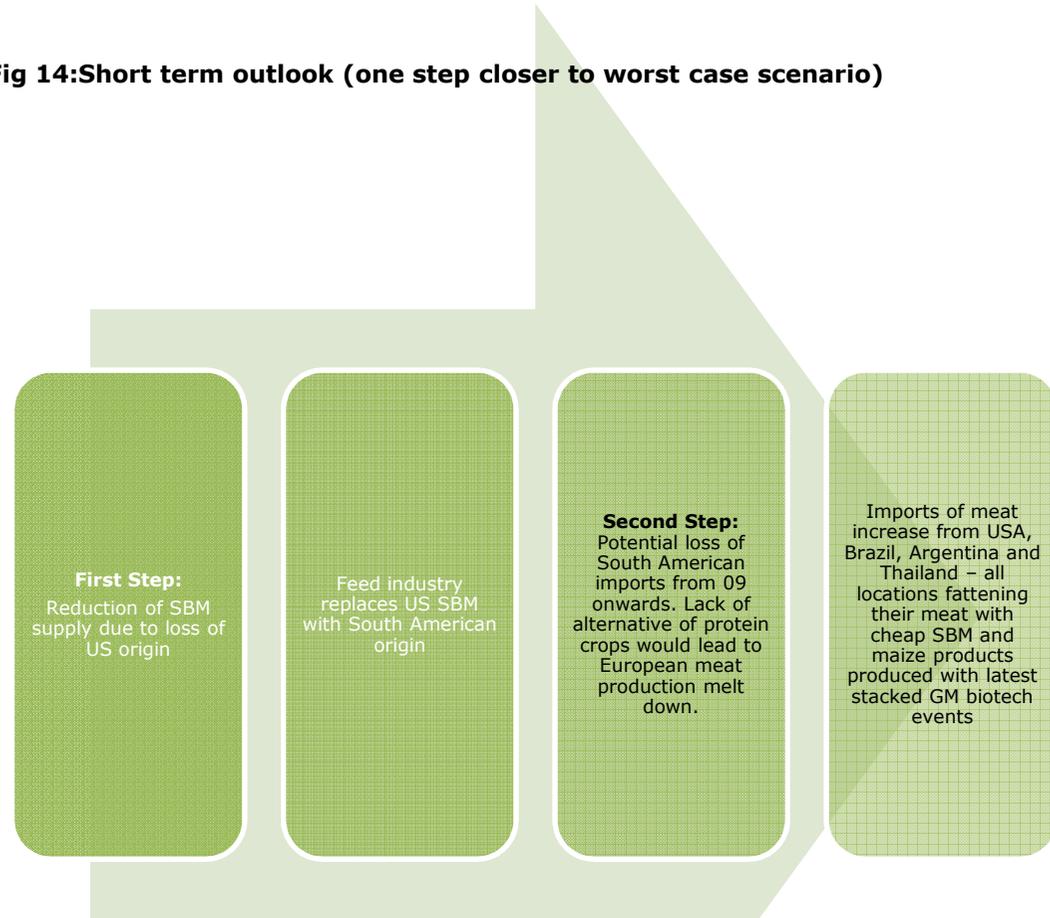
# Short term 2008/09 outlook

The political inability of the EU to fix a workable LLP threshold for not yet approved GM events will move Europe one step closer to worst-case scenario during the current marketing year 2008/09. Indeed seed companies have started large scale seed multiplication of the new RR2Y event. If authorization is not granted timely, the Europe may initially lose 25% of its soybean supplies from the US. Supplies from the South American spring crop 2009 are also under threat if traces from unapproved events are found in new crop shipments. The EU oil crushing industry supplying today about 50% of SBM to the feed industry produced from soybean imports, would have to close a significant part of its operations due to the lack of availability of alternative oilseed throughput.

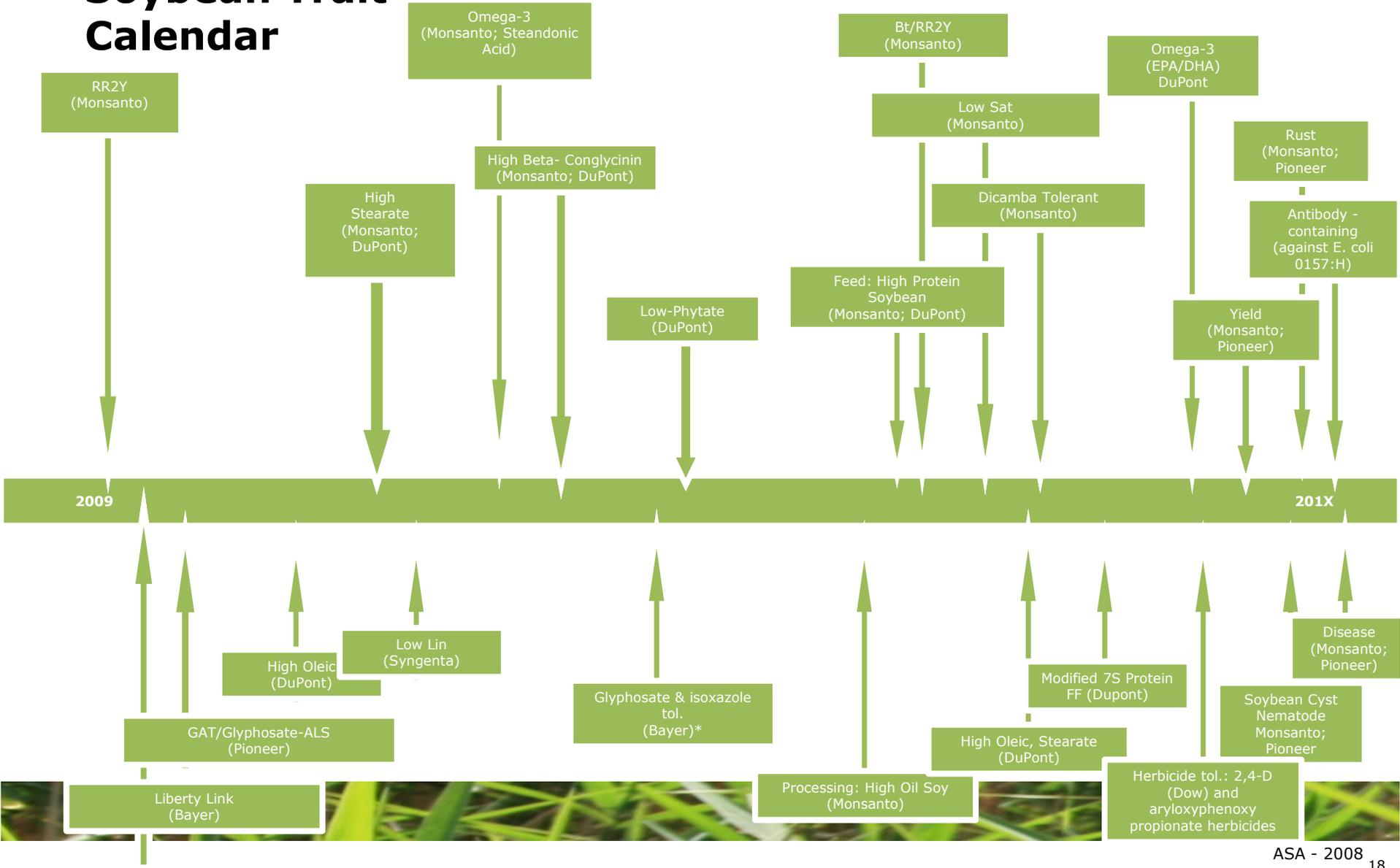
A loss of feed supply security would inevitably lead to a major rationalisation the European feed and meat industry. With falling European production, imports of meat would be certain to increase. Ironically, the imported meat would have been fed the very same soybeans that Europe is unable to utilise for its own industry.

It should be noted that despite the gravity of the approaching situation, approval of RR2Y soybeans for use in feed and food will be a short-term fix at best. The RR2Y trait represents the tip of the iceberg while a great number of traits are currently in approval processes for planting. See following page for pending soybean biotech events.

Fig 14: Short term outlook (one step closer to worst case scenario)



# Forth Coming Soybean Trait Calendar



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