GatePost
FROM THE BREEDER | Limagrain UK

Limagrain UK's Pulse Breeding Programme

International cooperation showing positive results for Limagrain UK's Pulse Breeding Programme

TOM BARKER
Cereals & Pulses
Product Manager

Limagrain's pulse breeding programme focuses on winter and spring peas and beans.

We are a multinational breeding team based in Europe and the UK and target a global pea and bean market.

Pulse breeding is centred in Rilland in the Netherlands, which is on the same line of latitude as London. The programme is spearheaded by pulses breeder Will Pillinger, along with his team consisting of Corrie Dekker (assistant breeder), Jaenet Ter Schure (assistant molecular breeder), Evelien Bakker-Breker (breeding assistant) and Lucie Collins (trials manager).

Major markets targeted include France, Germany and the United Kingdom, but we also breed for other markets within Europe and North America. The EU Market for peas and beans is worth €10 million and the specific types of peas include green seeded types (€1.8m) for human consumption and yellow peas (€3m) for animal feed. Field beans (€4.7m) make up roughly 1/3 of our breeding activities across spring and winter types, with our main market being the UK.

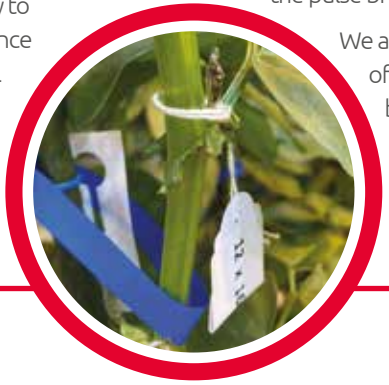
Key traits for peas and beans are excellent agronomics, yield, quality and protein content. The other targeted traits we look to develop include; resistance to lodging, Aphanomyces tolerance, tolerance to cold, Downy Mildew and Powdery Mildew and Pea Seed borne Mosaic Virus (PSbMV), maturity and plant architecture.

The core activities for breeding comprise of crossing, early generation selection and seed production.

Although we have many breeding targets for peas, there are some specifics for the human consumption market that are key, such as excellent seed colour retention. When harvested at the right time, peas will retain the blue green appearance. They will quickly lose their colour if not harvested or stored correctly.

In 2021, we entered 15 varieties into National Listing across Europe and the UK. For a small breeding programme, that is a significant number and gives an idea of the potential challenges of being successful in each target market. As a result, the pressure on the seed purification team can be high.

Further developments over the next couple of years will be the ability to measure yield performance of our breeding material during the first year of field assessment. Additionally, the development of techniques to predict the performance of material without testing in specific environments, will help to advance the output of high performance varieties from the pulse breeding programme.



We are excited about the future of pulses and Limagrain have backed the programme with significant investment to further modernise our activities.

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TURNING SPRING BEANS INTO NORTH AFRICAN CUISINE

Most faba beans exported from the UK are sold into Egypt and Sudan. They form an important staple of North African cuisine in dishes such as ful medames and falafel, especially through Ramadan.

TOM LAFLIN
Head Chef of The Bury St. Edmunds & Farmers Club

We challenged Tom Laflin, Head Chef of The Bury St. Edmunds & Farmers Club, to use LG Raptor spring beans in his kitchen. He made a faba bean and lamb tagine, along with a faba bean and onion soup.

"The beans were unusual and took a lot of soaking. However, with the spices in the recipe adding the much needed flavour, the dish turned out well," said Tom.

Whether members and guests of The Bury St. Edmunds & Farmers Club will see the dishes on the winter menu, only time will tell.

For anyone wanting to use their own spring beans, here is Tom's Lamb Tagine recipe:

Tom's Lamb Tagine

INGREDIENTS

3 Shallots	Splash of Oil (preferably Rapeseed)
0.5 tsp Turmeric	1.5 tsp Cumin Powder
1.5 tsp Fennel	1 tsp Cinnamon
1.5 tsp Carraway	2 tsp Garlic Powder
1.5 tsp Paprika	1 tsp Salt
1 tsp Pepper	1.5 tsp Smoked Paprika
2 bay Leaves	1.5 tsp Ginger
300g Lamb	Zest 1 x Orange
Juice 1 x Orange	1 tin Chopped Tomatoes
400ml Water	400g Faba Beans

METHOD

- Soak beans overnight in water
- Tip away water and then boil beans for 25 mins in clean water
- Dice shallots
- In a saucepan, add the oil, fry the shallots and put in all spices for 10 mins

- Once combined, transfer to large oven proof dish with lid
- Add lamb, orange zest and juice, chopped tomatoes and stir
- Add water and beans and stir
- Put in oven at 150° for 3.5 hours
- Serve with warm bread, lime segment, fresh coriander and enjoy!

10 TOP TIPS FOR ENSURING HIGH SPRING BARLEY YIELDS

RON GRANGER
Arable Technical Manager

Ron Granger, Limagrain UK's arable technical manager, revisits the key agronomic principles for the best establishment of the barley crop, and for maintaining high tiller counts for optimal yields.

1. Know the end market or contract that you are growing for

This helps determine agronomic inputs for hitting desirable grain nitrogen content.

2. Choose the right variety

Usually determined by the end-use or contract chosen. LG Diablo is the highest yielding, dual-use variety* which means it can be used for either brewing or distilling.

3. Time of drilling

Patience is needed in the spring. Wait for when weather, soil conditions and temperature allow for good seedbed preparation, to encourage rapid emergence and establishment.

a. Earlier drilling in the spring can encourage higher yields when on lighter, free draining land as a result of increased root and canopy size development.

b. Disease risk may increase, so choose varieties with a stronger disease resistance.

4. Seed rate

Seed rate: for higher tillering varieties, the optimum seed rate is 350 seeds/m^2 when drilling in ideal conditions around mid-March.

This target can be adjusted depending on

- Weather
- Soil temperature
- Drilling date
- Seedbed quality
- Moisture availability
- Growers' own experience on individual sites.

When forced to drill into April, push rates up to 400-450 seeds/m^2

5. Maintaining high tiller numbers

High final tiller or ear counts are critical for achieving high yield potential. An early balanced crop nutrition regime, encouraging better rooting and canopy development, play a critical role in securing final tiller survival.

*on AHDB RL 21/22

AHDB Barley Growth Guide

The AHDB Barley Growth Guide suggests that the final ear target population should be around 775/m^2 (3 shoots/plant), however this is often underachieved, impacting on final yields.

6. Nitrogen and tiller numbers

a. Limagrain trials show that to achieve higher yields without exceeding grain nitrogen, 150 kg/ha nitrogen based on a split nitrogen application of a standard 120 kg/ha in the seedbed, plus an additional 30 kg/ha at tillering, is the best approach - when compared to a standard seedbed or split 50/50 nitrogen application of 120 kg/ha.

b. Higher yielding varieties respond well to higher nitrogen levels, as nitrogen grain content dilution is achievable. Additional nitrogen input can be beneficial on better soil types and should be targeted for early canopy development, thus ensuring high final ear number - but beware on lighter soils regarding nitrogen timing in stress situations, when plant uptake is limiting.

7. Micro and macro nutrition

Pay attention to macro and micro nutrition for establishment, crop health and ensuring a high final tiller number.

8. PGR's

Early PGR applications programmes are recommended on thick crops, to promote additional rooting and strong uniform tillering.

9. Fungicides

Limagrain trials work suggests a minimum of two fungicides for maximum yield potential. If the season dictates low disease incidence, then a fungicide timing at the T2 (GS37-39) stage, may be satisfactory.

10. Harvesting

Harvesting of the crop when fully fit is advisable, to reduce lodging and brackling, and the effects on both yield and grain quality when weather conditions deteriorate. If using a desiccant, ensure the correct growth stage and harvest intervals are observed.

LOOK BEHIND THE SEPTORIA HEADLINES

ED FLATMAN
Head of European Wheat Research

As a result of the perfect 'Septoria storm' this spring, many wheat varieties have seen their Septoria resistance ratings drop. Whilst this has mostly affected varieties with Cougar in their parentage, it is important to look at the detail behind each individual varieties' genetics to fully understand the risk, says Ed Flatman, Head of European Wheat Research for Limagrain.

"It's very easy to panic and group all the varieties with Cougar parentage into the same risk level – but this is not the case – and growers should take the time to really understand the risks to individual varieties," he says.

"Parentage is a good indicator, however varieties do not inherit all the traits of both parents, therefore it's important to understand the attributes of the new variety itself."

Mr Flatman takes the example of the Group 3 biscuit, LG Astronomer. "The most recent additions to the Group 3's last year all have Cougar in their parentage. LG Astronomer was one of these, and joined the group, offering the highest Septoria resistance rating of 7.4."

Mr Flatman explains that on paper, with Cougar in its parentage, it is a (Leeds X Cougar) X Britannia cross, therefore LG Astronomer was likely to be one of the varieties affected.

"However, whilst other varieties in the group have seen their Septoria resistance ratings severely challenged by the Cougar strain, LG Astronomer's genetics held on relatively well and its rating has only dropped from 7.4 to 6.8 on the current three-year rating, and 6.2 for the one-year (2021) rating."

"This puts LG Astronomer as one of the highest rated Group 3 varieties for Septoria resistance, on both the new Recommended List three-year rating and the one-year (2021) rating."

> "This puts LG Astronomer as one of the highest rated Group 3 varieties for Septoria resistance, on both the new Recommended List three-year rating and the one-year (2021) rating."

"It has not been as affected as other varieties in the group - and this is an important differentiation."

"We know that relying on a single gene is a risky approach, but a lot of knowledge has been gained over the years, and rather than solely using field observations, we now use these in combination with molecular strategies to actively stack multiple resistances together to protect the individual lines, and this is the case with LG Astronomer."

"As breeders, our focus is looking at overall resilience, and this includes protecting the resistances we have, as well as bringing through new lines that don't come at the cost of yield."

Mr Flatman's advice is to grow a range of varieties that offer genetic diversity, so that risk is spread out across the farm. "We do not know what next spring will bring and how the Septoria population will evolve - disease ratings after all only reflect recent pathogen populations."

Protecting Septoria resistance ratings in the field

NIAB first looked at the Cougar isolates in an AHDB project in 2015 (and this has been furthered by a study conducted at Teagasc), which confirmed that these isolates were also virulent to a range of Cougar based varieties.

NIAB's crop protection and agronomy specialist, Dr Aoife O'Driscoll explains: "A key point is that not all isolates are virulent to all varieties, which is why we have seen a range of responses across varieties with Cougar parents."

Independent studies have shown that Cougar isolates are similar in fungicide sensitivity to the wider Septoria population, and there have been no significant shifts in azole sensitivity this season.

"Septoria should not be more difficult to control in terms of fungicide sprays, if programmes are timed properly. Growers should take confidence in this when planning their fungicide programmes this spring."

NIAB supports the resistance ratings put forward by AHDB this autumn and Dr O'Driscoll recommends planning fungicide programmes based on the one-year (2021) rating, rather than the three-year rating.

DR AOIFE O'DRISCOLL

> "A key point is that not all isolates are virulent to all varieties, which is why we have seen a range of responses across varieties with Cougar parents."

MORE OPPORTUNITIES FOR BEET

MARTIN TITLEY
Director of
Forage Crops

With purchased feed becoming more expensive, many livestock producers are returning to a reliable crop that can produce a consistent feed – Fodder Beet!

It's a great crop to grow, but you need the right soil, the right machinery, and a good arable knowledge - as the inputs and growing costs (approx. £1,500 per ha) are relatively high and are necessary to achieve the crops' full potential.

Seed is pelleted and needs to be precision drilled, and considering that many of the older single row harvesters are now becoming obsolete, it's no surprise that many livestock producers are relying more on arable farmers to grow the crop as a cash crop.

The crop is usually sown from late March to late April, and harvested in October/ November; very similar to sugar beet. A well grown crop can yield up to 100 tonnes per hectare, with a typical ME of 13 MJ/kg dry matter - unrivalled in terms of any other fodder crop.

High dry matter varieties have also been successfully used for Biogas production, where gas yields have been impressive.

There are also some fantastic varieties available, such as the high dry matter varieties Brick and Tadorne, as well as consistent performers more suitable for livestock production, such as Robbos and Blaze.

Download a copy of the latest trial results
www.lgseeds.co.uk/fodderbeet

> "High dry matter varieties have also been successfully used for biogas production"

Breeder's Perspective Q&A

Sophie Buon - Barley Breeder

Q What are breeders doing to benchmark quality and innovation in spring barley?

Limagrain plant over 10,000 trial plots in the UK annually and screen varieties on key traits, including treated yield, end-use quality, resistance to pests and pathogens, and agronomic suitability.

It takes at least 8-10 years to develop and breed a variety, from an initial cross to a volume of commercial seed. To decrease this timeline and respond to the market quickly, breeders are combining genomic selection (a tool based on DNA markers, which helps predict yield and end use characters in early generation material), out of season nurseries in the Southern Hemisphere, and the use of greenhouses - to grow more generations per year.

Q What are the challenges and difficulties in producing a dual use spring barley, like Concerto and LG Diablo?

In comparison to feed barleys, dual use varieties require a good yield with a minimum of agronomic standards (mainly specific weight, brackling and Rhynchosporium resistance), as well as a good malting profile.

Brewers and distillers have around a dozen malting specifications that allow a variety to be suitable for both the beer and whisky industries. The main requirements are an optimal Hot Water Extract (HWE) and Predicted Spirit Yield (PSY), to achieve high sugar extract from the malt and maximise the quantity of alcohol produced.

It is also essential to breed for 'non-Glycosidic Nitriles (GN) producer' varieties, to avoid the production of harmful substances during distilling.

Q What are barley breeders currently trialling and testing, that growers could see in varieties in 10 years' time?

Our challenge will be to provide stable varieties adapted to climate change, and which have a lower impact on the environment, without having economic bearings on growers and end users.

We must also adapt our breeding programme in line with the evolution of agricultural practices (e.g., no-till sowing or use of cover crops), and with economic and governmental policy, such as input costs, loss of chemistry and reducing the overall carbon footprint.

VARIETY CHOICE FOR MAIZE BREAK CROPS

TIM RICHMOND
Maize Manager
UK & Ireland

Maize is increasingly seen as an alternative break crop on arable units, and by selecting the right variety you can ensure a good crop and the timely establishment of a successor crop.

Maize was often seen as a challenging crop to grow due to the late harvest. However, new earlier maturing varieties mean the crop can fit very well into rotations, allowing successor crops to be drilled in good conditions and in good time.

While not a full alternative to oilseed rape, which will usually provide a better return on investment in most years, maize can be incorporated into rotations as a way to increase the break crop area and leave a good margin. Agronomically, maize can prove particularly effective on farms wanting to control problematic weeds like blackgrass.

The crucial thing to look for is early maturing varieties that will suit your site's conditions, as you need a variety which will mature at the right rate for your farm to ensure a timely harvest and successful establishment of a successor crop.

Maize maturity is all about heat, which is expressed as Ontario Heat Units (OHU). Maize needs to accumulate a minimum of 2500 OHU, before being fit to harvest. The fewer OHU required, the earlier a crop will be ready to harvest. Earliness is defined by the FAO for the variety; earlier varieties have a lower FAO. They can be ready to harvest as much as two weeks earlier than later maturing ones, which can make a big difference to crop success.

If you have a shorter growing season, selecting an earlier variety will reduce the risk of variable weather delaying harvest and will increase the chance of the successor crop being established.

Look for varieties with an FAO of 140-220, to ensure you get a variety that will mature in good time. Varieties like Resolute, Saxon and Mantilla, all combine early maturity with excellent yields, while Gema with an FAO of 150, is very early maturing.

To simplify variety choice for your site, download our unique **Maize Manager App**, available free on the Apple or Google Play stores, or at **www.maizemanager.com**.

The Maturity Manager section was developed with data from the Met Office. It shows the average heat units for your postcode and then lists varieties which are suited to your farm, and will mature within the average accumulated OHU.

The Maturity Manager will allow you to make an informed choice and select the optimum variety - reducing risk, ensuring an effective break crop and the establishment of the successor crop.

> "Look for varieties with an FAO of 140-220, to ensure you get a variety that will mature in good time."

LIMAGRAIN UK AT CROPTEC 2021

After two long years, it was great to finally see visitors face-to-face at CropTec.

WILL CHARLTON
Arable Marketing Manager

This year, Limagrain UK was the host of the Plant Breeding Hub.

Over the two days, visitors had the opportunity to quiz Limagrain's technical experts on all things related to plant breeding.

The Hub also hosted talks throughout the day:

- **Limagrain UK's Pulse Breeder, Will Pillinger** covered the latest developments in pulse breeding and explained how increasing pulse crop yields can potentially improve output and reduce risk on-farm.
- **Dr Emma Wallington of NIAB** discussed gene editing and how this could be adopted in the UK.
- **Liam Wilkinson, Arable Technical Specialist at Limagrain UK** shared his views on trait focused oilseed breeding and how this forms the basis of an IPM strategy.
- **Farmacy Agronomist, Charles Wright** shared his first-hand experience of the impact of varietal resistance on agronomic decision-making, in a farm environment.
- **UK grower, Jonny Hodgson** talked about the importance of plant breeding in a regenerative agricultural system, from a farmer's perspective.
- **Limagrain UK's Cereal Pathologist, Rachel Goddard** shared her views on breeding diverse disease resistance in wheat and discussed what wheat breeders can do to stay one step ahead of pathogen evolution.

The CROPTEC SHOW

Check out LG's website, to view recordings of the talks www.lgseeds.co.uk

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