Scotland Bean Agronomy in Practice: Year 1 Variety Trial

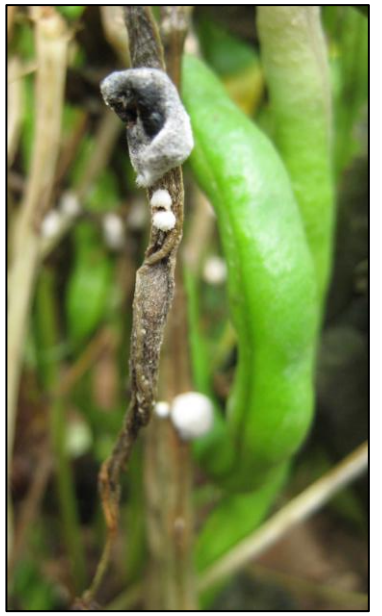
Why focus on beans?

- Improve soil structure & fertility
- Add nitrogen to the rotation
- Support sustainable production
- Fit well within arable systems

Building block to successful production

- Crop rotation
  - Recommendation to not grow legumes or pulses closer than 1 in 5 years to mitigate risk of foot rot
  - Monitor for *Sclerotinia sclerotium* in multiple crops in the rotation, including oilseed rape and linseed
    - Causes stem rot in peas and beans

- Tools to cross-check disease or nematode plant hosts
  - https://www.best4soil.eu/database



Seed selection

- Variety does have an impact on yield potential, but good agronomic practices is far superior vs varietal choice

- At least 80% germination
- Seed should be completely free of stem nematode
- Seed should have no more than 1% *Ascochyta fabae*

BEANS		
TEST	AMOUNT SEED REQUIRED	PRICE £ excl. VAT
BEAN PACKAGE		
Germination, *Ascochyta*, stem nematode, TSW	1.5kg	105.00
BEAN COMBI 1		
Germination, *Ascochyta*	900g	82.20
BEAN COMBI 2		
Ascochyta, stem nematode	1.5kg	82.20
BEAN COMBI 3		
Germination, stem nematode	1.5kg	76.00
GERMINATION		
	250g	47.60
SEED DISEASES		
Ascochyta	500g 200 seeds	59.50
Stem and bulb nematode	1.2kg	40.60

Prices subject to change

Establishment

- Seed Bed Preparation
  - Good drainage and avoidance of compaction can lower risk of foot rot
- Drilling depth of 7.5-12.5 cm is optimal

- Drill under right conditions
  - Being a large seed, requires adequate moisture to germinate
    - Good seed to soil contact essential.
  - Not as impacted by soil compaction as peas but can still cause up to 40% yield reduction

- Seed rate is 50-55 plants/m^2 for spring

Weed Management

- Poor competitors in early growth stages
- Do as much weed control as possible in previous crops
- Start with a stale seed bed
- Most herbicides available are pre-emergent

Chocolate Spot

- Encouraged by long periods of overcast and humid conditions
- Winter beans are more susceptible, especially under high plant populations
- Infection starts on the leaf but can spread to stems and pods
- Preventative sprays are essential when conditions are suitable for disease

Bean Rust

- Disease develops quickly favoured by hot days and cool humid nights
- Yield reductions can be huge if the disease develops during late flowering and into pod set
- Infections after pod development have little effect on yield
- Can impact both spring and winter beans

General bean disease control

- Resistance ratings are on the DL
- Monitor for downy mildew early on
- Stay on top of Chocolate Spot
- 2nd fungicide application for Chocolate Spot (if needed) should also be targeted for rust

WINTER BEANS - PGRO Descriptive List 2026

The control for yield is the mean of four and five year varieties (4.32 t/ha). Yield differences of less than 8.7% are not statistically different.

		Agronomic characters				Resistance to			Seed characters			
UK Agent see appendix	Yield as % of control	Flower colour	Earliness of maturity (1-9)	Straw length (cm)	Standing ability at harvest (1-9)	Downy mildew (1-9)	Rust* (1-9)	Chocolate spot (1-9)	Thousand seed weight (g) (@15%mc)	Protein content (% dry)	No. Years in matrix	Year first listed

SPRING BEANS - PGRO Descriptive List 2026

The control for yield is the mean of four and five year varieties (4.21 t/ha) Yield differences of less than 6.7% are not statistically different.

		Agronomic characters				Resistance to		Seed characters				
UK Agent see appendix	Yield as % of control	Flower colour	Earliness of maturity (1-9)	Straw length (cm)	Standing ability at harvest (1-9)	Downy mildew (1-9)	Rust* (1-9)	Thousand seed weight (g) (@15%mc)	Protein content (% dry)	No. Years in matrix	Year first listed

Key aphid species

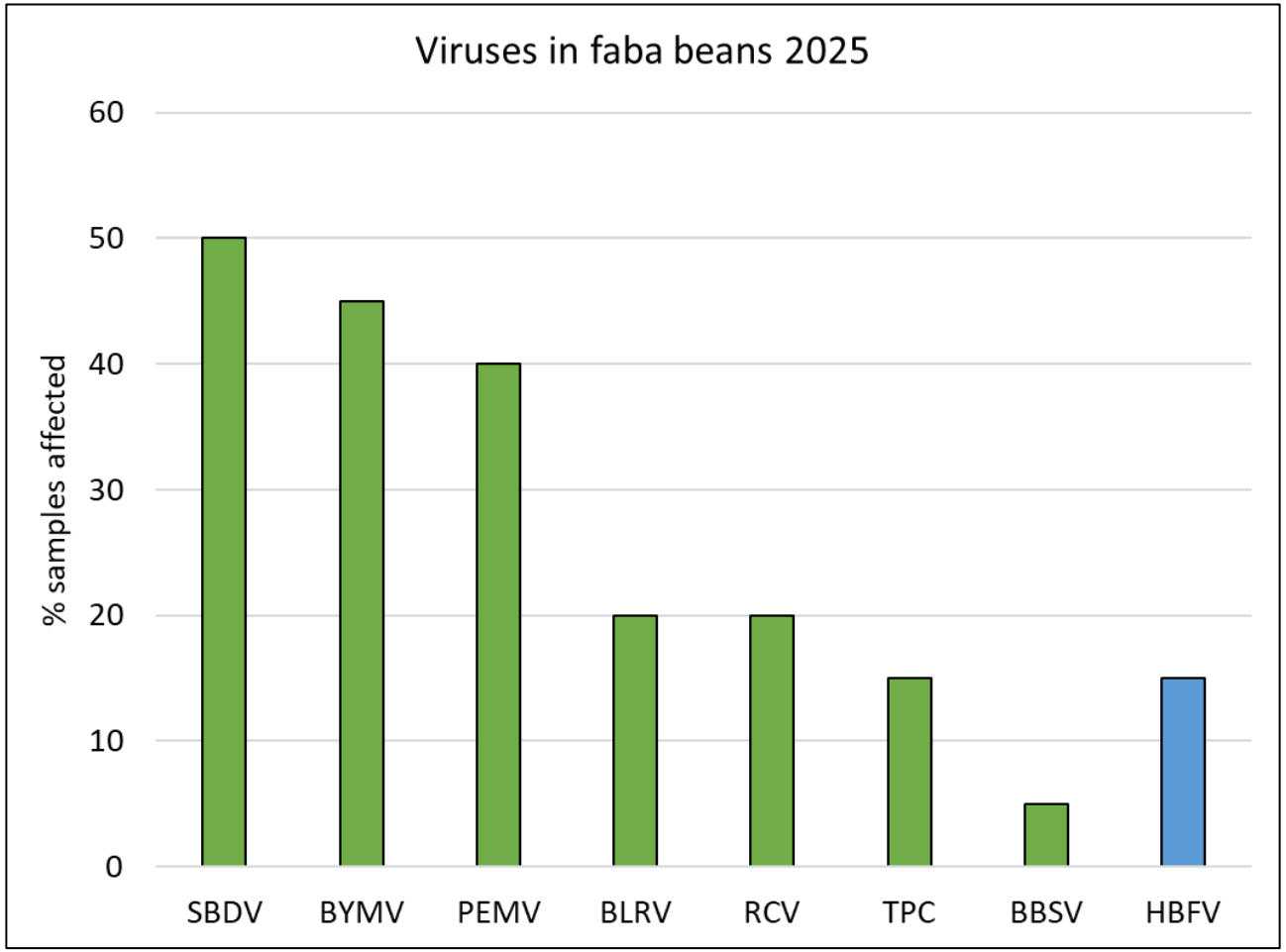
- **Pea aphid (*Acyrthosiphon pisum*)**
  - Overwinters as eggs or adults on wild legumes
  - Is a vector for more than 30 viruses worldwide
- **Black bean aphid (*Aphis fabae*)**
  - Winter host is the common spindle (eggs) or wild legumes (mobile stages)
  - Greater impact from direct feeding than from virus transmission, although it can transmit viruses and spread existing infections from plant to plant
- **Peach potato aphid (*Myzus persicae*)**
  - Has been shown to transmit over 100 viruses in about 30 different plant families
  - Risk is higher if overwintered brassica crops or other plant hosts are grown in neighbouring fields
  - Mild winter conditions may lead to larger and earlier spring migration

Bean Viruses

Virus	Vector/ mode of transmission	Reported host plants (for virus)
Bean leaf roll virus (BLRV)	pea aphid and peach-potato aphid	faba beans, peas, lucerne, red clover, sainfoin, and white clover
Bean yellow mosaic virus (BYMV)	pea aphid, peach potato aphid and black bean aphid (sometimes seed-borne)	chickpeas, faba beans, peas, lentils, lupins, lathyrus, lucerne, vetch, medic and clover
Broad bean true mosaic virus (BBTMV)	pea and bean weevil, clover seed weevil, seed-borne	faba beans
Pea enation mosaic virus (PEMV)	pea aphid, potato aphid, peach potato aphid	peas, lucerne, faba beans and vetches
Pea early browning virus (PEBV)	stubby root nematodes, seed-borne	peas, lupins, black medic, lucerne, Phaseolus beans and faba beans
Pea seed-borne mosaic virus (PSbMV)	seed-borne, pea aphid, peach potato aphid, black bean aphid	peas, chickpeas, lentils, shepherds purse and faba beans
Turnip yellows virus (TuYV)	pea aphid, peach potato aphid	brassicas, radish, peas, clover, chickpea, lupin, vetch, faba bean, multiple weed species

Virus survey in faba beans-2025

- 20 faba bean sites were surveyed in 2025 using the same methodology as for the pea survey, although not quantifying.
- Seven sites tested negative using HTS. These were sites that were sampled earliest of the 20.
- Two sites tested positive for only a single virus.
- The remaining 11 sites had multiple viruses present.
- Work will continue in 2026 and 2027

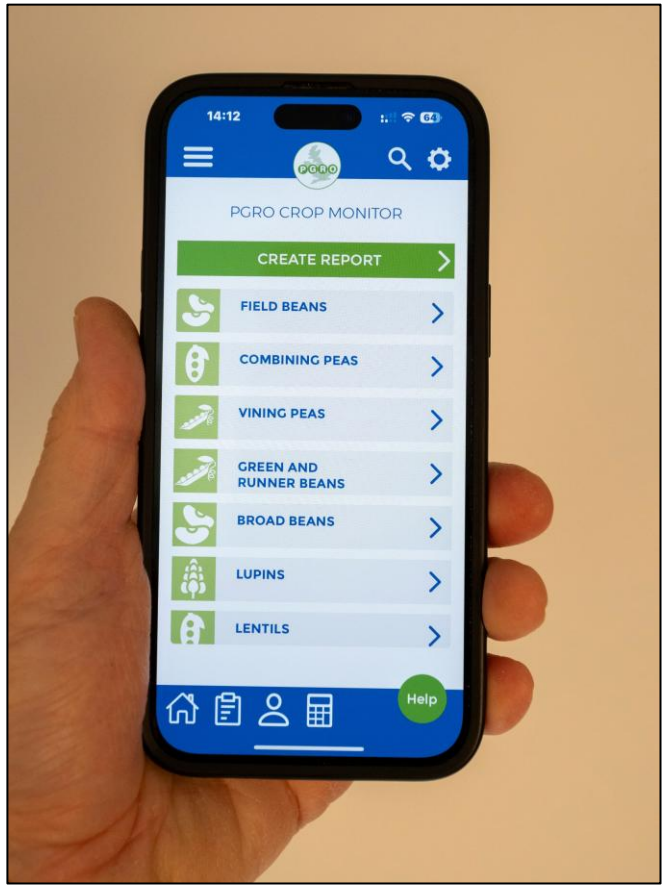


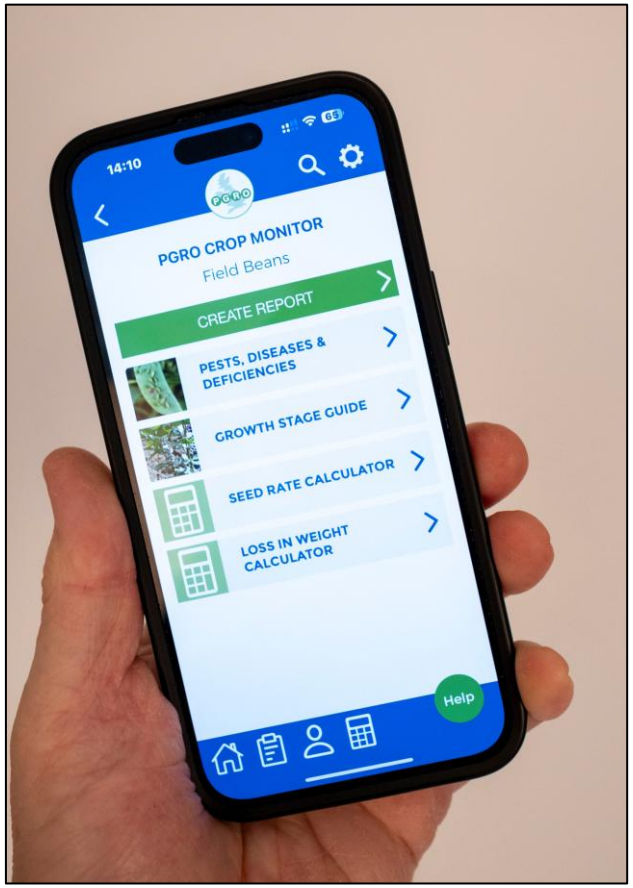
PCGIN
Pulse Crop Genetic Improvement Network

IPM

- **Flowering field margins** to encourage natural enemies.
- **Prevention:** Avoid planting close to other host crops and following host crops - IPM – Aphids and Viruses | PGRO.
- **Choose resistant varieties** if information is available – breeders may have this information
- **Seed testing** is essential to prevent spread of seed-borne viruses
- **Monitor** presence of aphids using the Rothamsted Insect Survey to understand when first flights occur - Aphid Bulletin | Insect Survey. Monitor crops during the growing season – low numbers of aphids at early growth stages transmit damaging levels of virus.
- Other **biological/ non-pesticide** products are available
- **Thresholds** may be used for general management to prevent feeding damage, but these do not apply when managing virus transmission.
- Use **chemistry** that is targeted for aphids. Pyrethroids will not give complete control and will disrupt beneficials. Consider insecticide resistance when selecting products for different aphids.

Key Takeaways





PGRO Crop Monitor

Processors and Growers Research Organisation

Scan the QR code to download the PGRO Crop Monitor app.

GET IT ON Google Play

Download on the App Store

For further information go to www.pgro.org

NCS Project

- Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems
- Led by farmers, backed by science.
- involves 17 industry and research partners and over 200 farmers

Reduce Carbon Emissions

To enable UK Farming to bring about a reduction of 3.4MtCO_2e p/a or 54% of the maximum potential for the industry.

Increase Pulses in Arable Rotations

To increase pulse and legume cropping in arable rotations to 20% across the UK (currently 5%).

Reduce Imported Soya Meal

To replace 50% of imported soya meal used in livestock feed rations with home-grown legumes.

Pulse Pioneers

- Pulse pioneers are paid to perform field scale trials, and they get to chose what the focus is for the bean or pea crop
  - Seed rates
  - Biostimulants
  - Fertility
  - Intercropping
  - Etc.
- Yield is important but also understanding what caused the yield improvement is key
  - Same holds for quality
- Also monitor the following cereal crop to gauge residual N from the beans

YEN

- Grower gets to see what the full yield potential is in the field entered for that season by combining local weather data with soil analysis

- Benchmark your own crop using a variety of nutritional, physiological and quality parameters.

- Although Cereal and OSR YEN's are not continuing for 2026, Pea and Bean YEN will continue into 2026 season and beyond

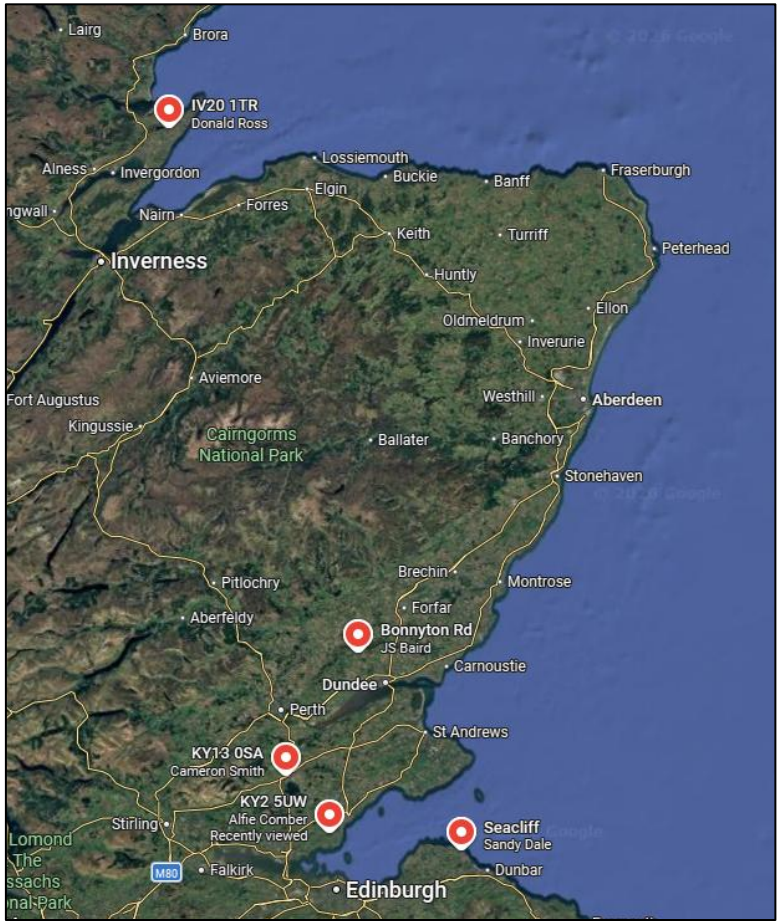
Scotland Bean Variety Trial

Objective:

- Identify bean varieties for Scotland by evaluating multiple varieties across several farms to determine which provide consistent, profitable performance under Scottish climatic conditions.
- Strengthen farmer and advisor confidence in beans as a viable break crop by generating local, practical evidence on establishment, growth, resilience, and yield.

Protocol for Year 1:

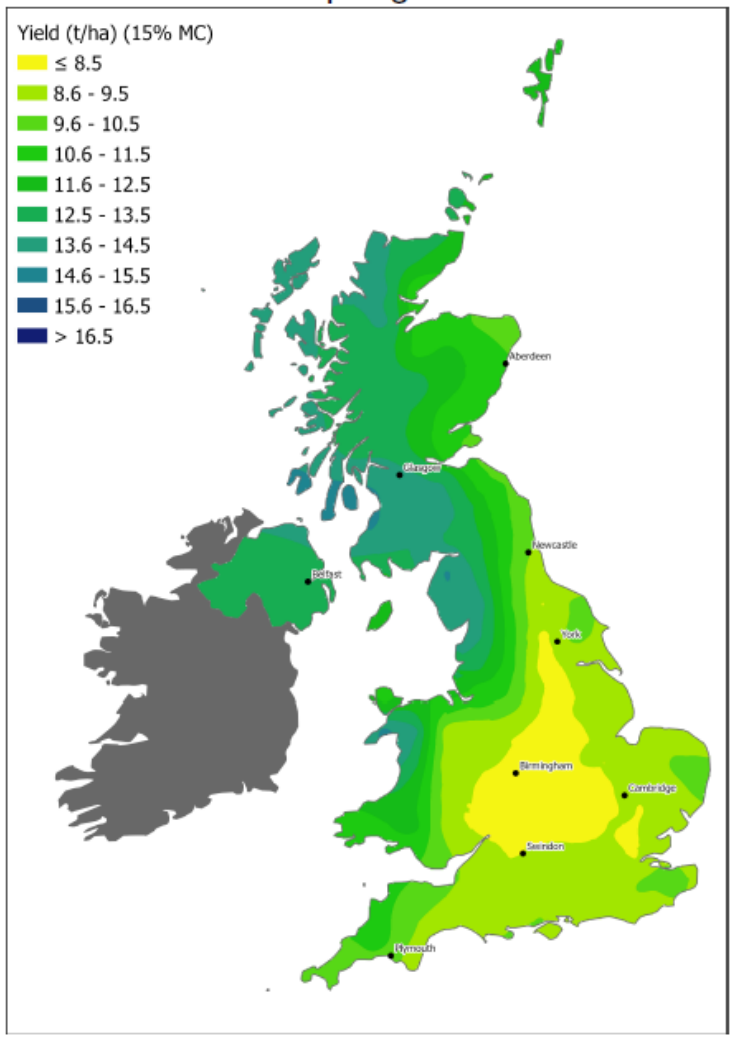
- 5 farms and 4 varieties (3 winter and 1 spring)
- Tundra was entered into Bean YEN to compare outcomes across entire bean growing region



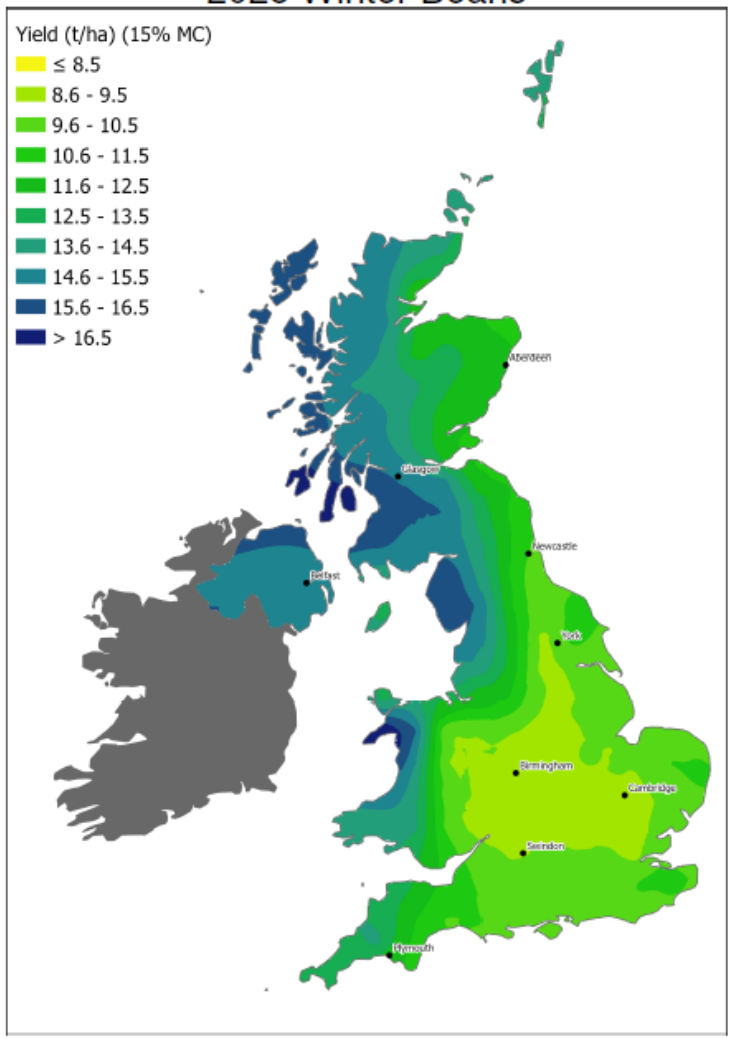
Yield Potential –YEN 2025

SCOTTISH AGRONOMY LTD

2025 Spring Beans



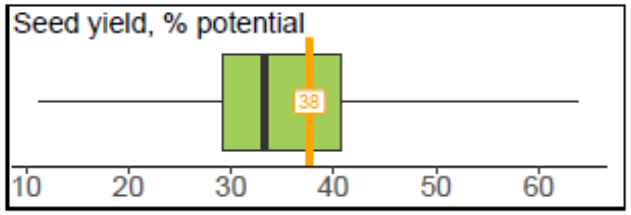
2025 Winter Beans



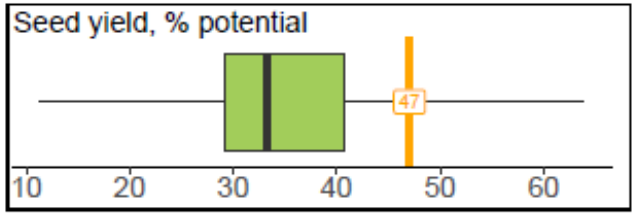
Yield Potential –YEN 2025

- Yield potential in YEN is a model based on weather, soil type and other factors

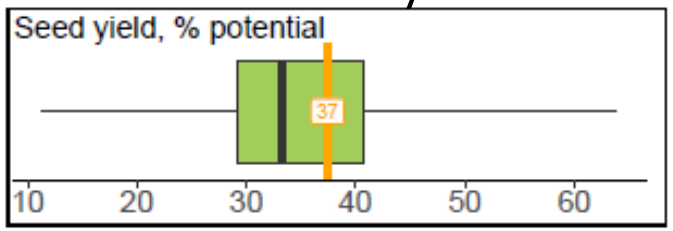
Inverness



N. Berwick



Kirkaldy



- % of yield potential is a better indicator on how the crop performed vs looking at straight yield

Inverness YEN Report Findings

- **Yield performance:**
  - Below long-term YEN benchmarks, consistent with the 2025 dry spring.
- **Strengths:**
  - Harvest index close to winter bean average, indicating efficient portioning of biomass to yield
  - Low disease and pest pressure
- **Limitations:**
  - Water availability during flowering and seed fill restricted biomass and seed size.
  - Short canopy lifespan reduced both biomass and light interception
- **Nutrition:**
  - Adequate nutrient supply, with no clear macro- or micro- nutrient deficiencies evident.
- **Key takeaway:**
  - A structurally sound crop whose yield was capped by environmental stress and limited resource capture, rather than by nutrition, disease, or harvest index.

N. Berwick YEN Report Findings

- **Yield performance:**
  - Performed better than later-established or spring crops.
- **Strengths:**
  - Earlier establishment supported better root development.
  - Slightly improved water capture compared with lower-yielding entries.
- **Limitations:**
  - Reduced light capture efficiency due to early senescence.
  - Seed size still restricted by dry conditions during grain fill.
- **Nutrition:**
  - Leaf and seed analysis show no major deficiencies, suggesting capture rather than supply was the issue.
- **Key takeaway:**
  - One of the more resilient winter bean crops in 2025, but still constrained by inability to sustain water capture late enough

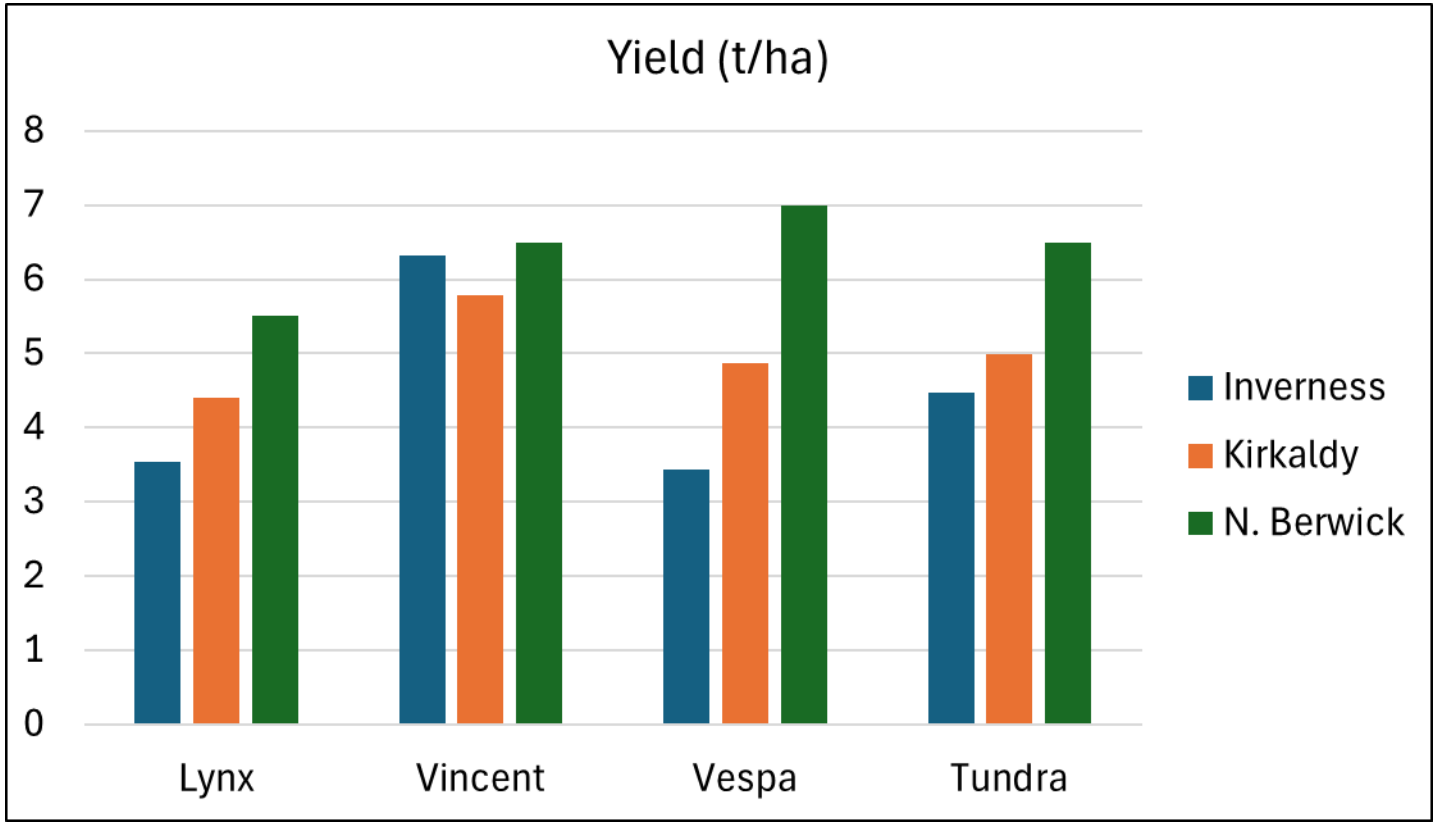
Kirkaldy YEN Report Findings

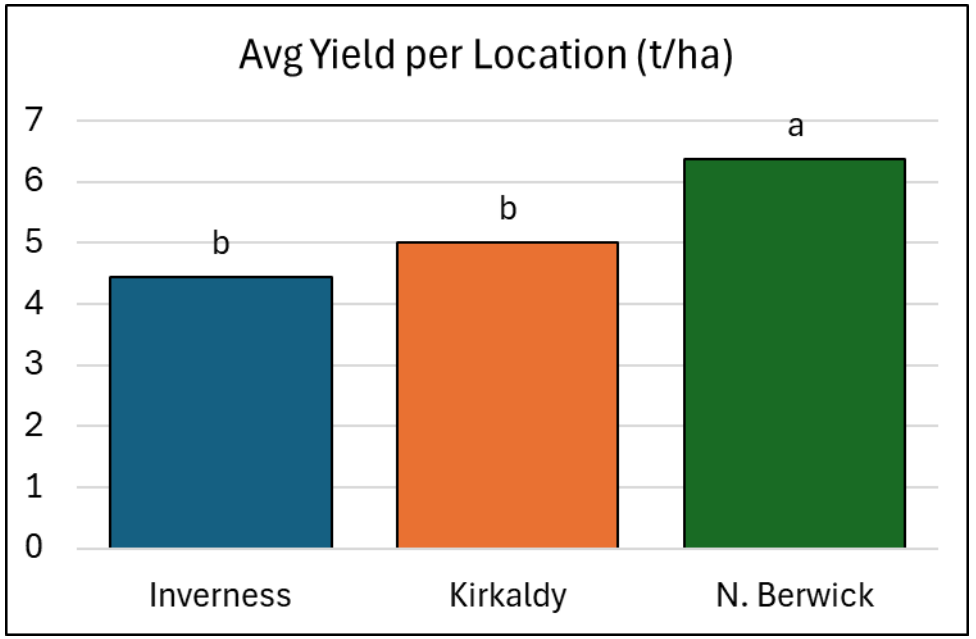
- **Yield performance:**
  - Above average yield under challenging conditions
- **Strengths:**
  - More effective conversion of biomass into seed, even though total biomass was not exceptional
  - Agronomy and crop protection well aligned with higher-performing YEN entries
- **Limitations:**
  - Good theoretical soil water availability, but actual use of available water was limited, implying rooting constraints
  - Like all entries, still fell well short of yield potential due to limited water capture during seed fill
- **Nutrition:**
  - No clear nutrient deficiencies, confirms water was the dominant limiting factor.
- **Key takeaway:**
  - A stronger-than-average winter bean crop for 2025, demonstrating what was achievable in a dry year, but still limited by late-season water stress.

Overall YEN Interpretation

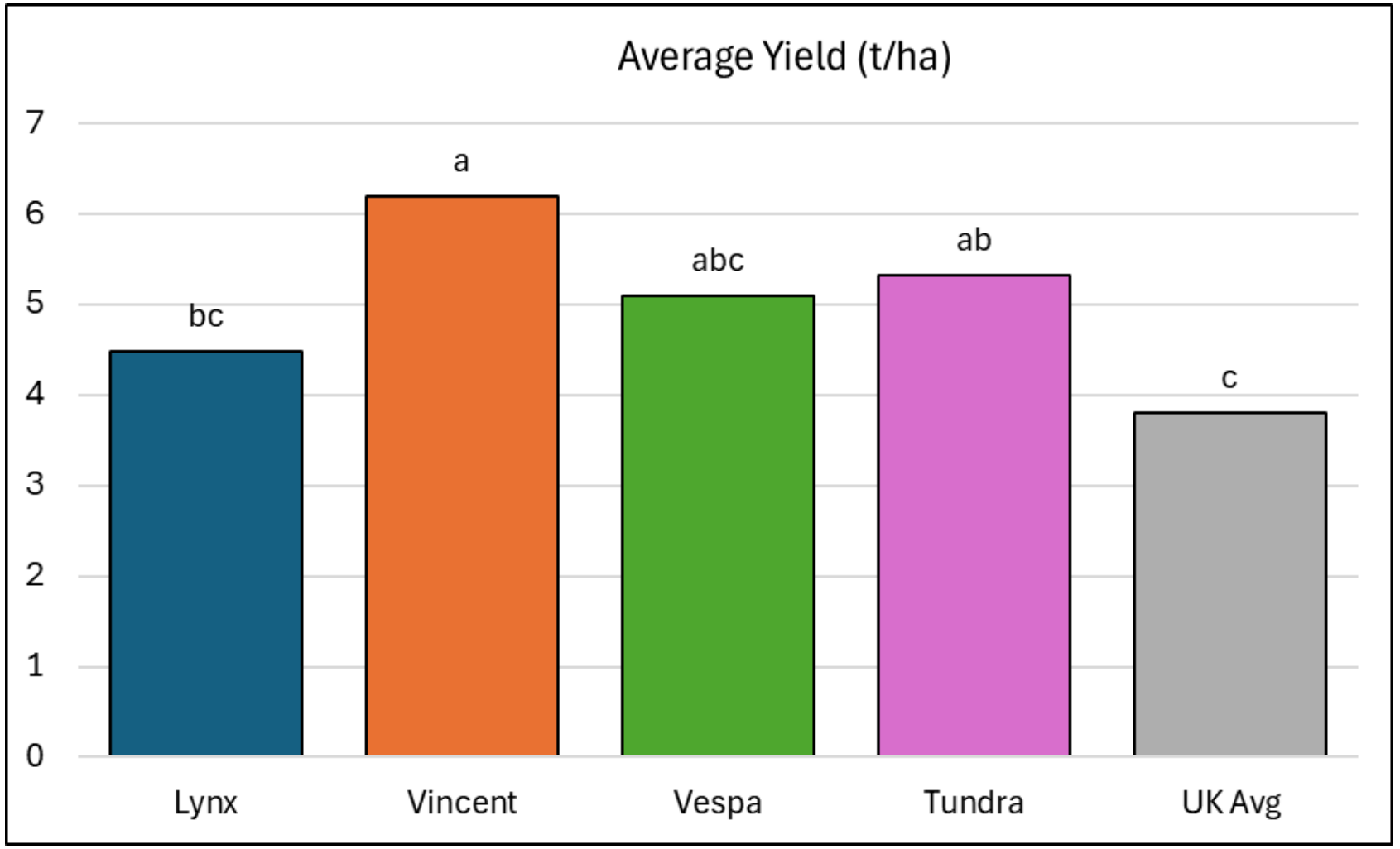
- All three reports fall within the expected performance envelope for winter beans in 2025.
- Differences between them are explained primarily by how well each crop captured and used water, rather than by nutrition, disease, or harvest index.
- Improving early rooting and sustaining canopy function into seed fill remains the clearest route to higher winter bean yields in dry seasons.
- All 3 sites exceeded the average for % yield potential for the entire UK entries

Location performance





Comparison to UK



UK Average represents 54 Bean YEN entries from 2025

Why only showing 3 sites of data?

- All 5 sites emerged but only 3 survived to harvest
- 2 sites suffered from winter kill on all varieties
  - Proves that it is not a varietal issue but an agronomic/climatic issue
  - These sites were drilled later and potentially under suboptimal conditions
- Suboptimal conditions could include poor seed beds, wet conditions leading to
  - Seed rot
  - More prone to foot rot
  - Easier for bird damage
  - Less resilient plants to sustain winter like conditions

Year 1 Key Take Aways

- Winter beans can **succeed** in Scotland
- Scottish crops can reach UK-level yield potential and possibly exceed it
- Drilling date and agronomy are critical
- New growers can perform well
  - Two successful sites were first time bean growers
- Variety performance was location specific
  - No winter variety was consistently superior

Thank you!

Any questions?

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Reminder: Send BASIS info to Erin to collect CPD points