



Entrant's Report

Harvest 2024

YEN Field ID: Example

Entrant name: Example

Main contact email:
Example

Sponsor/supporter: Example

Sponsor/Supporter email:
Example

Field/Site name: Pond

Incident energy: 38 TJ/ha

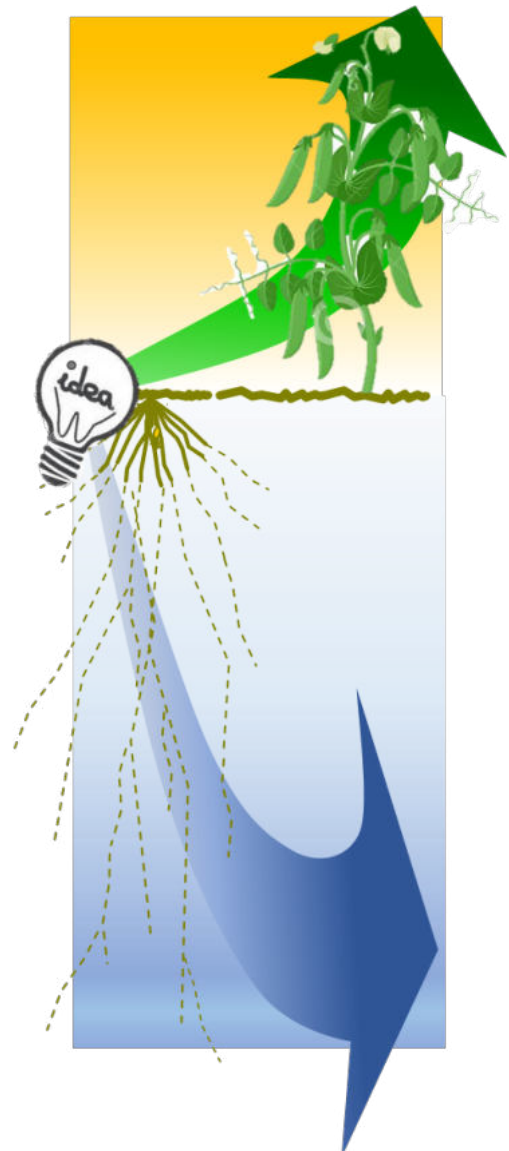
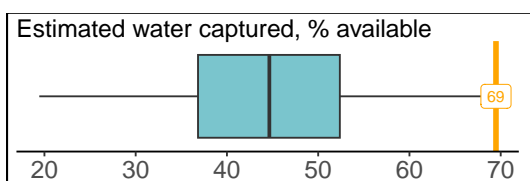
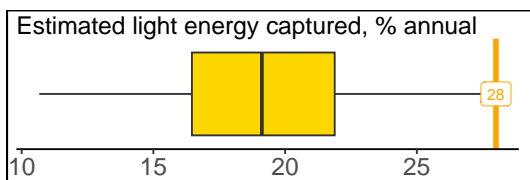
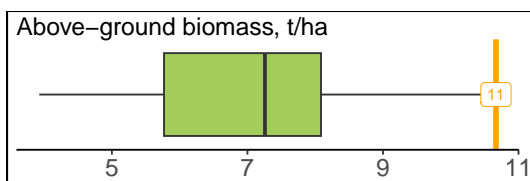
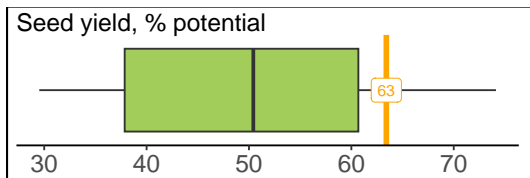
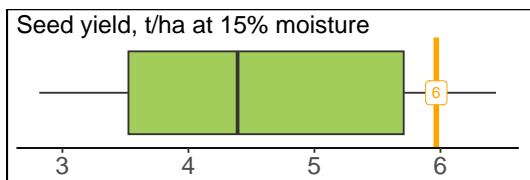
Available water: 384 mm

Crop: Peas

Variety type: Green

Variety: Example

SUMMARY: YEN entries with yield were completed from 10 out of 15 registered pea crops this year. Headline results for your entry are shown below. Your yield of 6 t/ha represents 63% of its estimated yield potential of 9.4 t/ha.



CONTENTS

Our detailed analysis of your yield result is provided in the following pages, including comparisons with other YEN entries, and with benchmarks derived from previous YEN data where possible. We hope that this helps you to identify aspects of your husbandry and growing conditions that offer routes to further yield enhancement.

Our approach in this report is to consider growing conditions and potential yields for crops grown in this season, then the conditions for and husbandry of your crop, its development, its basic resources (light energy, water & nutrients), its success in capturing these and in converting them to seed. Lastly, we use grain analysis to provide a post-mortem on your crop's limiting components and nutrition.

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POTENTIAL SEED YIELDS

"The YEN exists to help you to enhance your yields."

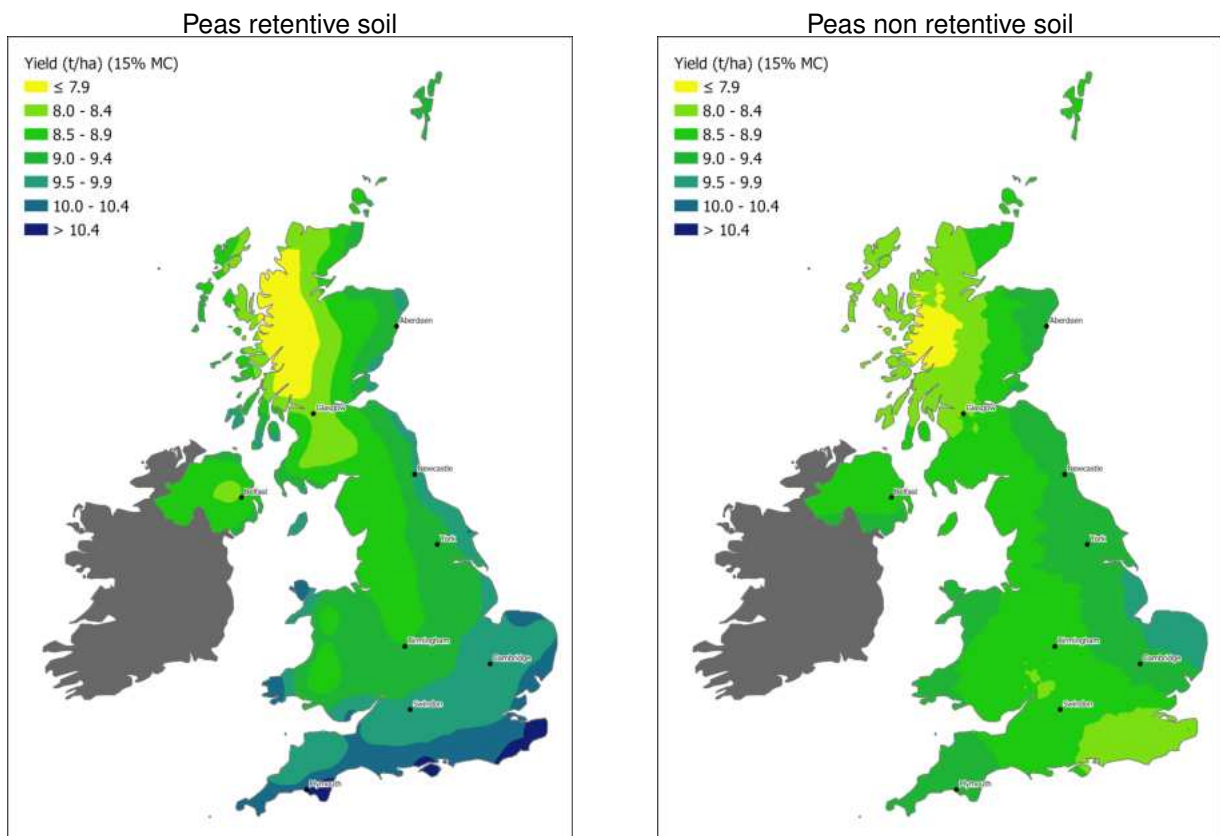
To estimate potential yields, we assume a theoretically 'perfect' variety grown with 'inspired' husbandry on your land with this season's weather, achieving either:

- (i) **50% capture of light energy** through this season (including some in September), and its conversion to 1.2 tonnes of biomass per terajoule, or
- (ii) **Capture of all the available water** held in the soil to 1 m depth (or to rock if shallower than 1 m) plus all rainfall from April to July, and conversion of each 25 mm into a tonne of biomass per hectare. Our model of potential yield estimates potential growth on a daily basis; this identifies impacts of water limitation more precisely than the cruder monthly estimates we made in previous YEN reports.

Taking the lesser of these two biomass amounts, we assume that a maximum of 60% can be used to form seed, this is the 'harvest index'. Note that we assume average temperatures for the UK, and no damage from waterlogging, frost, heat, or lodging.

The maps below show the potential seed yields for autumn sown cereals on retentive and light soils this year. For this we assume deep soils with no irrigation. Potential yields in arable areas ranged from 9 t/ha upwards so, on most soils, high yields were theoretically possible almost everywhere.

2024 Potential yields



We are using weather data from DTN™ this year. Note we do not have long term met data from DTN so cannot show a map of long-term average yield potentials.

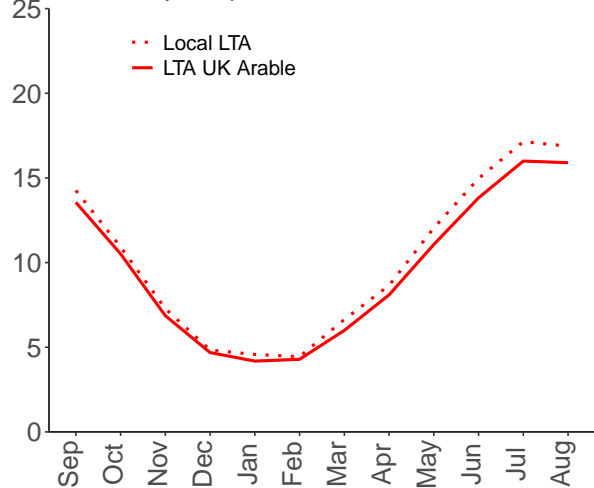
SEASONAL GROWING CONDITIONS

The adjacent graphs show the monthly temperatures, rainfall and total solar radiation for your area through this growing season compared to your regional long-term average (LTA) and the average for all UK arable areas (1981-2010, from the Met Office).

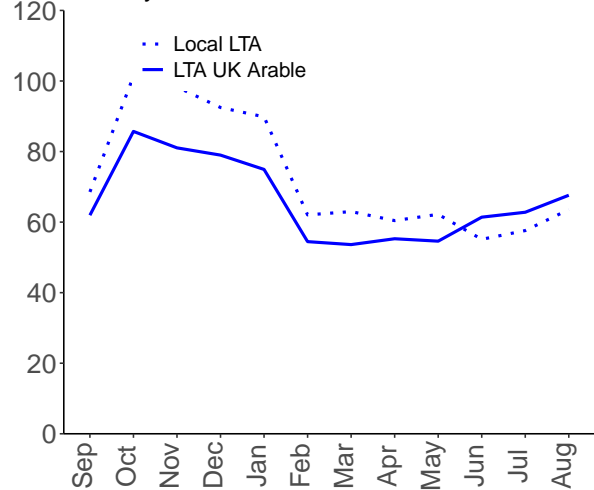
Spring 2024 had excessive rainfall, leading to difficulties drilling into good conditions. There were some reports of foot rot and pythium, likely due to the wet conditions.

June had warm days and cool, humid nights, leading to powdery mildew infestations. Overall, not a lot virus was found in the pea crops this season. Despite the challenging drilling conditions pea yields were overall average, perhaps due to the mild summer conditions helping to limit flower and pod abortion.

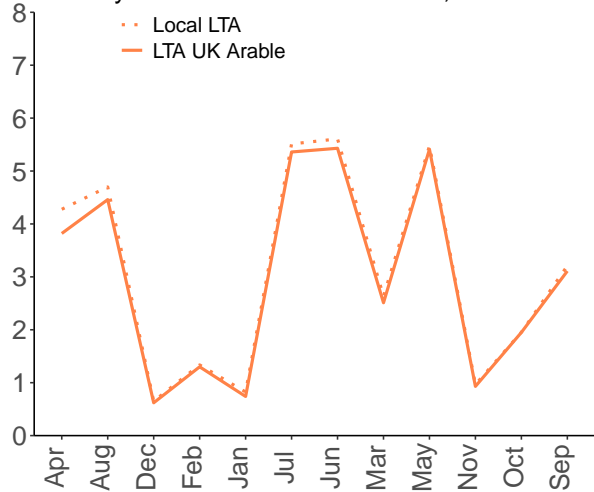
Mean daily temperature 2023–2024, °C



Monthly rainfall 2023–2024, mm

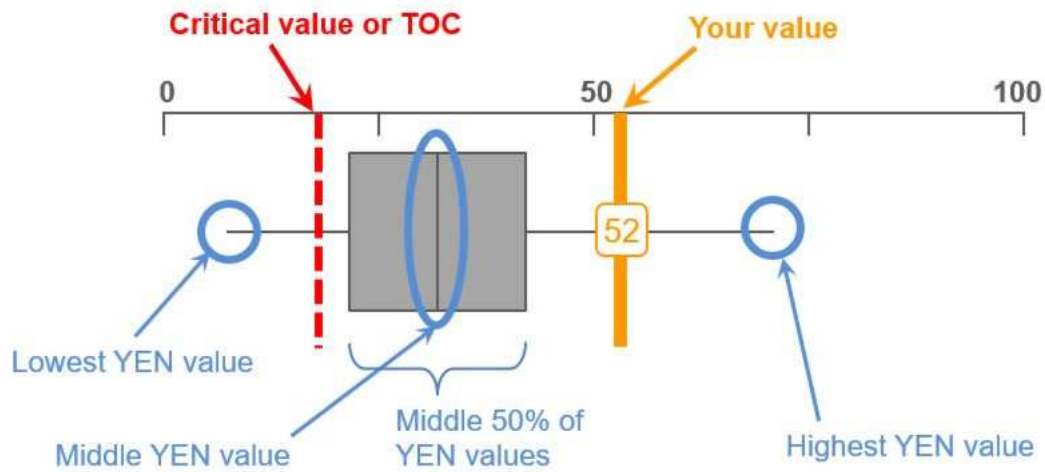


Monthly solar radiation 2023–2024, TJ/ha



YEN Benchmarking charts – What do they mean?

YEN provides a full set of metrics whereby you can gauge the performance of your crop against all other YEN crops. This has provided the principle value of YEN to most participants. We do this with benchmark charts. These compare your value with everyone else's this year and with standard benchmarks and critical values, if available and appropriate. The key is as follows:



The 'whiskers' show the range of YEN values in 2024 whilst the grey box shows the middle half of values, with a line for the mid-value. The orange line shows the value for your entry, and the red line is a limit beyond which yield may be adversely affected; crops with values beyond this merit further investigation. In the Pea YEN 2024 thresholds have been estimated for seed using historic YEN data.

Note that 'Dynamic Benchmarking' is available to all YEN members via the YEN website. This means you can compare your own yield or seed nutrient data with subsets of all other YEN crops selected by crop type, soil type, location or year back to 2013.

Soil description and nutrition analysis

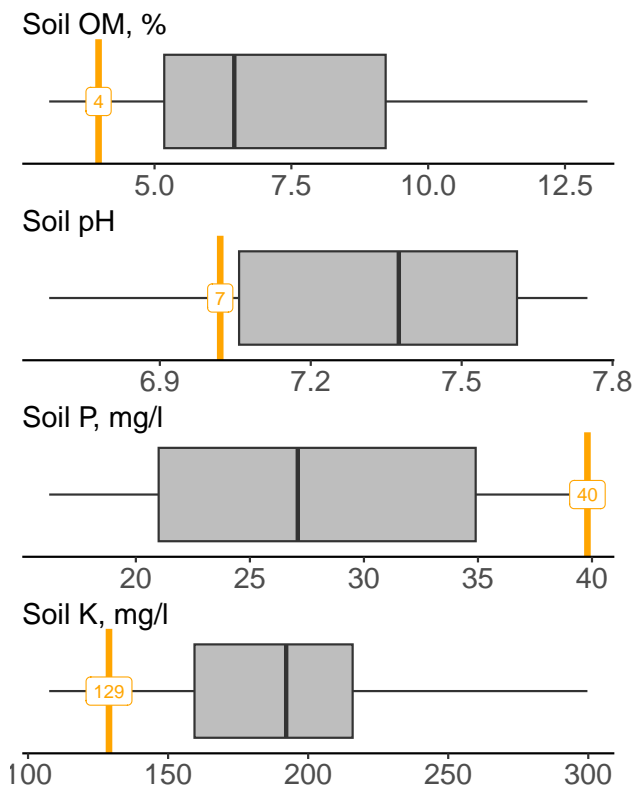


Your soil's capacity to hold available water is critical in determining your potential yields. We rely on entrants describing the soil where their YEN entry grew. We can use the [UK Soil Observatory map viewer](#) to check whether this complies with the surrounding land.

Good soil descriptions are vital in allowing us to estimate soil water holding capacity and, along with summer rainfall, the water available to your crop (see Benchmark charts in the section on 'Resources & their Capture').

Topsoil analyses provided by NRM also tell us about soil status for pH, P, K and Mg, as reported on the next page. A few sites show low values for soil pH, P, K or Mg. If these are unexpected, they may need further checks, either by repeating soil analysis and by checking both leaf and grain analyses later in this report. Previous YEN leaf and grain nutrient data have indicated that UK cereal crops often experience deficiencies in one or more nutrients, and sometimes this is despite soil levels being satisfactory. So, by combined use of soil, leaf and grain analysis, the YENs now help to diagnose whether nutrient shortfalls are arising from poor supply, or poor capture by the root system. Levels of foot rot in the soil were assessed by PGRO. This year, the organisms responsible for foot rot were assessed separately, however an overall foot rot risk level was given to each entry.

Soil analysis



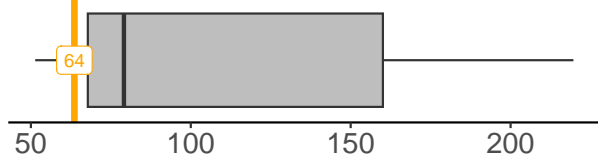
SOM supports crop performance through better nutrient availability, soil aggregation, and water holding capacity. NRM determines SOM by 'loss on ignition'. Note: other methods can give lower values.

Soil pH <6 is acid. High pH soils may require that special attention is paid to phosphorus (P) and micro-nutrient levels in leaf and grain (see later).

Only a small difference separates P Index 0 (<=9) and 2 (>=16). High yields are possible at P index 1 but fresh P is also usually required. Use grain P (page 20) to double-check if P was sufficient.

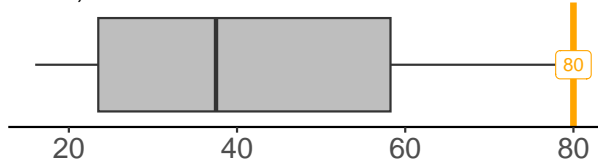
Soil potassium (K) analysis checks on whether K supplies are likely to have been deficient for average crops. However, high yielding crops require very large amounts of K.

Soil Mg, mg/l



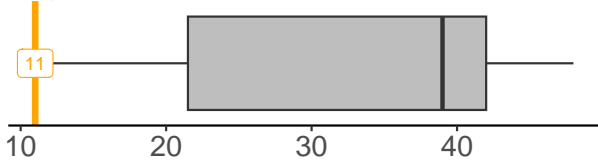
Magnesium (Mg) is a key component of chlorophyll so deficient plants show striking inter-veinal yellowing. Temporary deficiencies often occur in spring if topsoils are dry.

Sand, % w/w



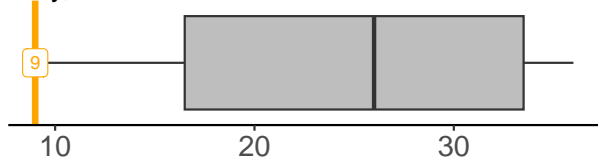
Soils with high sand content hold least water and soils with high silt content tend to hold most water.

Silt, % w/w



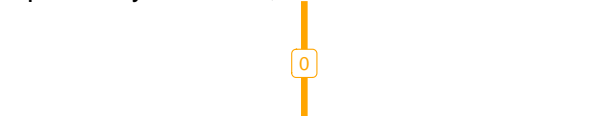
Soils with much silt and sand, hence less clay, tend to be relatively weak, and so are more difficult to maintain with a stable structure.

Clay, % w/w

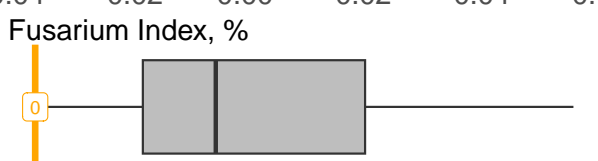


Soils with high clay content hold much water but part of this is held too tightly for crop use. Nutrients within this unavailable water tend to be less available than nutrients in lighter soils.

Aphanomyces Index, %

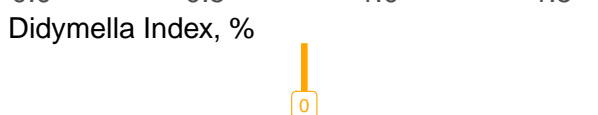


Fusarium Index, %



Overall, your foot rot risk was categorised as Low'

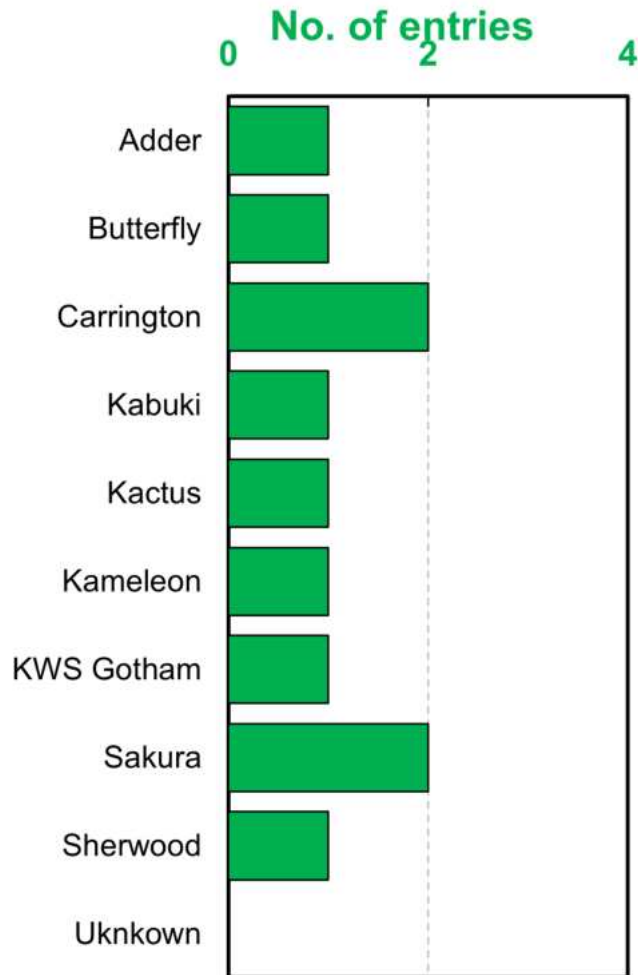
Didymella Index, %



AGRONOMY

This section considers how your variety and husbandry decisions related to others entering the YEN this year. The most chosen varieties are compared in the figure below.

- Your variety was Example.

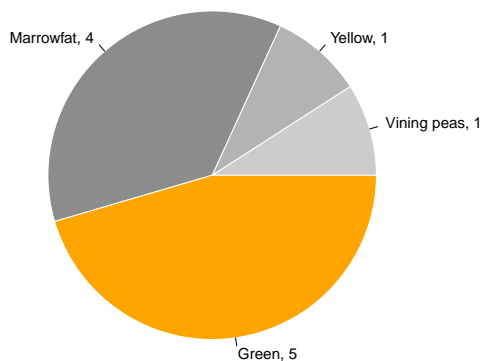


Husbandry factors

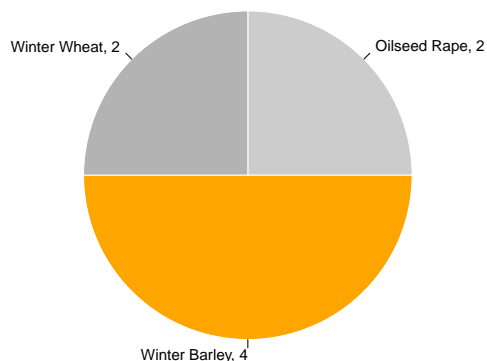
The following diagrams use orange segments or orange bars to indicate the agronomy of your crop, if known, so you can see how this relates to all other YEN entries. Analysis of all Pea YEN entries from 2016-2021 shows the following associations with seed yield (note that these do not necessarily imply causes – it may just be that farms with high yields also happen to have these traits):

Soil analysis	better yields with more soil P
Seed rate	positive association with seed rate in non-marowfat types
Herbicide use	Suggests that good weed control is important for attaining high yields

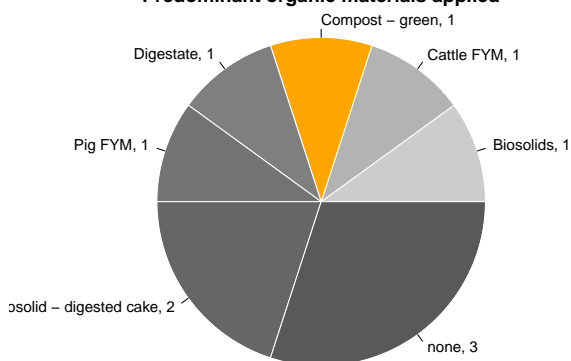
Pea type



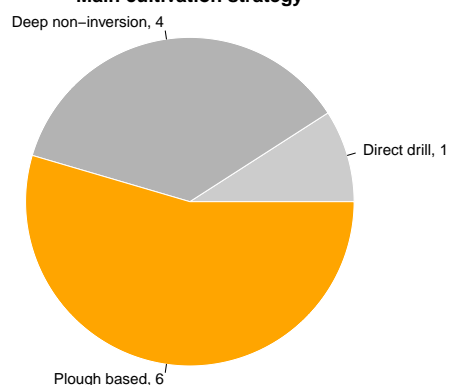
Previous Crop Type



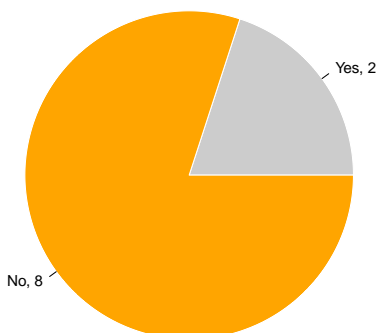
Predominant organic materials applied



Main cultivation strategy

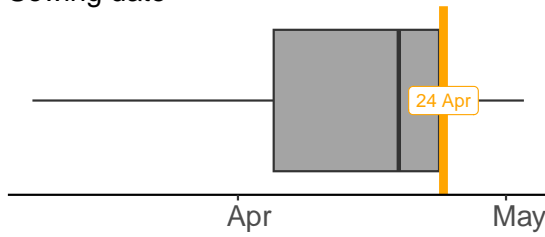


Pod sealant used

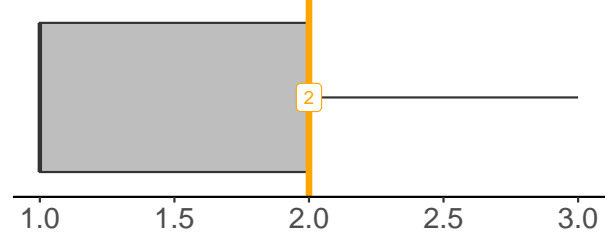


Husbandry factors continued

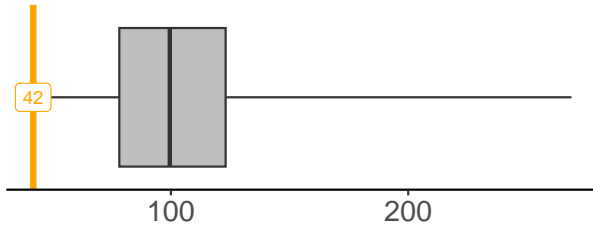
Sowing date



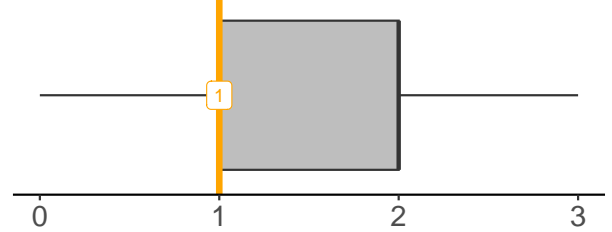
Number of herbicides applied



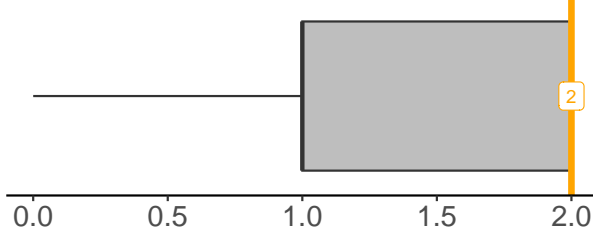
Seeds sown per m²



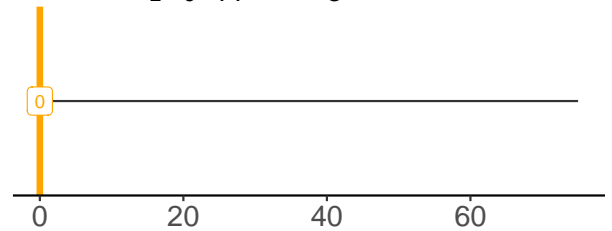
Number of insecticides applied



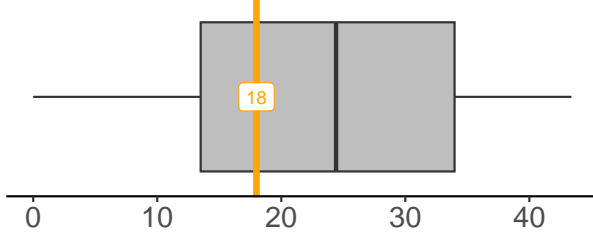
Number of fungicides applied



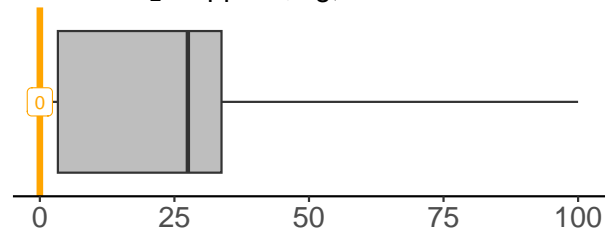
Fertiliser P₂O₅ applied, kg/ha



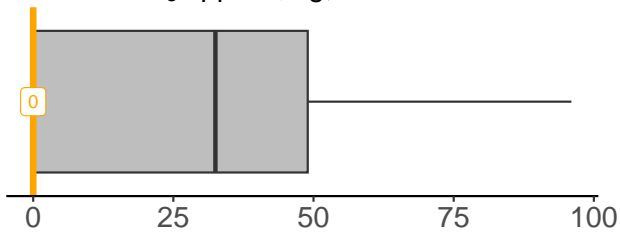
Fungicide spend, £/ha



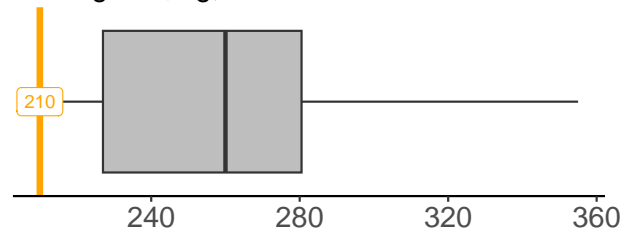
Fertiliser K₂O applied, kg/ha



Fertiliser SO₃ applied, kg/ha



Sowing rate, kg/ha

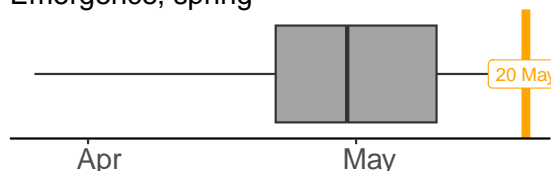


CROP DEVELOPMENT

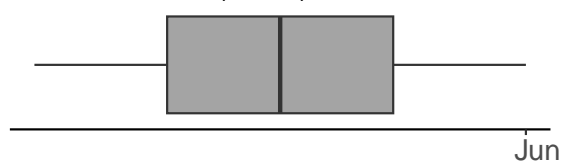
The following charts show how your entry developed through the 2021-22 season, compared to all other Pea YEN entries and available benchmarks. The cardinal stages of full emergence (GS10), flowering (GS61), and full senescence (GS89) determine the length of each important phase for growth:

- Foundation, GS10-GS31 – when development of leaves and side shoots occurs;
- Construction, GS31-GS61 – when stem elongation occurs, and flowers are formed;
- Production, GS65-GS89 – when pods are formed, and seeds are filled.

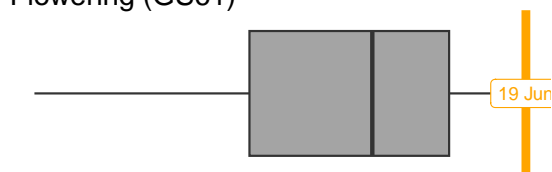
Emergence, spring



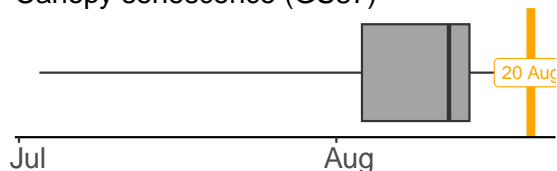
Stem extension (GS31)



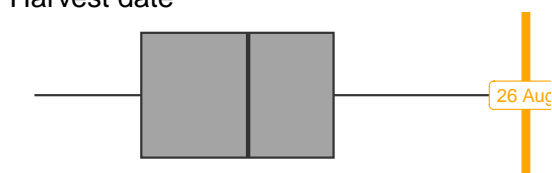
Flowering (GS61)



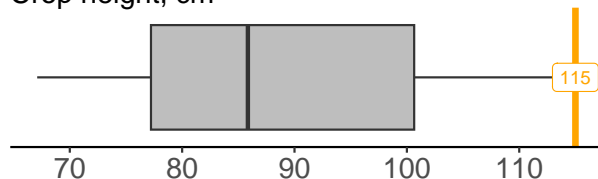
Canopy senescence (GS87)



Harvest date



Crop height, cm



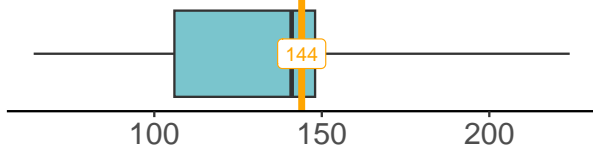
These are the average heights from 10 shoots in each grab sample.

RESOURCES AND THEIR CAPTURE

Water availability and capture

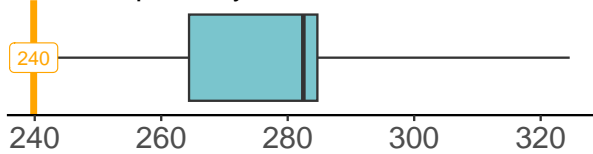
This page shows how weather this year affected the water available for your crop and other crops entered in the YEN. Water is supplied through the main growing period from concurrent rainfall and also from water stored in the soil. UK soils almost always refill with water over-winter. Water potentially available to each crop through the summer includes all this soil water plus the summer rainfall (April to July).

Soil water holding capacity, mm



Deep soils hold water to a great depth; we assume roots can access all easily held water (to 2 bar suction) to a depth of 1 m (or to rock, if shallower). If enough roots didn't reach to this depth, capture of soil-available water will have been accordingly less.

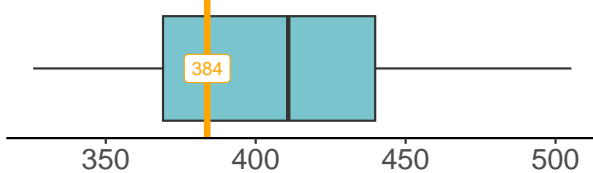
Rainfall April–July, mm



After winter drainage stops, spring and summer rainfall is held in the topsoil until it is evaporated or transpired by the crop's canopy.

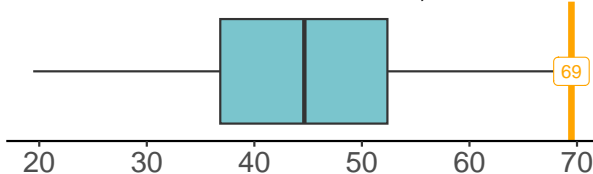
Whilst we cannot yet measure water captured by YEN crops individually, by assuming your crop's conversion of water to total biomass was 'normal' (25 mm water for each t/ha biomass formed), we have made crude estimates below of the likely success of your crop's root system in capturing water.

Total water available, mm



Total water is the sum of your soil's water-holding capacity and your summer rainfall (both shown above).

Estimated use of available water, %



Small water use will sometimes have been due to less demand for canopy transpiration (e.g. because crop developed faster and matured earlier) or otherwise due to worse rooting.

If your estimated use of available water exceeds the total water available, this may be good news! It either suggests that your crop's roots were more efficient than normal, or that your soil description was overly pessimistic: i.e. your soil apparently managed to provide more water than we estimated was possible from your soil's texture, stone content and depth.

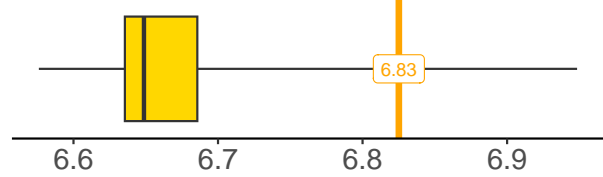
A high yielding crop, growing say 9.4 t/ha of biomass (so yielding 5 t/ha seed at 45% harvest index and 15% moisture), would need to capture ~240 mm water from soil reserves plus summer rain.

Energy capture

The benchmarking charts below show how weather this year affected light energy available for this entry and other YEN crops. Solar radiation has been divided into periods that roughly equate to the three key phases of crop development reported above:

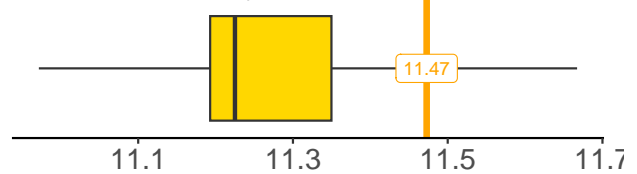
- Foundation – when development of leaves and branches occurs (March to April)

Solar radiation Mar–Apr, TJ/ha



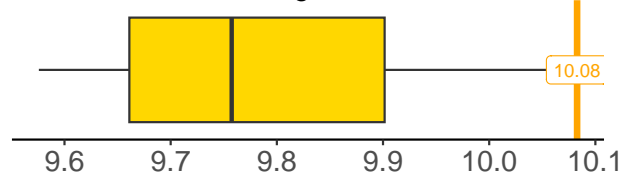
- Construction – when stem elongation occurs, and flowers are formed (May to June)

Solar radiation May–Jun, TJ/ha



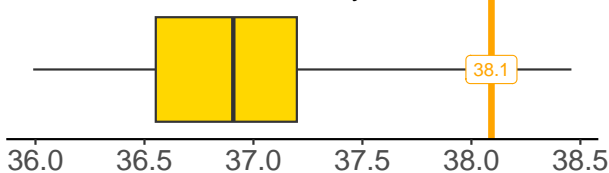
- Production – when pods are formed, and seeds are filled (July - August)

Solar radiation Jul–Aug, TJ/ha



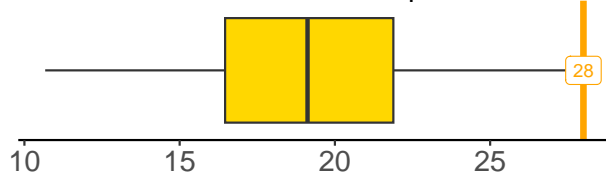
Whilst we cannot yet measure light capture by YEN crops individually, by assuming your crop's conversion of light-energy was 'normal' (1 tonnes/TJ), we have made a crude estimate below of the likely success of your crop's canopy in capturing total light-energy for the 12 months of this season.

Solar radiation total, TJ/ha/yr



Total solar radiation across YEN entries is generally less in the north and more in the south.

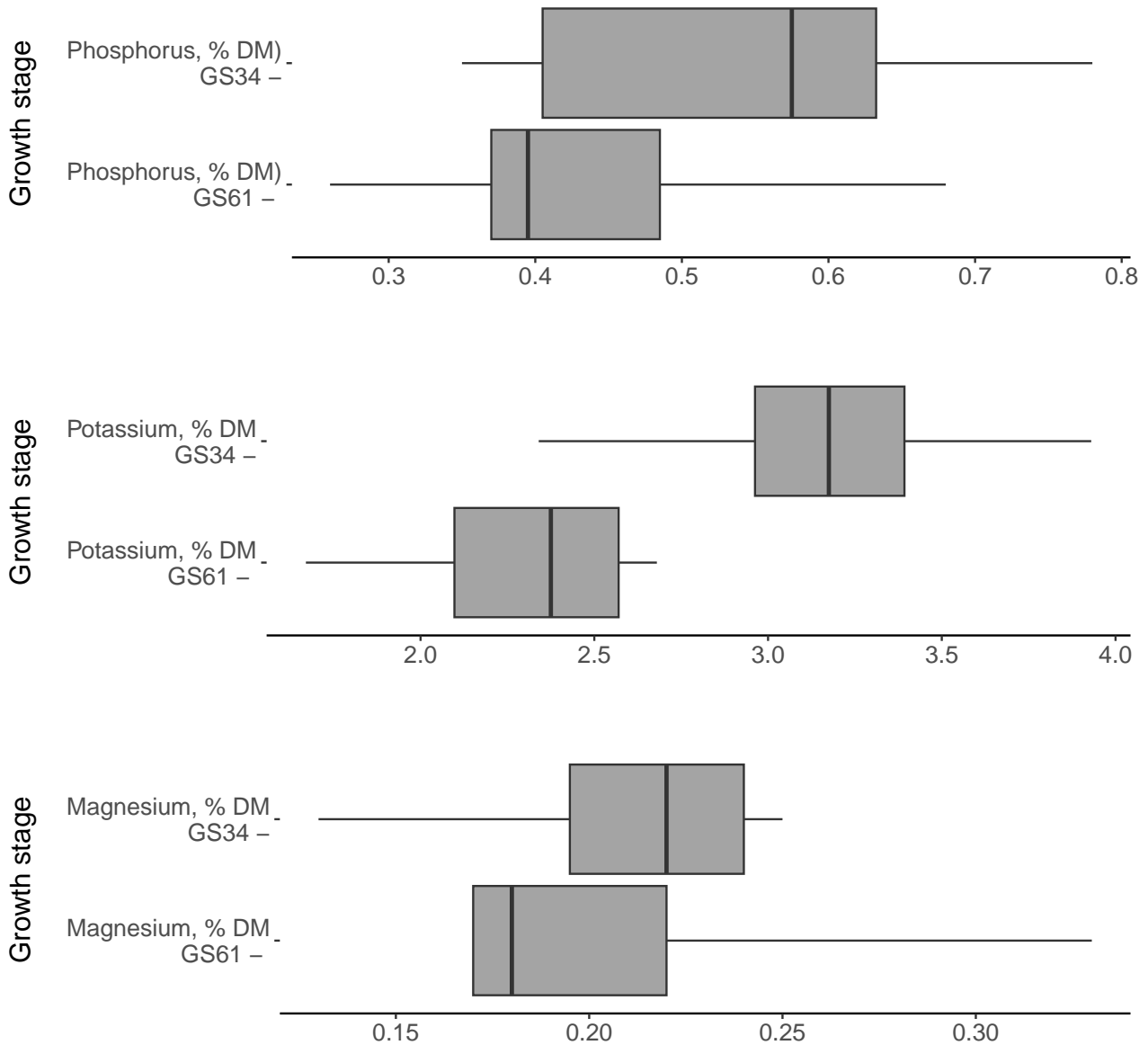
Estimated % solar radiation captured

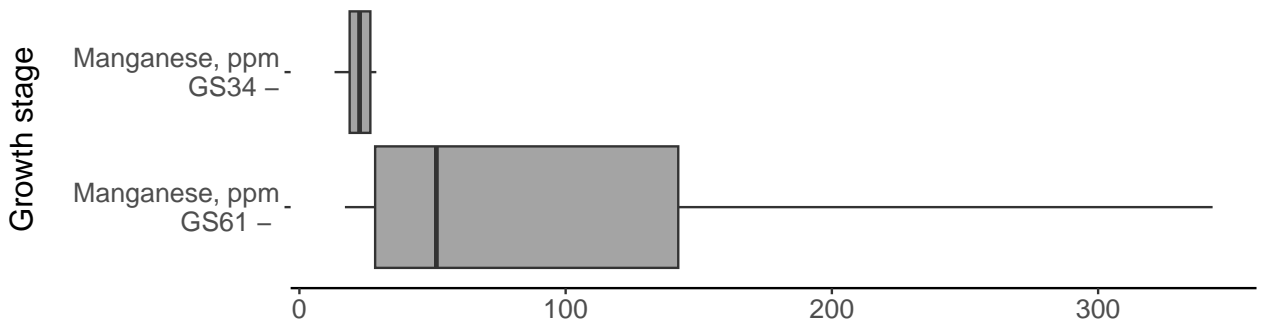
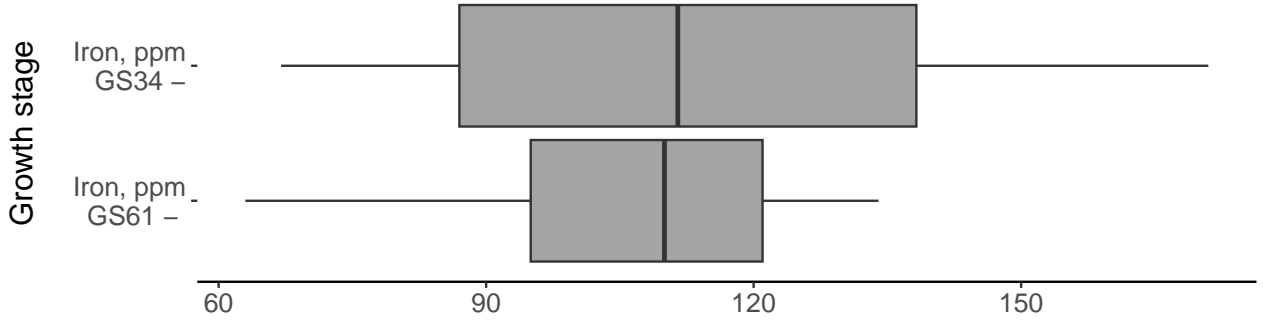
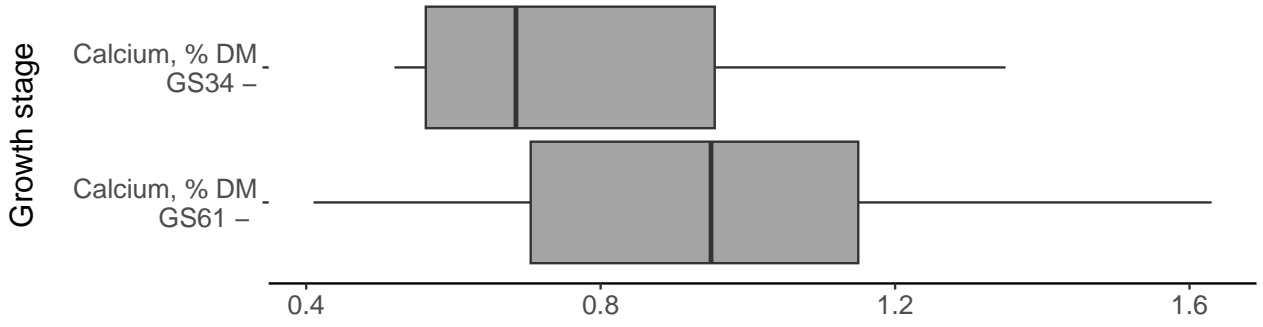
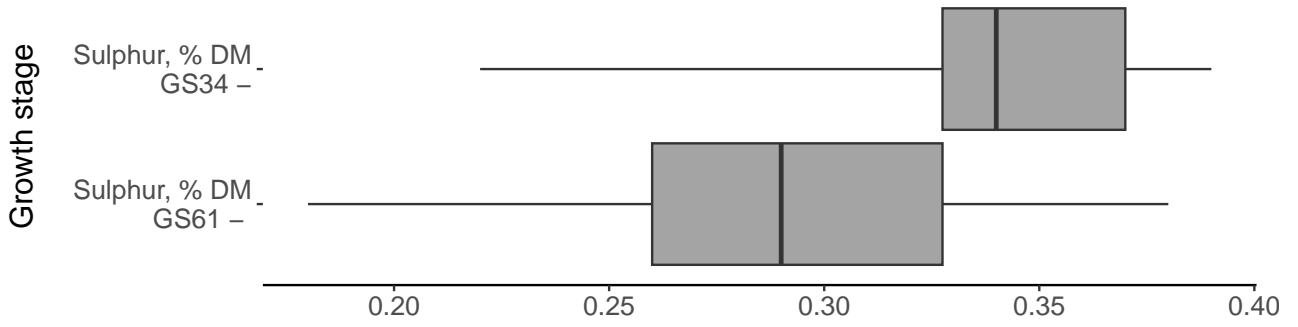


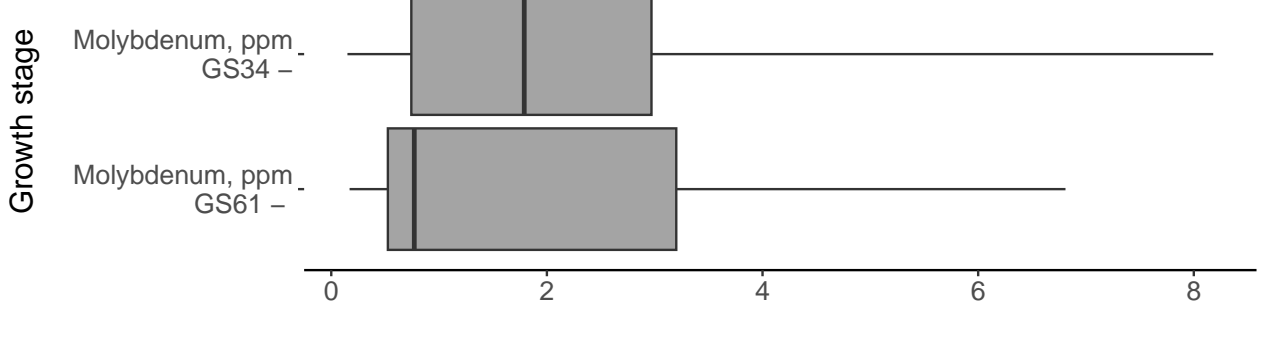
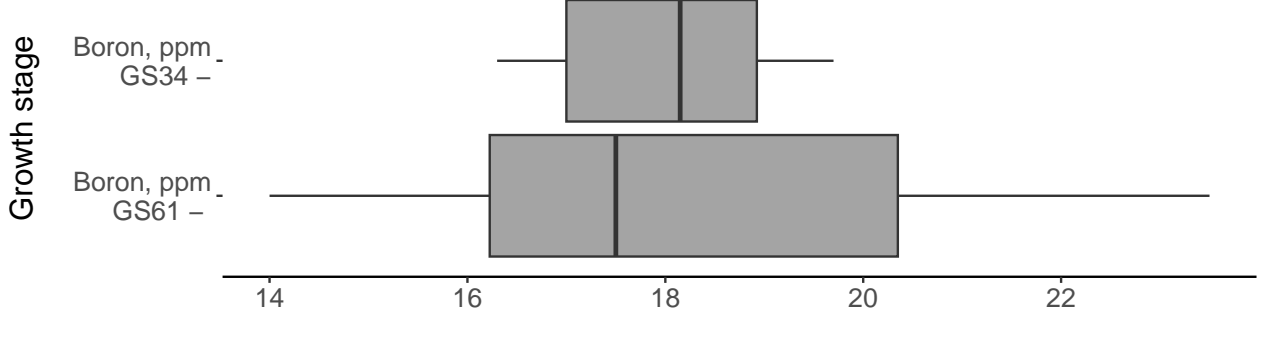
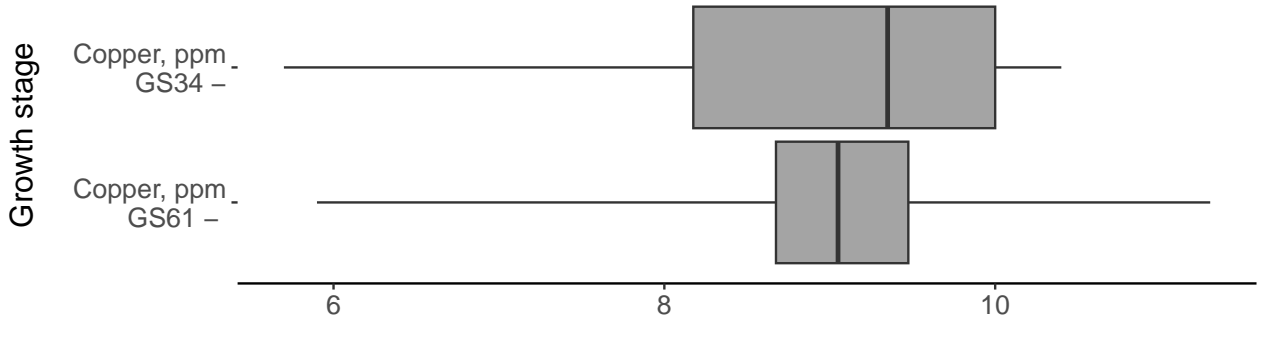
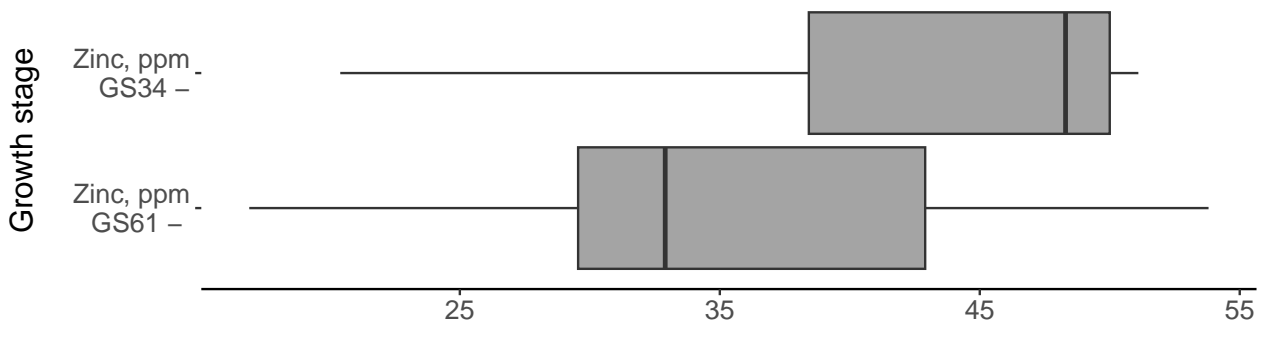
Average light capture tends to be poor if a crop's lifespan is short. Here, the estimated light captured is based on March-August.

Nutrient capture

Whether nutrient capture was sufficient to support full conversion of light and water is best deduced from nutrient concentrations in crop tissues – both leaves (next 3 pages) and seeds (later section). No critical thresholds or benchmarks are shown for leaf analyses because these change through a crop's life and are still uncertain. However, the benchmarking diagrams used below should enable comparison of your crop's levels with all other YEN entries this year, analysed at the same time. Lancrop Laboratories provide leaf analyses for YEN. Samples are of the newest fully expanded leaf. If a nutrient result does not appear on the charts, it could be that it exceeds the maximum or minimum limit of detection. Consult your Lancrop report for more info.







YIELD ANALYSIS

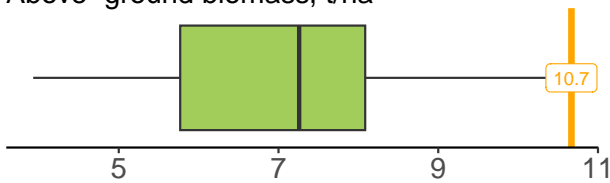
Yield formation

The whole-crop samples that YEN entrants provide all have their components counted and weighed and results are shown in the following charts, assuming that each sample was representative of the whole area from which seed yield was determined. [Area-related values such as seeds/m² are derived from the validated yield are derived from the validated yield.]

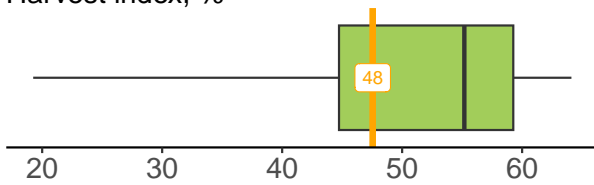
Total biomass production indicates the success with which a crop captured its key resources, light-energy and water, and the harvest index (the proportion of total biomass that was harvestable) indicates how this biomass was apportioned to seed. Since seed growth happens last, harvest index also indicates how late growth related to early growth.

Your seed yield (expressed as t/ha and % of potential) is shown below along with biomass and harvest index, in relation to all other YEN entries.

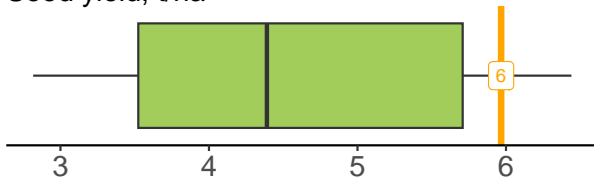
Above-ground biomass, t/ha



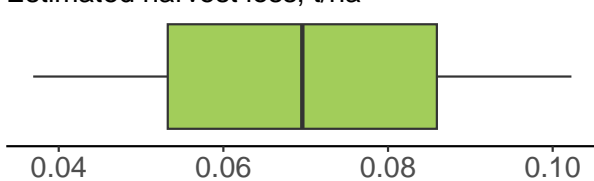
Harvest index, %



Seed yield, t/ha

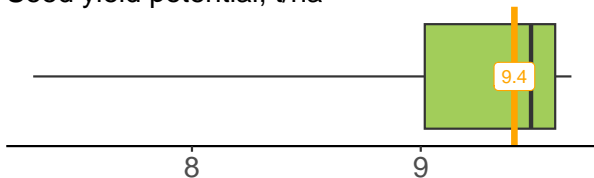


Estimated harvest loss, t/ha



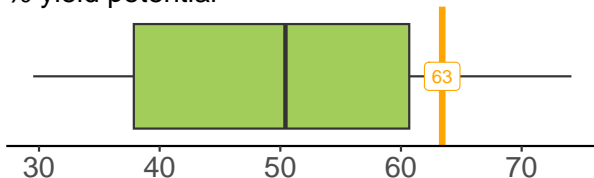
Estimated from the number of seeds seen on the ground after harvest, and the average weight per seed.

Seed yield potential, t/ha



YEN yield potential express the light energy and water available for your entry this year, simply converted to t/ha.

% yield potential



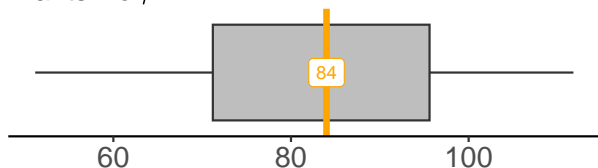
Yield components

Whole crop yield analysis can also tell us about the history of your crop because the different crop components are determined sequentially, at least within given layers of the canopy for peas. So comparing components of yield for your crop in the following charts with those of other YEN entrants should help to indicate the stage(s) through the season at which your crop deviated from normal.

Total biomass provides the overall summary of your crop's growth; this depends on plant numbers determined first, shoot numbers determined next, pod numbers determined next, seed numbers determined next, and the seed size determined last.

Pea yields within the YEN appear to be 'sink limited', meaning that the ability to set seed numbers is likely to be a factor limiting yields. Analysis of 2016-2021 Pea YEN data suggests that high yields are associated with set seeds/m², whilst the pods/shoot and HI remain stable, across Pea YEN crops, this may be linked to targeting optimum plant populations rather than achieving larger, more well podded individual plants. However, high yields can be built in different ways.

Plants No./m²



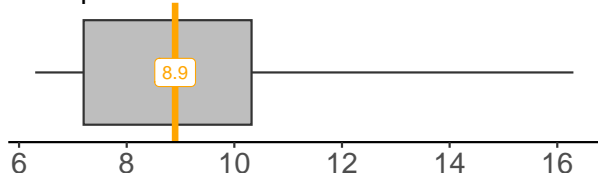
Plants per m² are calculated from the plant counts or overhead photos you provided. If you did not provide plant counts some calculated metrics below might be missing.

Shoots per plant



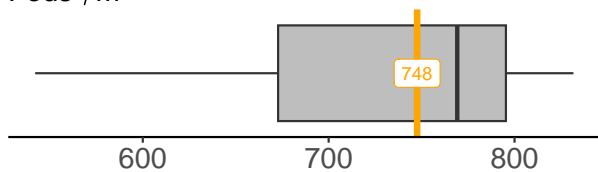
Shoots per plant were counted from your grab sample. Note that if plants were cut above ground level this could reduce the value calculated.

Pods per shoot



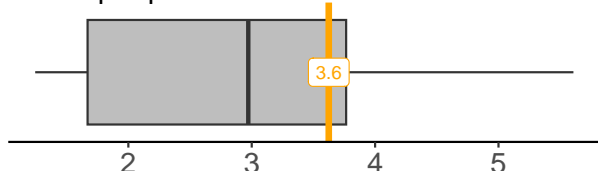
Pod numbers were counted on 10 shoots. Taller stems may have space for more pods per shoot. This count may have included infertile pods. This is a varietal characteristic and also influenced by growing conditions. Typically, two pods will set per fertile node and between 6 and 14 pods per plant.

Pods /m²



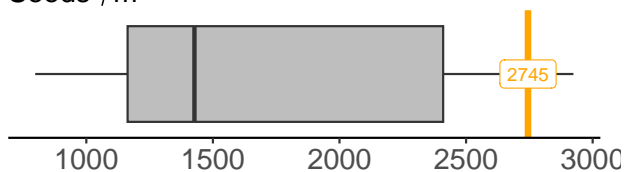
Pods per m² is a calculation of pods per shoot and shoots per plant.

Seeds per pod



The expected value is 3-6 seeds per pod. Infertile pods in the grab sample may lead to underestimation.

Seeds /m²



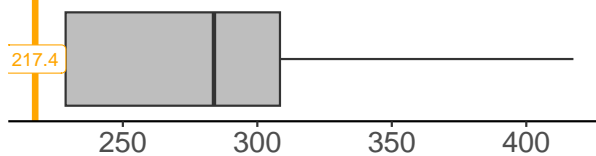
Seeds per m² in the crop are a reflection of seed set. Here, seeds per m² are estimated from you combine seed sample TSW and crop yield.

Seed formation and quality

We use your combine-harvested seed sample to provide the analysis of seed size and seed filling. Seed protein was measured by Lancrop laboratories and other seed quality assessment scores below are provided by Askew & Barrett Pulses Ltd.

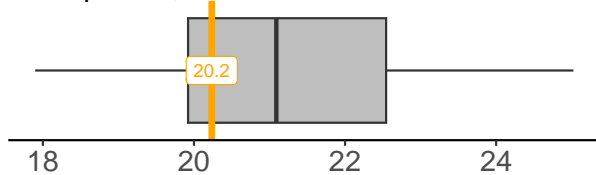
Using the quality comments provided by Askew & Barret Ltd for your sample, we have estimated the value of the crop based on it's potential end use and yield on a per/ha basis, using estimated sell prices provided by PGRO. We hope that this will help compare the success of different variety types within the Pea YEN more easily.

Combine TGW, g (15%MC)

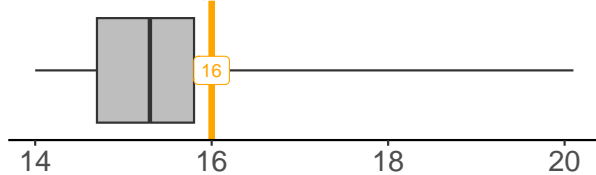


This is a varietal characteristic and influenced by growing conditions, if photosynthesis is limited during seed filling values may be lower than expected e.g compared to PGRO's descriptive list. Typically, white peas: 150-250, small blues 150-225, large blues >225, Maples >150, Marrowfats >275.

Seed protein, %

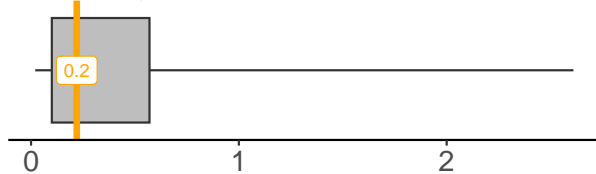


A & B Moisture, %



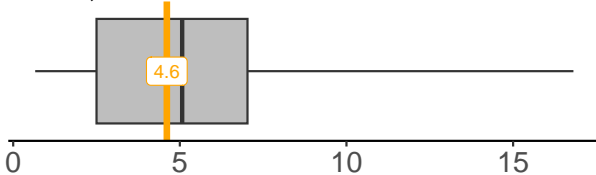
Typically merchants would look to take peas at 15% moisture content.

Admixture, %



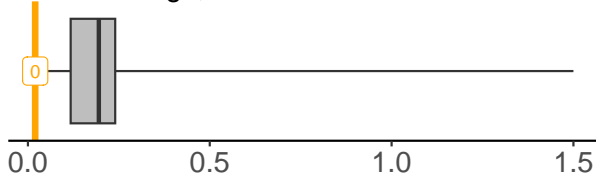
This would include soil, pods, weeds, stones and other species. Levels less than 2% should be the target. Higher levels may be accepted.

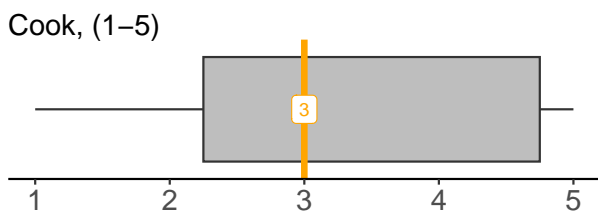
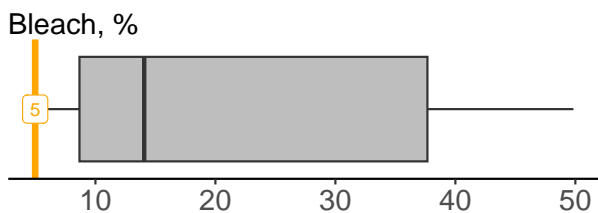
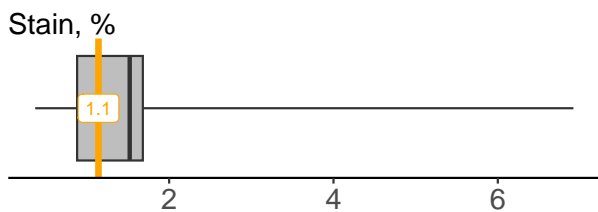
Waste, %



Waste, insect damage and stain % are often combined, with levels of <10% being the target. Higher levels may be accepted. Some contracts may specify levels for insect damage E.g. 2%.

Insect damage, %





Bleaching is described as “where the green colour has leached from the pea (in part or whole) due to environmental conditions. This is diagnosed as a lightening of colour of the skin to a yellow/white, away from the intended green colour”. It is in part varietal, very dependent on the timing of and weather conditions at harvest. Bleaching limits the intended markets and value of the produce.

Merchants carry out soaking and cooking tests to determine suitability for various markets. Methods and scales may differ between merchants, but here a value of 1= best and 5= worst.

We hope that this will help compare the success of different variety types within the Pea YEN more easily.

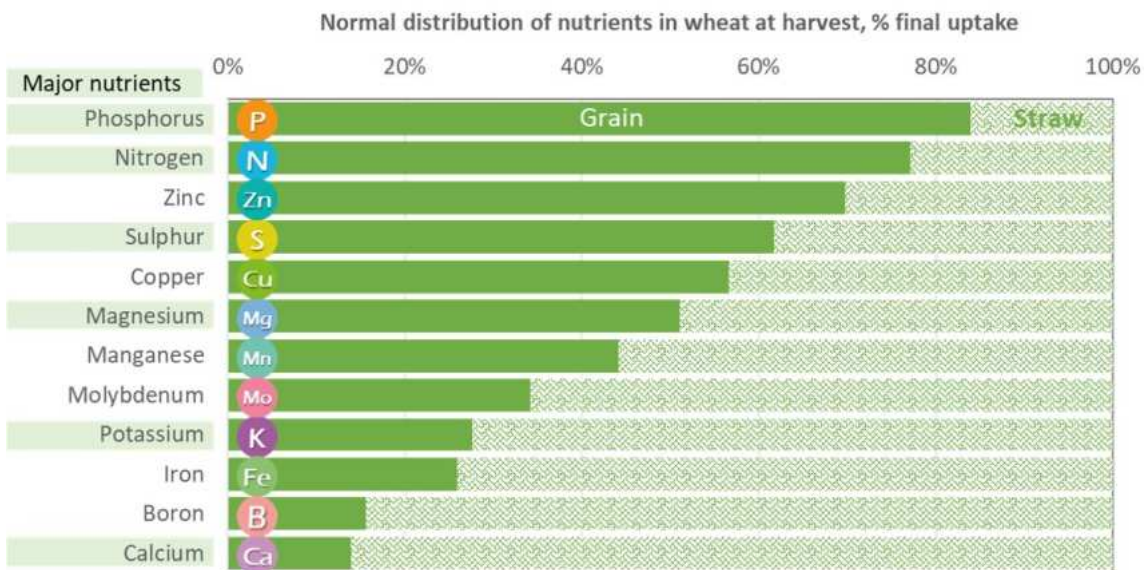
Askew and Barrett Ltd comments of the sample:

- The size would have to be taken into consideration if considering these for micronising homes, but the colour would suit perfectly. The average cook may rule them out of very top human consumption export markets, but these would fit into most other domestic and export homes.
- Small seed size with some considerable variation. Smooth skin and nice deep colour but with some darkness on the smaller seeds. Low waste and stain levels.

CROP NUTRITION POST-MORTEM

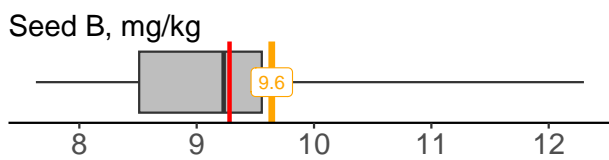
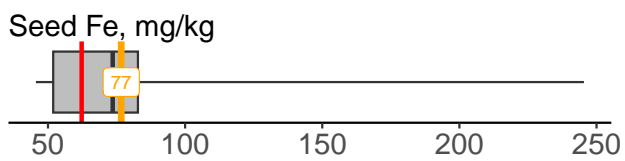
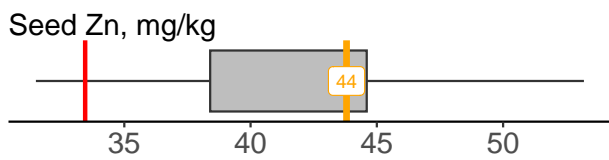
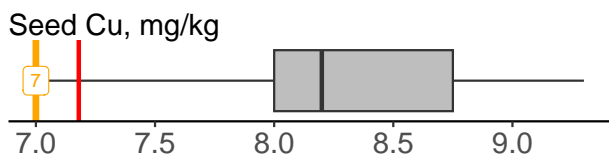
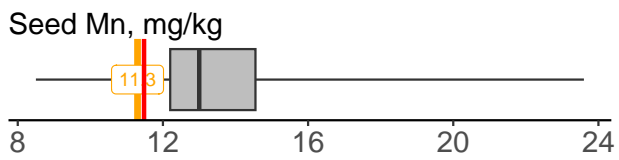
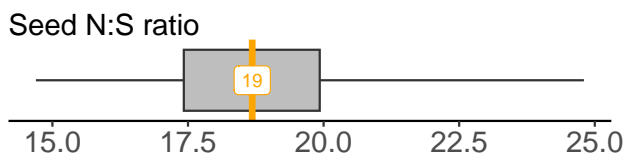
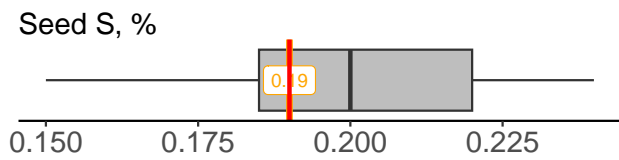
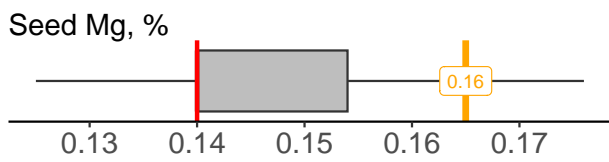
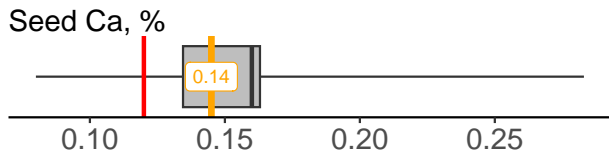
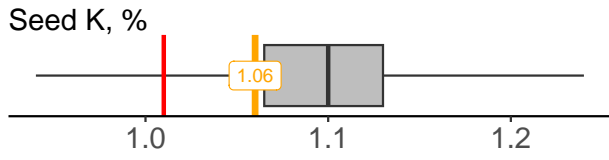
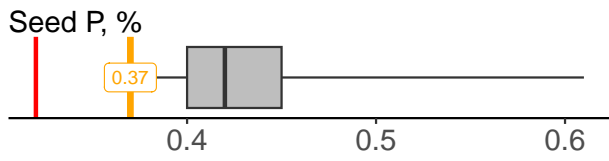
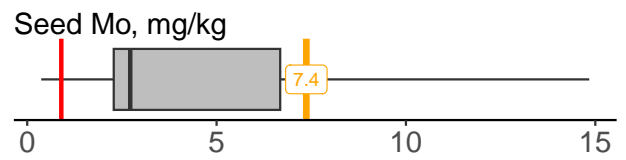
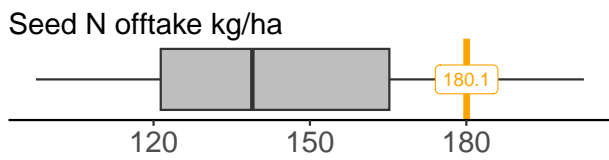
The YEN has trail-blazed use of seed analysis to provide overall post-mortems on a crop's nutrition.

- Results from >900 YEN cereal samples analysed up to last year suggest that nutrient deficiencies are very common (using the 8 critical values that we know so far); >80% of crops showed deficiencies, and >50% showed two or more deficiencies! Phosphorus deficiency has been most common.
- YEN Nutrition was therefore launched in 2021 to help to remedy these deficiencies – further details and registration are available [here](#)
- Crop nutrients differ in how they are shared between grain and straw at harvest. The graph below shows how different crop species store most of their N & P in the seed but most of their K in the straw (as estimated from analyses of feed materials).



We now use YEN-low values (i.e. lower quartiles from all past YEN data – the boundary between the bottom quarter and top three-quarters of all YEN values since 2013) as comparators (red lines) for all nutrients in all crops. We find YEN-low values to be very similar to known critical thresholds of N, P, S and Mn in wheat, as well as to less certain critical values of K, Mg, Cu & Zn, so we assume they can be applied for all nutrients in all crops.

The following benchmarking-charts and YEN-low values provide the best means of identifying the nutrient(s) most likely to have limited your crop.



SUMMARY

The 2023-2024 Pea YEN:

- Thank you for providing the samples and information necessary to complete this report; the collective efforts of all YEN contributors maximise the value of the results that can be reported and the deductions that can be made.
- The highest seed yield in 2024 was 6.4 t/ha (in Essex). This crop achieved a percentage of biophysical potential at 74 %.

YIELD ENHANCEMENT NETWORK RELATED INITIATIVES



YEN Zero connects growers and stakeholders in sharing data and testing ideas to reduce greenhouse gas (GHG) emissions from crop production. To join the network, and benchmark GHG emissions from your fields, fill out the webform on the [YEN Zero webpage](#) and we will contact you.



YEN Nutrition provides multi-field, multi-crop grain nutrient analysis and benchmarking to guide crop nutrition and input strategy across the farm. To order your YEN Nutrition pack for 2024 seed/grain samples please visit – <https://yen.adas.co.uk/yen-nutrition-signup> and we will contact you.



YEN [Dynamic Benchmarking](#) is a free tool to help any current or past YEN entrant compare their YEN results across farms, fields, and years, so they can improve their future decision-making. Data from 2024 will be available from March '25.



Imagine a library where you can also meet the authors and experts in their respective fields – this is what we want to facilitate in [FarmPEP](#). FarmPEP aims to provide easier access to the latest research and best practices as well as to experts who can benefit you. Access the site [FarmPEP](#).



[IPM NET](#) is a free farm research network to improve and promote IPM, through updates, events & IPMNET Hubs. Use the QR code to join. Click to register for upcoming free IPMNET Conference 2025, 13 February 2025 ([here](#)) and IPMNET BYDV Hub Webinar on 29 January 2025 ([here](#)).



The [NCS](#) project aims to unlock the benefits of pulses in UK agriculture. Farmers can baseline their farms through the Farm Carbon Toolkit and, as [Pulse Pioneers](#), can be paid to run pulse field trials, monitored through YEN.

CONTACTS

Please send any comments, observations or queries to the contacts below.

Thomas Wilkinson	Thomas.Wilkinson@adas.co.uk	07814043347
Charlotte White	Charlotte.White@adas.co.uk	07503570264

Or email yen@adas.co.uk for general enquiries.

✉ twitter: @adasYEN

YEN SPONSORS

The YEN was initiated by industry and is entirely industry funded. We are most grateful to all our sponsors. They not only provide funding but they are fundamentally involved in management of the YEN and in supporting individual farms in making their YEN entries. The YEN would not exist without them!



Visit www.yen.adas.co.uk for sponsors' details, news updates and to register for 2024.