Entrant's Report

Harvest 2019

Entrant's name	**Field / Site: Field name**
YEN Field ID:	
Region: East Anglia	Supporter:
Crop: Winter wheat	Variety: KWS Barrel
Main contact email:	
Sponsor/Supporter email:	

The 2019 YEN competition saw completed entries from 249 fields, 6 trial plots, and 70 in field comparisons.

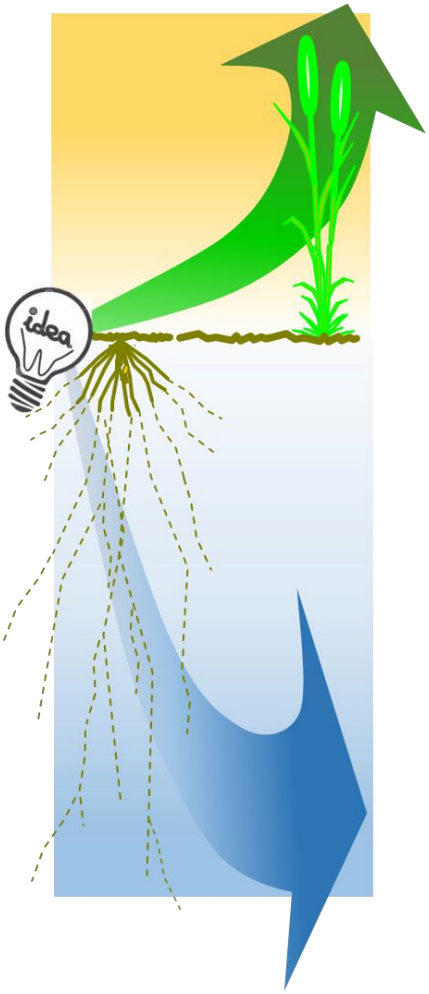
- ❑ The average grain yield for the Cereal YEN 2019 competition was 11.1 t/ha for absolute field yield.
- ❑ The average yield potential was 18 t/ha and the average % of potential yield achieved was 61%.
- ❑ Your entry yield of 12.6 t/ha ranked 59 for absolute field yield within all YEN field entries.
- ❑ This represents 65% of an estimated yield potential of 19.4 t/ha at your site in 2019, which ranked 105 for achieving the highest percent of potential yield within all YEN field entries.

	Rank	Grain yield (t/ha)	Rank	Grain yield (% potential)
	1	**16.3**	**1**	**93%**
	2	15.2	**2**	88%
	3	14.8	**3**	86%
Your entry	**59**	**12.6**	**105**	**65%**

CONTENTS

Our detailed analysis of your yield result is provided in the following pages, including comparisons with other YEN entries and with benchmarks taken from the AHDB Growth Guide and the AHDB Nutrient Management Guide (RB209). We hope that this helps you to identify aspects of your husbandry and growing conditions that offer possible routes to further yield enhancement on your land.

Our approach in this report is to consider yield potentials and growing conditions for crops in the 2018-19 season (this year we augment soil analysis with leaf analyses), then the agronomy of your crop, its development, the basic resources (light energy & water) available to it, its success in capturing these and in converting them to grain. Lastly, we use grain analysis to provide a post-mortem on your crop's nutrition.



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

The key to high yields amongst YEN entries has been accelerating crop growth. So our approach to enhancing yields is to work out what is limiting growth – light energy or water – and then develop ideas to target better green canopies or better rooting accordingly.

To estimate potential yields we assume a theoretically 'perfect' variety grown with 'inspired' husbandry on your land with its 2018-19 weather, achieving either:

(i) **60% capture of light energy** through this season (including some in August), and its conversion to 1.4 tonnes of biomass per terajoule, or

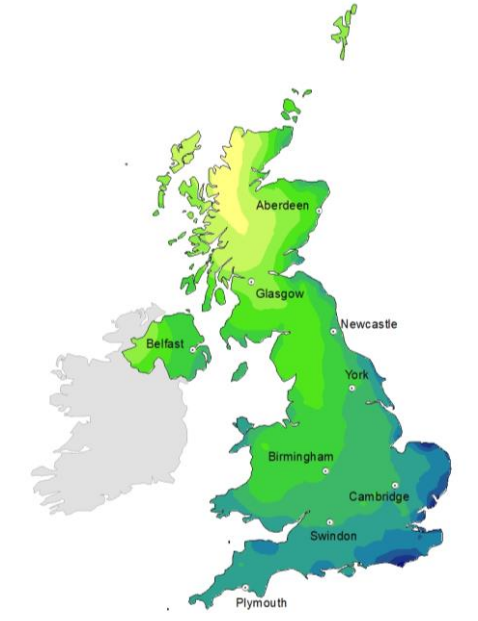
(ii) **Capture of all the available water** held in the soil to 1.5 m depth (or to rock if less) plus all rainfall from April to July, and conversion of each 18 mm into a tonne of biomass per hectare.

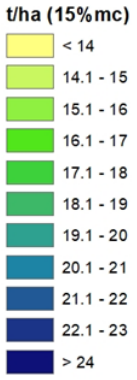
Taking the lesser of these two biomass amounts, we assume that a maximum of 60% can be used to form grain; this is the 'harvest index'.

The maps below show potential grain yields for retentive and light soils in 2019[1]. Potentials in arable areas would have commonly been water limited, even on medium soils. They ranged from 13 t/ha upwards so, on deep soils, high yields were theoretically possible everywhere.

2019 Potential yields

Retentive soils – 260 mm AWC





Light soils – 160 mm AWC

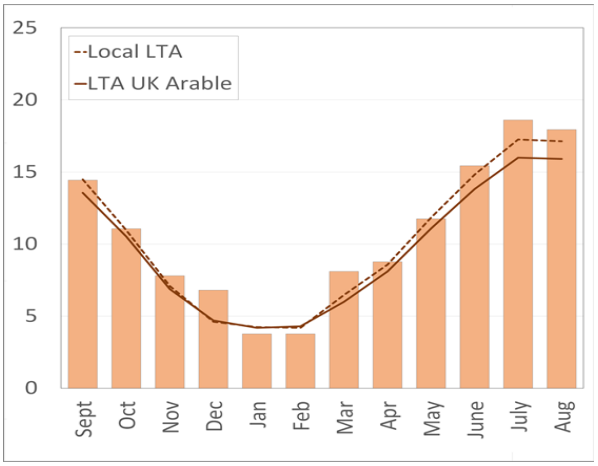
[1] We are using weather data from Iteris™ in 2019 and assumed deep soils with no irrigation. Note we have not yet processed long term met data from Iteris so cannot show a map of long-term average yield potentials.

The season's weather

The adjacent graphs show the monthly temperatures, rainfall and total solar radiation (half of which is light-energy for photosynthesis) for your area in 2018-2019 compared to your regional long-term average (LTA) and the average for all UK arable areas (1981-2010, from the Met Office).

The key defining features of the season were a dry autumn, and a warm dry winter with few severe frosts. April was bright and very dry for most. June was very wet across the Midlands and around the Wash, but Suffolk, Norfolk and Cambridgeshire had a dry summer. The low sunshine levels in June generally appear to have restricted grain set and grain filling.

Mean daily temperature 2018-19 °C



Overall crop progress

Conditions for autumn cultivations and sowing were good, so most crops established well.

Winter was warm, and relatively dry, especially in Scotland; tillering proceeded well and there were no reports of frost damage.

Some spring germination of blackgrass occurred, e.g. with clods breaking down after winter frosts.

With the warm dry winter, root development was probably ahead of normal, supporting spring growth despite topsoils remaining largely dry.

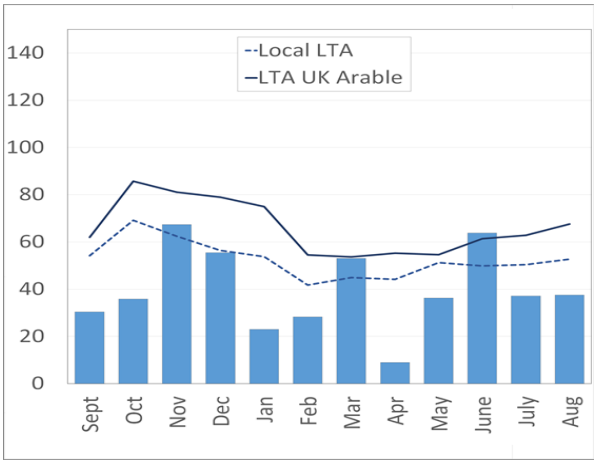
Low spring rainfall kept disease and pest levels at low levels, and delayed broad-leaved weed emergence. Some BYDV was observed in barley.

May continued dry, except in northern Scotland, so spring spray programmes generally proceeded unhampered by the weather.

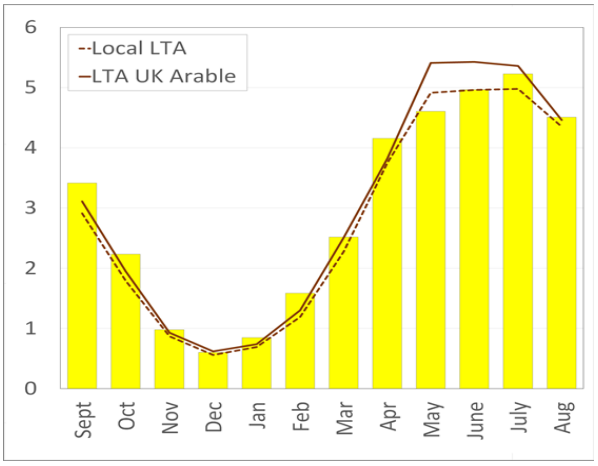
Then June turned very wet, especially across the Midlands and around the Wash, causing local flooding. The heavy rain caused much lodging; this often originated where drilling and fertiliser applications had overlapped.

It then turned dry in the south; the rains were generally too late to cause serious spread of Septoria, but some ear bleaching was observed due to Fusarium head blight. There were reports of aphids exceeding spray thresholds and of orange wheat blossom midge, but serious damage was infrequent.

Monthly rainfall 2018-19, mm



Monthly solar radiation 2018-19, TJ/ha



Attempts to extend canopy greenness were thwarted in the South by dry and warm conditions.

Harvest proceeded well in the South but proved problematic further north due to frequent rainfall.

Site overview

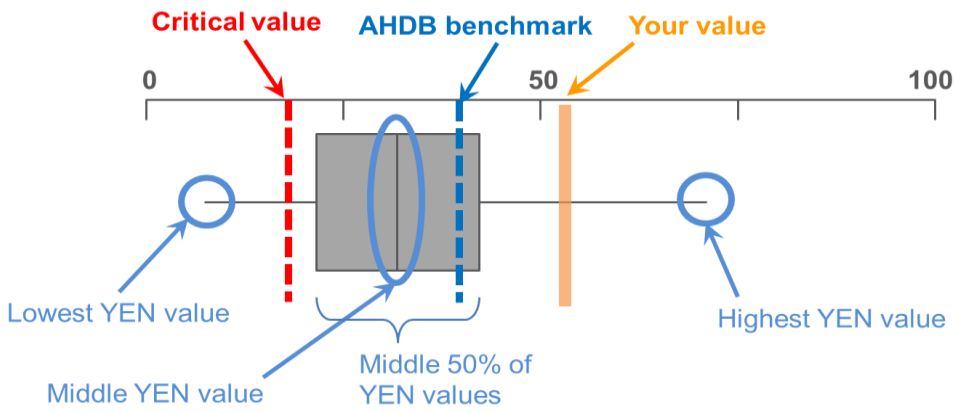
Farm descriptions of topsoil and subsoil stone content, texture and depth allow us to estimate soil water holding capacity and, along with summer rainfall, to estimate the water available to each crop (benchmarking charts below); this is critical in estimating potential yields.

Topsoil analyses provided through NRM's soil health service tell us texture, organic matter, OM activity and nutrient status. These are summarised in the following benchmarking charts and indicate any possible nutritional limitations to yield.

Topsoil textures (determined by laser diffraction) generally agreed well with farm-defined topsoil textures. NRM determines soil organic matter by 'loss on ignition'. Beware that SOM by other methods can give somewhat lower values. A few sites showed low values for soil pH, P, K and Mg. These merit further checks, initially through grain analysis (see later).

YEN Benchmarking charts – What do they mean?

YEN is much more than a competition – it provides a full set of metrics whereby you can gauge the performance of your crop against all other YEN crops. This has proved to provide the prime value of the YEN to many participants. We do this with benchmarking charts. Benchmarking charts compare your value with everyone else's in 2019 and with benchmark and critical values, if available and appropriate. The key to these charts is as follows:

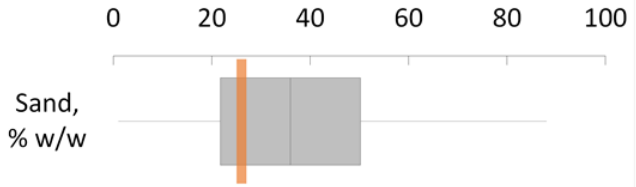
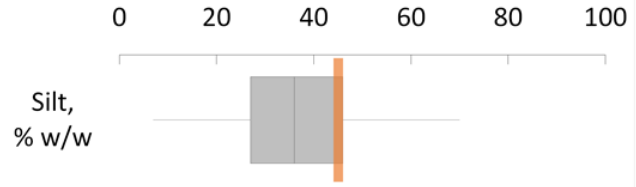
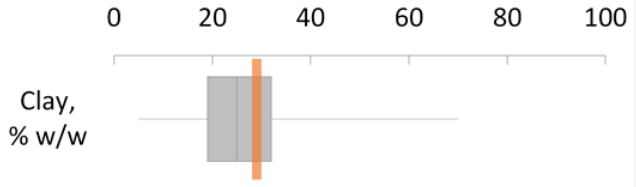
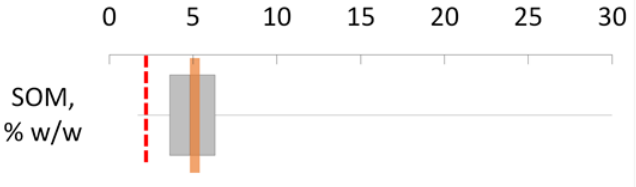
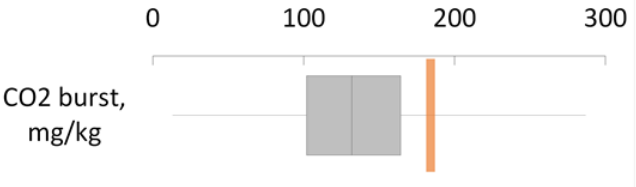
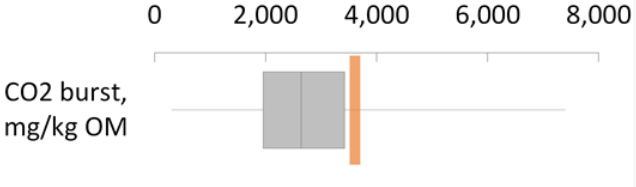
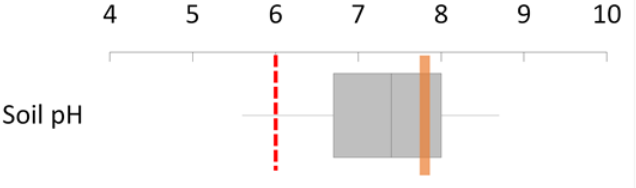
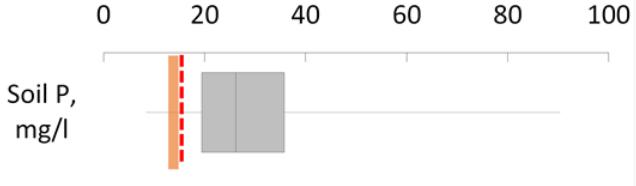
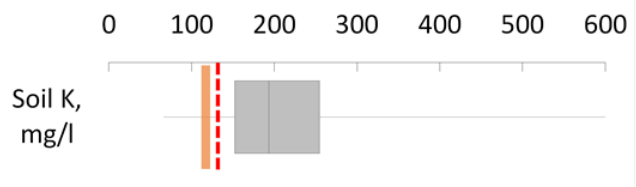
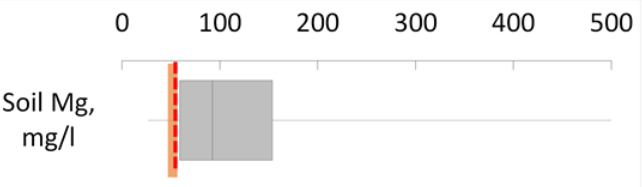


The 'whiskers' show the range of YEN values in 2019 and the box shows the middle half of YEN 2019 values, with a line for the mid-value. The orange line shows the value for this entry, and the red line is a limit beyond which yield may be adversely affected; crops with values beyond these merit further investigation. Blue dashed lines indicate benchmark values e.g. from the AHDB's Wheat Growth Guide (which relate to a feed wheat with slow development yielding 11 t/ha). Benchmarking charts exclude data on non-wheat crops (barley, triticale & rye).

Nutritional status

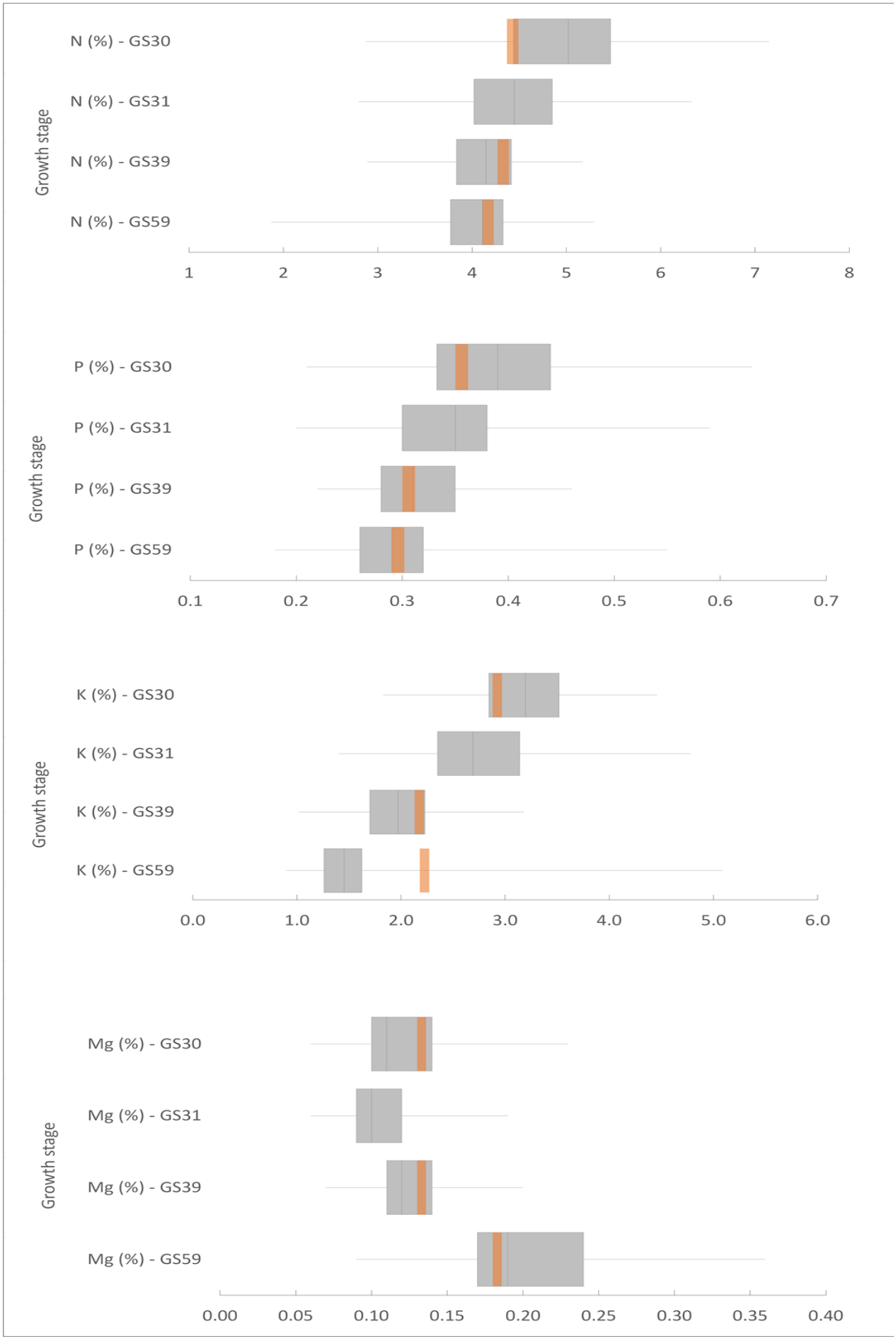
Through grain analyses, YEN data indicate that UK cereal crops often experience deficiencies of one or more of the twelve essential nutrients. So this year, the YEN has intensified nutritional testing, providing comprehensive leaf analyses on up to four occasions.

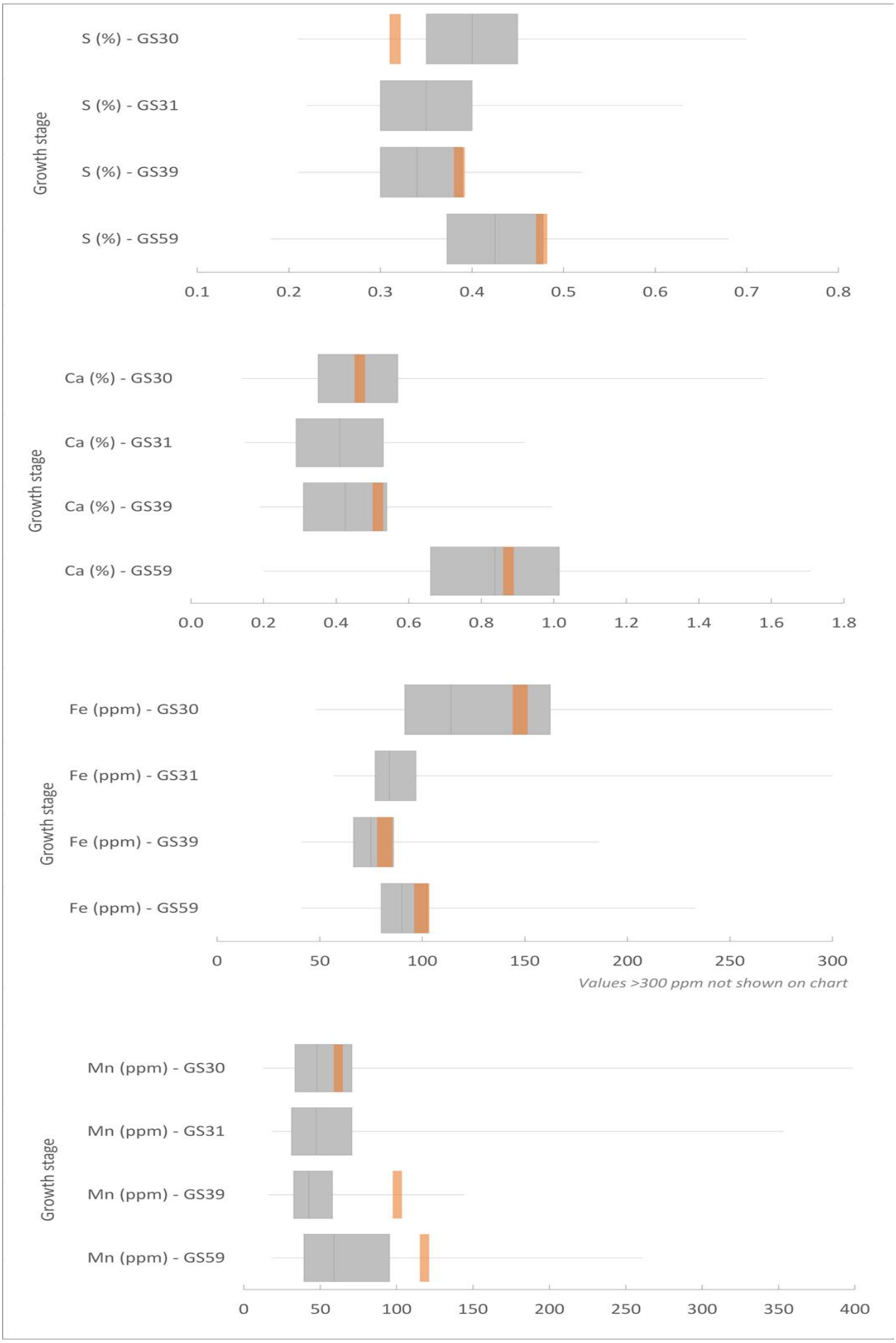
Ten soil 'soil health' traits are reported on the next page, as in previous years; then the leaf analyses are reported on three subsequent pages. No critical thresholds or benchmarks are shown for leaf analyses because these change through a crop's life and are still uncertain. However, the benchmarking diagrams should enable you to compare your YEN crop with all other YEN entries, analysed at the same time. In due course, we hope to make this 'live benchmarking' approach available on-line for any YEN crop.

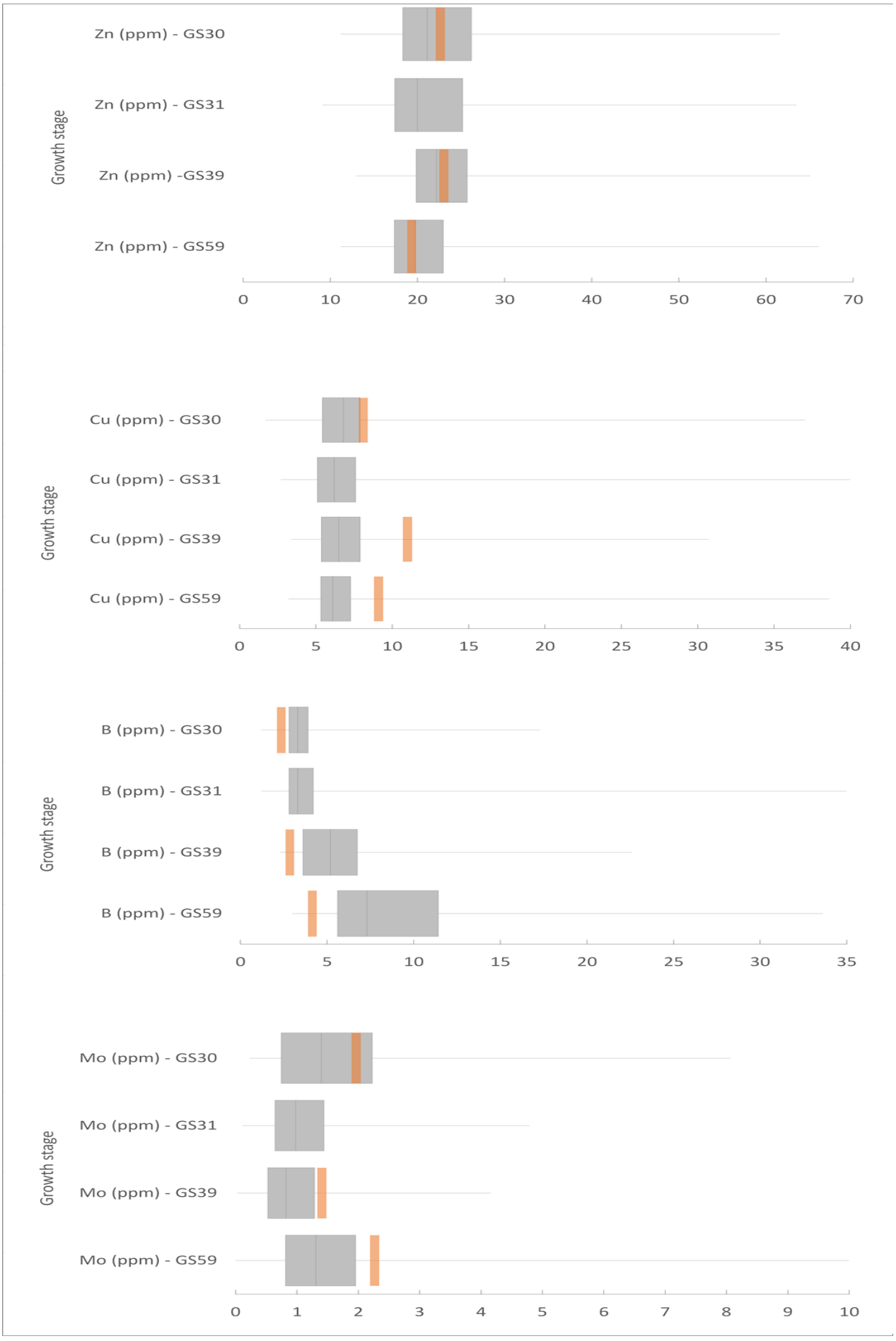
	Soils with high sand content hold least water and soils with high silt content tend to hold most water.
	Soils with much silt and sand, hence less clay, tend to be relatively weak, and so are more difficult to maintain with a stable structure.
	Soils with high clay content hold much water but part of this is held too tightly for crop use. Nutrients within this unavailable water tend to be less available than nutrients in lighter soils.
	NRM determines soil organic matter by 'loss on ignition'. Beware that SOM by other methods can give somewhat lower values.
	A burst of CO2 is emitted when moist soil is incubated in air; this reflects activity of living soil biomass, hence may indicate 'soil health'. CO2 emissions tend to increase as SOM increases.
	CO2 emitted per unit of SOM shows the relative activity, hence the degree of turnover, of the soil's organic matter. YEN data show higher pH soils generally have less turnover.
	High pH soils may require that special attention is paid to micro-nutrient levels (see page 15).
	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 (see page 15) to check if P was sufficient .
	Soil potassium analysis provides a reliable check on whether K supplies are likely to be deficient for average crops. However, high yielding crops require very large amounts of K.
	Magnesium is a key component of chlorophyll so deficient plants show striking inter-veinal yellowing. Temporary deficiencies often occur in dry conditions.

Leaf analysis, to show nutritional status of the crop

Tissue analyses were performed by Lancrop Laboratories on samples of the newest fully expanded leaf.




S (%) - GS30
S (%) - GS31
S (%) - GS39
S (%) - GS59
Growth stage
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Ca (%) - GS30
Ca (%) - GS31
Ca (%) - GS39
Ca (%) - GS59
Growth stage
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
Fe (ppm) - GS30
Fe (ppm) - GS31
Fe (ppm) - GS39
Fe (ppm) - GS59
Growth stage
0
50
100
150
200
250
300
Values >300 ppm not shown on chart
Mn (ppm) - GS30
Mn (ppm) - GS31
Mn (ppm) - GS39
Mn (ppm) - GS59
Growth stage
0
50
100
150
200
250
300
350
400

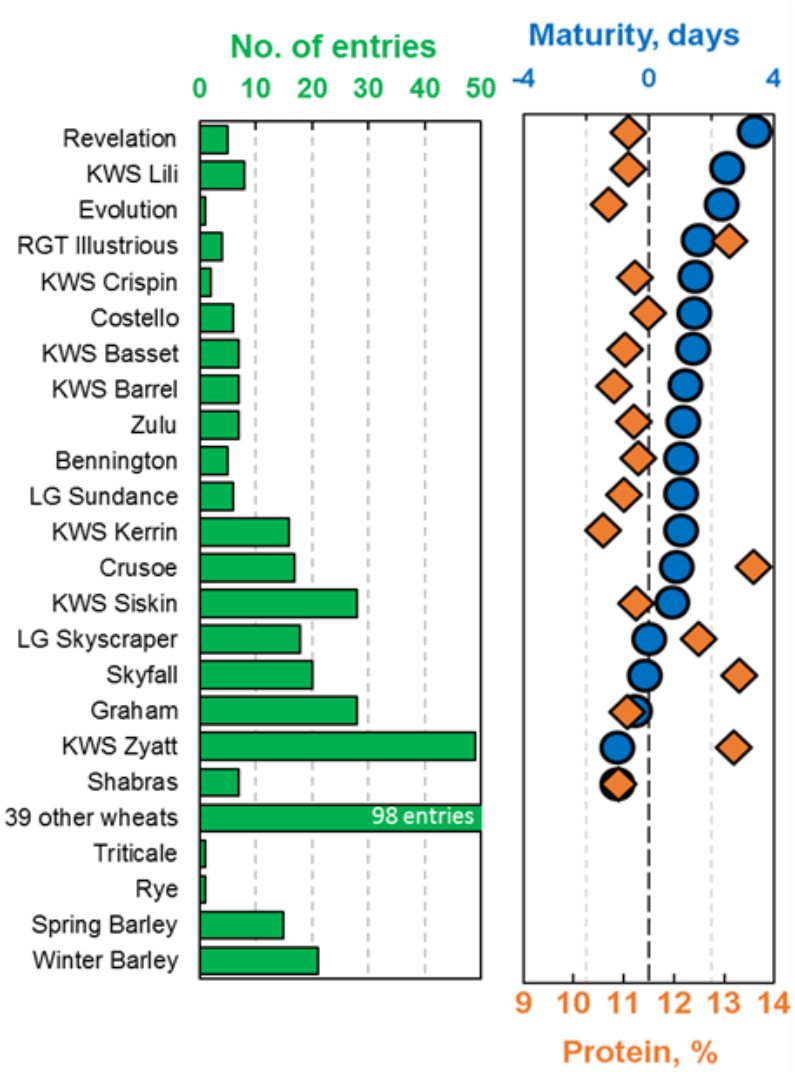

Growth stage
Zn (ppm) - GS30
Zn (ppm) - GS31
Zn (ppm) -GS39
Zn (ppm) - GS59
0
10
20
30
40
50
60
70
Growth stage
Cu (ppm) - GS30
Cu (ppm) - GS31
Cu (ppm) - GS39
Cu (ppm) - GS59
0
5
10
15
20
25
30
35
40
Growth stage
B (ppm) - GS30
B (ppm) - GS31
B (ppm) - GS39
B (ppm) - GS59
0
5
10
15
20
25
30
35
Growth stage
Mo (ppm) - GS30
Mo (ppm) - GS31
Mo (ppm) - GS39
Mo (ppm) - GS59
0
1
2
3
4
5
6
7
8
9
10

Analysis of YEN data accumulated over the YEN's first six seasons has shown that, although season has the largest effect on yields, farms are relatively consistent in their performance. Hence it should be possible to learn from the best performing farms, and the YEN is beginning to indicate husbandry practices that are associated with high yields. In summary, we are concluding that:

- ❑ 15 t/ha is possible **almost anywhere**! High yields are not restricted to just one part of the UK.
- ❑ **Attention to detail** is important. Aspects of this that appear significant include:
  - following a break crop
  - applying slurry and/or phosphate
  - adequate N use, including multiple applications
  - and several PGR applications.
- ❑ Other **High Yield Associations** include**:**
  - **Weather:** dry, bright autumns and winters, bright springs and cool summers
  - **Taller crops** with more ears, higher straw N% and lower grain N%
  - **Nutrition:** most crops suffer some deficiencies. P applied has a bigger influence than total N applied!

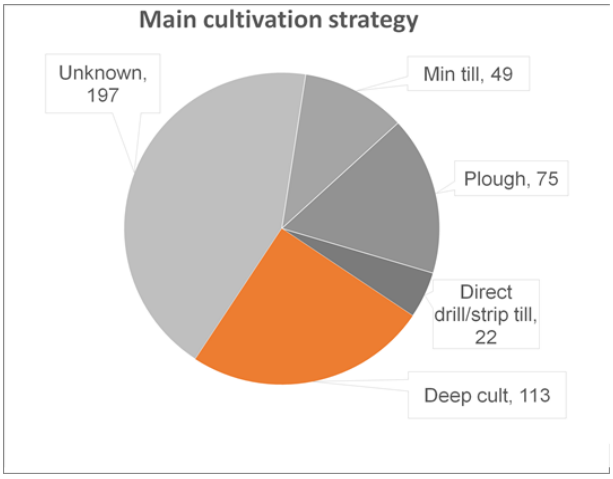
The following charts show how the husbandry of your entry related to all other YEN entries in 2019.

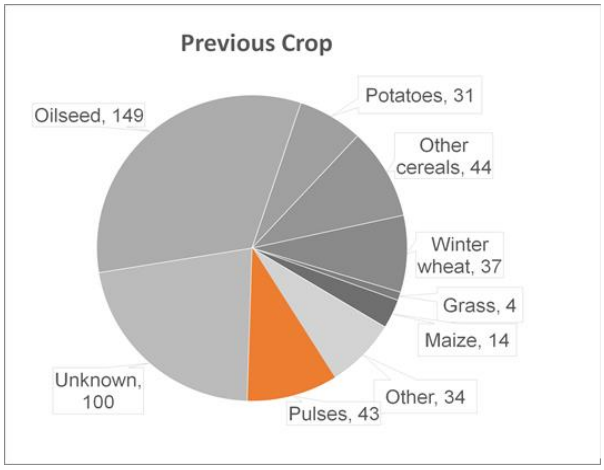
- ❑ **Variety:** YEN entries in 2019 included 61 different varieties! Your variety was KWS Barrel, which according to the AHDB Recommended List (or alternative source for some varieties) has standard duration to maturity and has an average grain protein content of 10.81%.

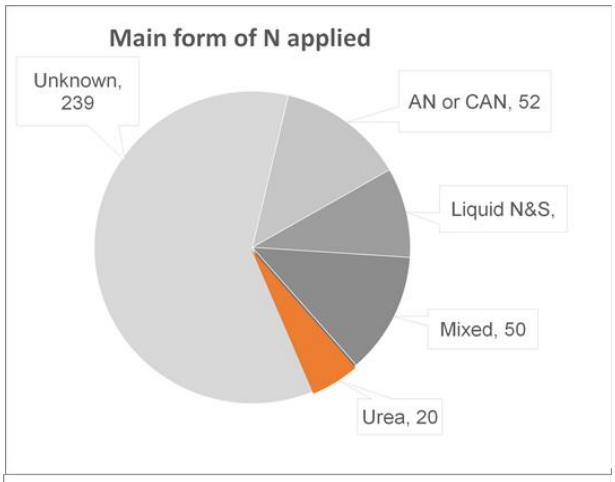


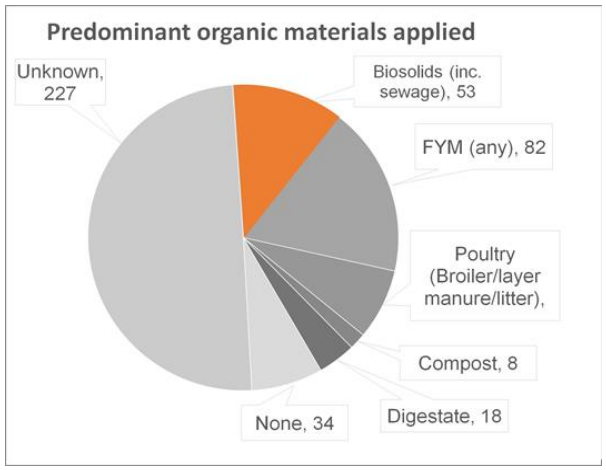
For Group 1 varieties only, the protein content quoted is the 'Protein content – milling spec.' from the 2019/20 RL Summer edition. For all other varieties, the protein content quoted is the 'Protein content' from the same edition of the RL.

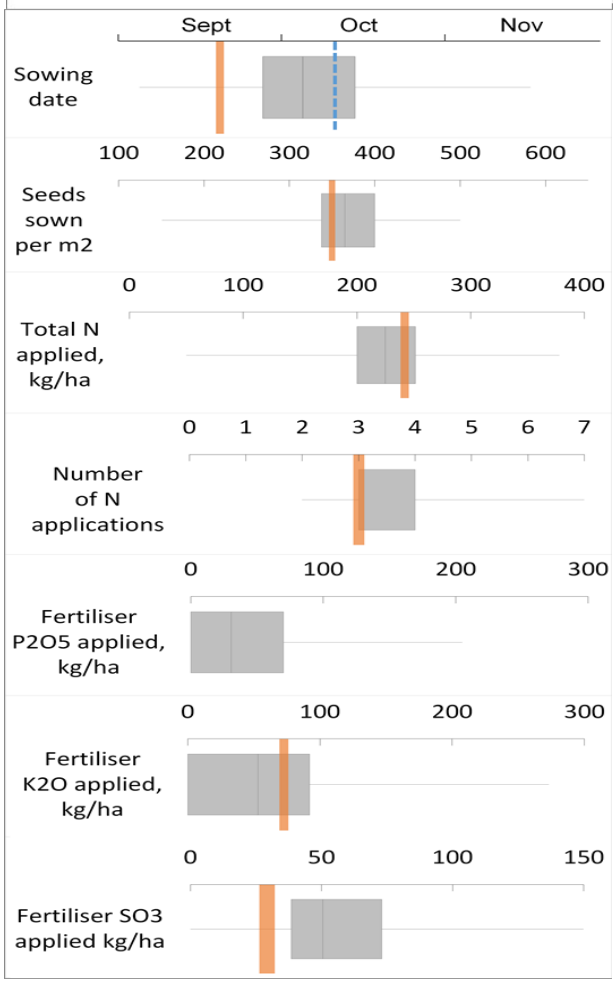
Orange segments or benchmarking charts in the following diagrams show the agronomy of your crop, if known, compared to all other YEN entries.

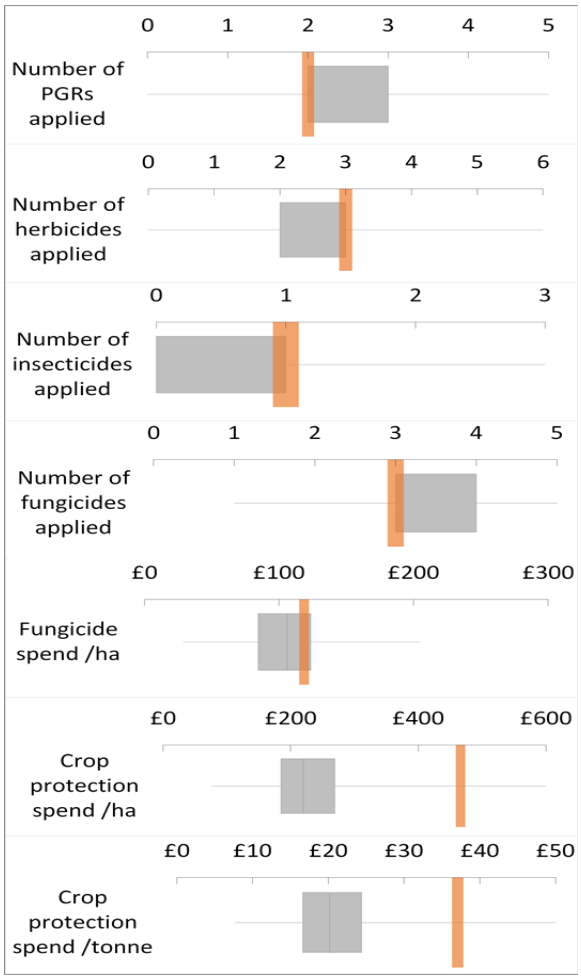








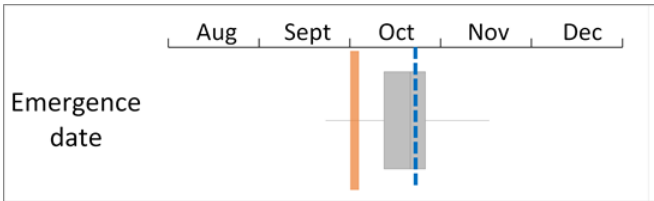
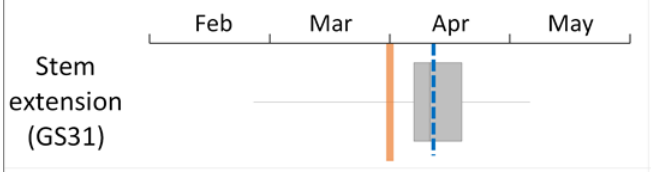
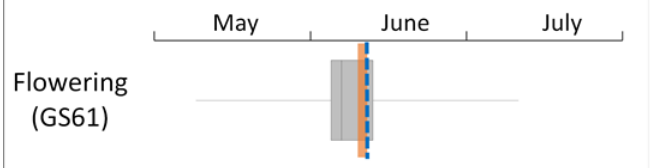
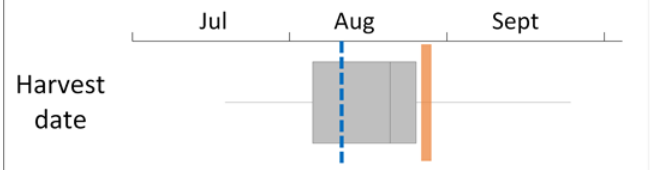
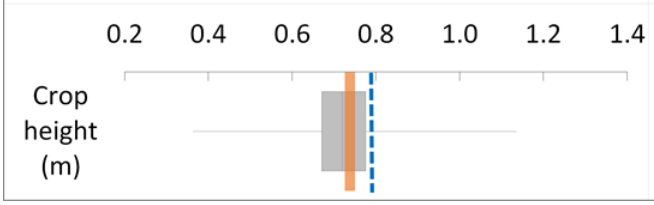




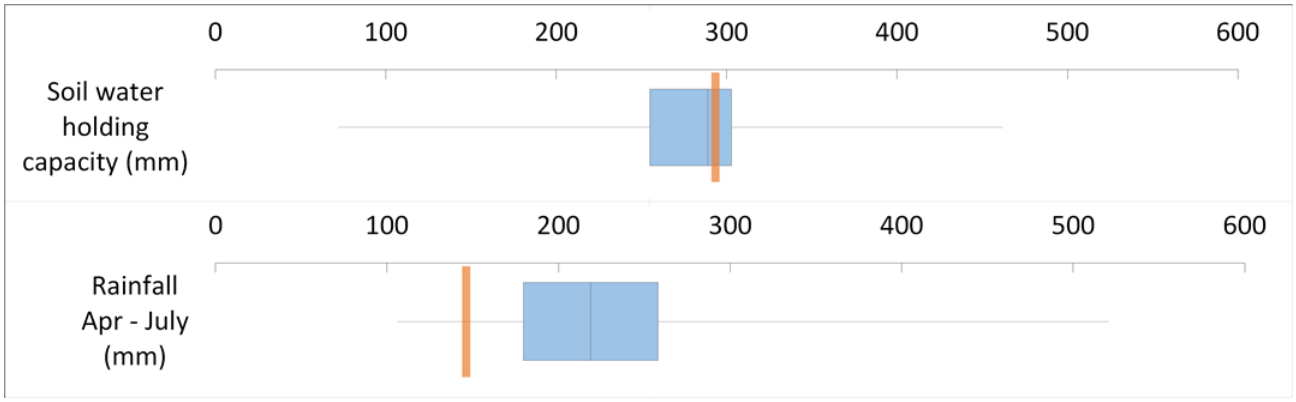
CROP DEVELOPMENT

The following charts show how your entry developed through the 2018-19 season, compared to all other YEN entries and Benchmarks from the Wheat Growth Guide. The cardinal stages of emergence (GS10), start of stem extension (GS31), flowering (GS61) and full senescence (GS87) determine the lengths of the key growth phases:

- ❑ Foundation, GS10-GS31 – when tillers and main root axes are formed,
- ❑ Construction, GS31-GS61 – when yield-forming leaves, ears and stems are formed, including soluble stem reserves
- ❑ Production, GS61-GS87 – when grains are filled, both with new assimilates and reserves redistributed from stems.

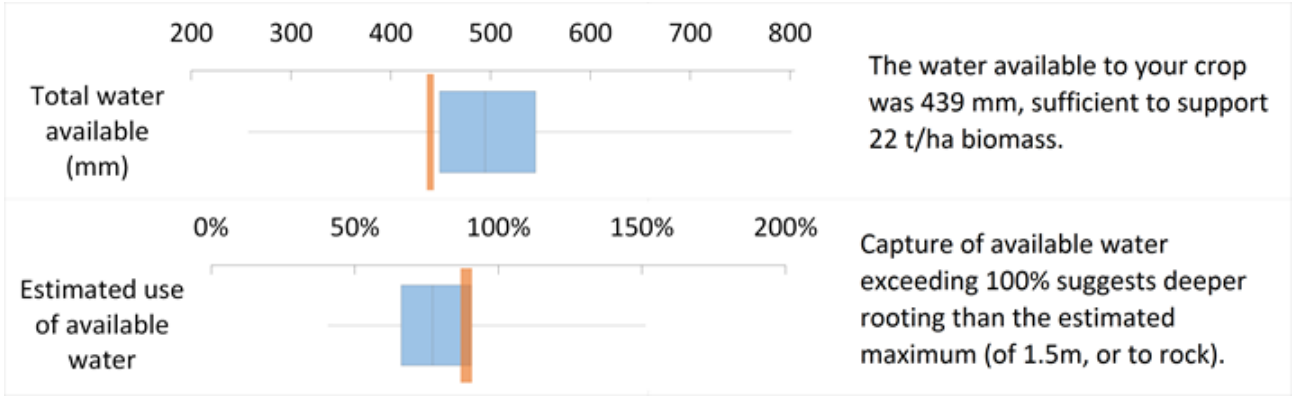
	Wheat crops were all sown in autumn, mostly around the normal time.
	GS31 marks the end of tiller production and the start of tiller survival. It was a little late this year.
	At GS61 'crop construction' and grain set finish and grain filling starts. Crop construction was short this year.
	Records show senescence to be slightly late this year. Ideally, for high yields, canopies would stay mostly green for 45 days after flowering.
	Rain-delays affected a fair-few crops this year.
	Wheat crops were generally short in 2019, due to the short construction period and dry weather in May.

Water capture



The soil water holding capacity quoted here assumes roots could access all soil water to 1.5 m (or rock, if shallower). If sufficient roots didn't reach this depth, soil-available water would be accordingly less.

Whilst we cannot yet measure water captured by YEN crops individually, by assuming your crop's conversion of water to total biomass was 'normal' (20 mm water for each t/ha biomass), we have made crude estimates below of the likely success of your crop's root system in capturing water.

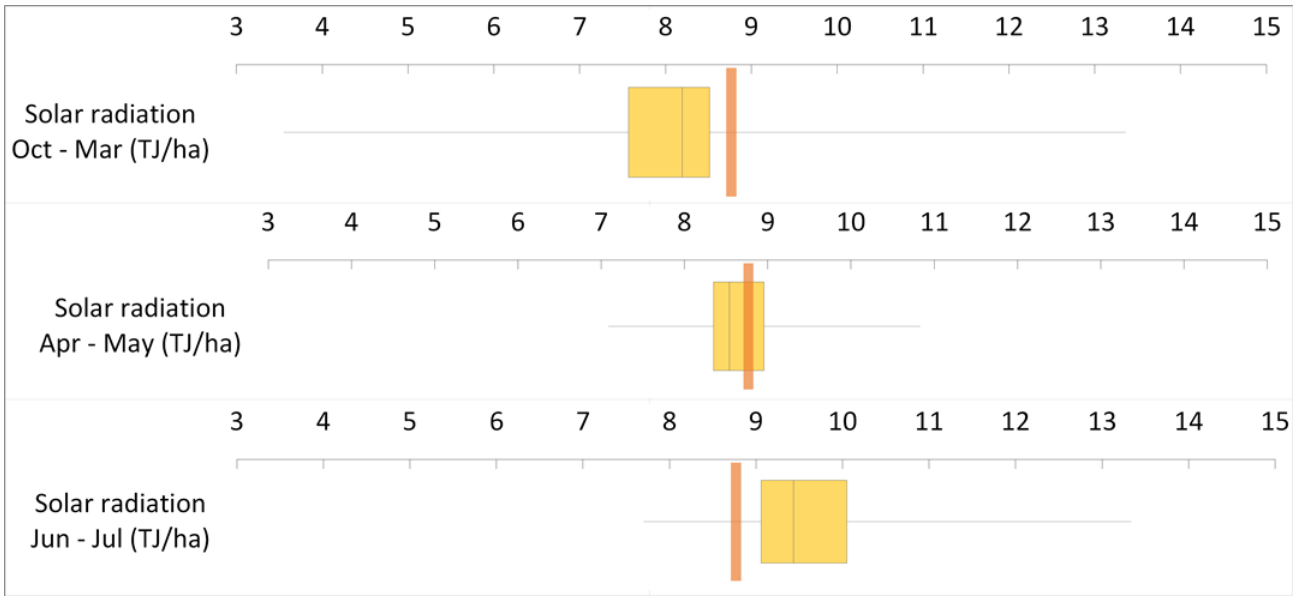


A high yielding crop, growing say 20 t/ha of biomass (so yielding 12 t/ha grain at 51% harvest index), would need to capture ~400 mm water from soil plus summer rain. This year many crops, especially those that did not receive heavy June rainfall, needed to capture much of their soil held water, and water supplies were probably inadequate for some crops.

Energy capture

The benchmarking charts show what the weather conditions meant for light energy available for this entry and other YEN crops in 2019. Solar radiation has been divided into periods that roughly equate to the three key phases of crop development defined by your crop's development stages, reported earlier:

- ❑ Foundation – when tillers and main root axes are formed,
- ❑ Construction – when yield-forming leaves, ears and stems are formed, including soluble stem reserves
- ❑ Production – when grains are filled, both with new assimilates and reserves redistributed from stems.



Solar radiation in September 2018 and August 2019 have been omitted, because few crops were green during those months, but crops could have achieved greater total biomass, and possibly also grain biomass, if they maintained green canopies during any part of these two months.

Whilst we cannot yet measure light capture by YEN crops individually, by assuming your crop's conversion of light-energy was 'normal' (1.2 t/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.

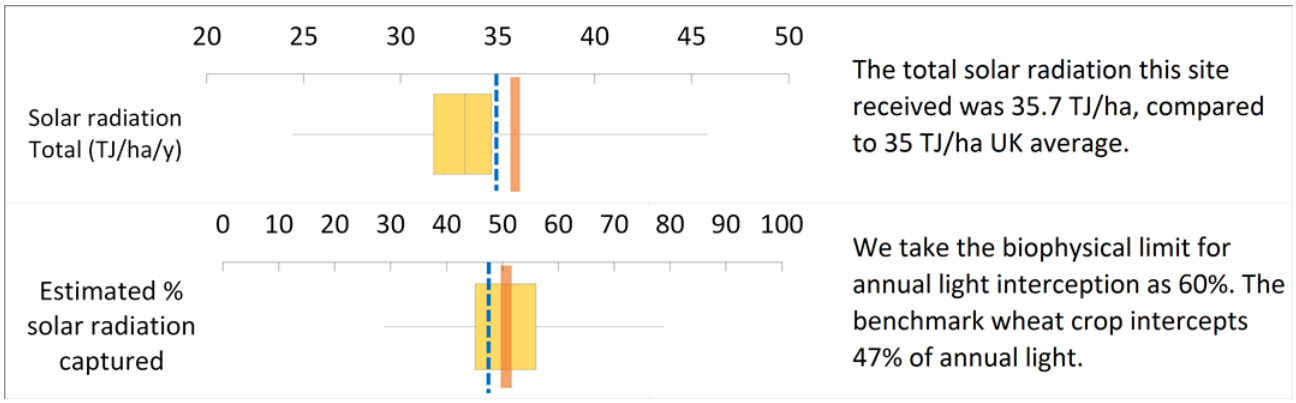
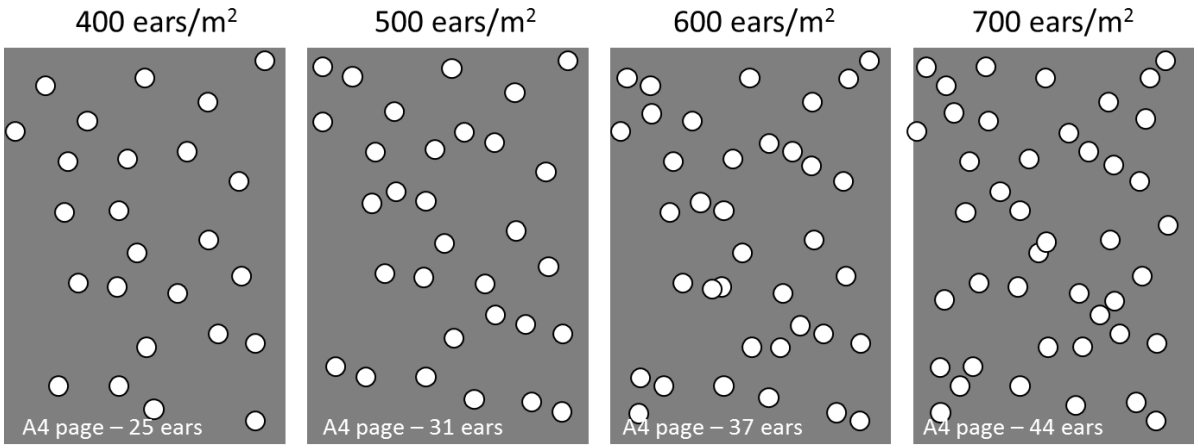


Image of this entry

Images are a very efficient way of collecting lots of information. An overhead photo taken during grain filling gives an impression of canopy size, nutrition and health, as well as providing an independent assessment of ears per m^2 (see diagram below). An overhead photo taken at the start of stem extension is similarly useful.

An A4 sheet of paper in your image can help to assess ear numbers per m^2, as shown here:

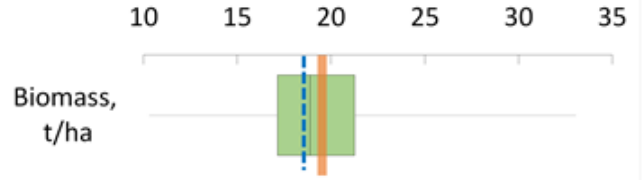
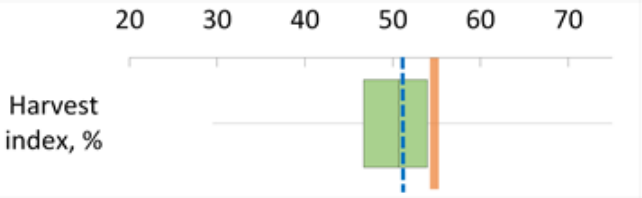
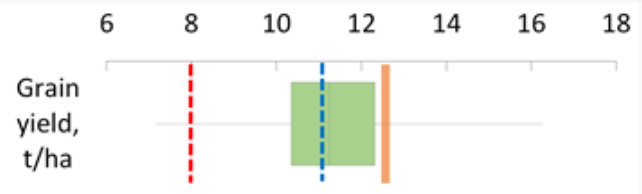
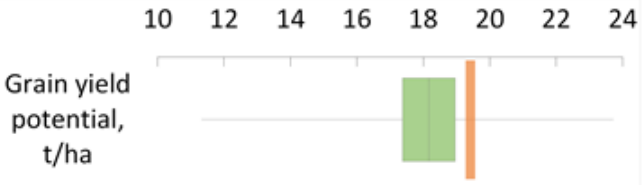
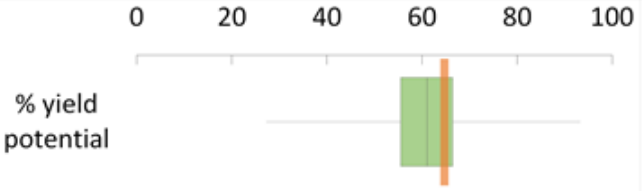


Yield formation

The whole-crop samples that YEN entrants provided were all analysed for their components and results are shown in the following charts, assuming that each sample was representative of the whole area from which grain yield was determined.

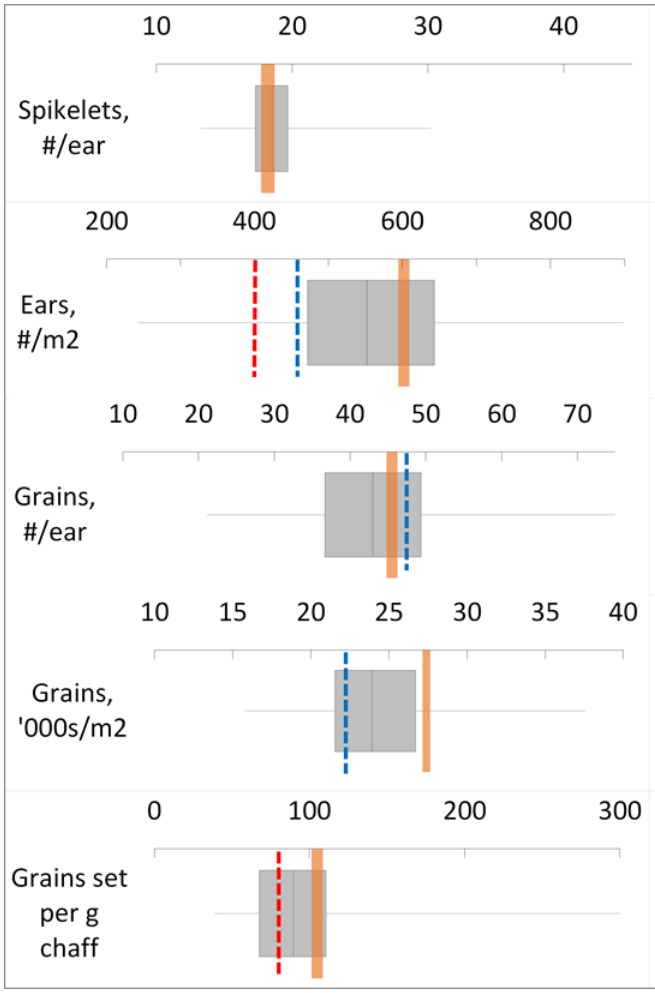
Total biomass production indicates the success with which a crop captured its key resources, light-energy and water, and the harvest index (the proportion of total biomass that was harvestable) indicates how this biomass was apportioned to grain. Since grain growth happens last, harvest index also indicates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

Your grain yield (expressed as t/ha and % of potential) is shown below along with biomass and harvest index, in relation to all other YEN entries and to the AHDB Benchmark grain yield of 11.0 t/ha.

	YEN biomass values in 2019 are generally average. YEN experience has been that high biomass relates to high yields.
	Harvest index is the percentage of total biomass that was harvestable as grain; values were average in 2019.
	YEN yields averaged 11.3 t/ha in 2019; this compares to 10.3 t/ha in 2016 (least), and 12.7 t/ha in 2015 (most). Yields below 8 t/ha are usually uneconomic.
	YEN yield potentials express the light energy and water available for your entry this year, simply converted to t/ha. Half of all yield potentials calculated in 2019 were between 17.6 and 19 t/ha.
	Yields achieved by YEN entrants in 2019 averaged 60% of potential, compared to 60%, 50%, 51%, 60%, and 40% in the previous five years.

Grain Yield

Whole crop yield analysis can also tell us about the history of your crop because the different components are determined sequentially. 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 (represented by the AHDB Benchmarks, blue lines).



Spikelets numbers are determined between GS30 (ear at 1cm) and GS31 (1st node). Numbers are not crucial because grains per spikelet is flexible and can compensate.

Ear numbers were high in 2019. High yielding crops tend to have many ears. Ear numbers under 400 per m2 cannot be fully compensated by grains/ear or TGW.

Grains per ear were high in 2019, possibly because June was dull. Grain set often compensates for variation in ear numbers, so grains / m2 relates better to yield.

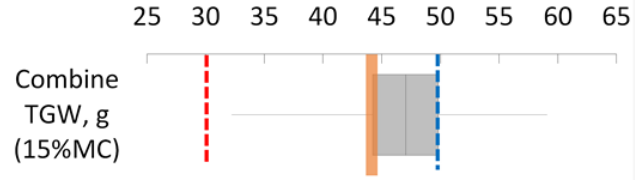
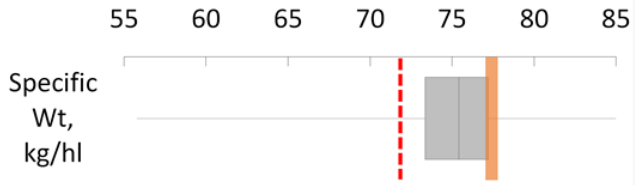
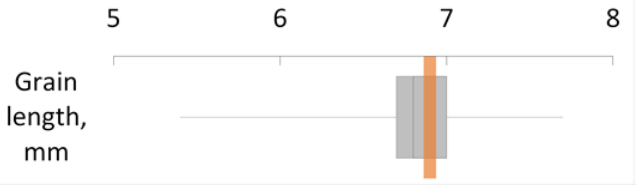
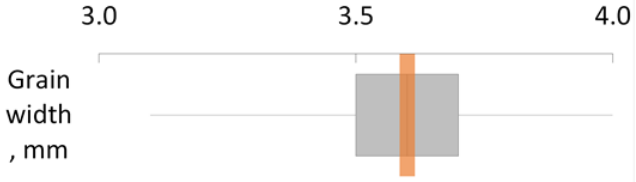
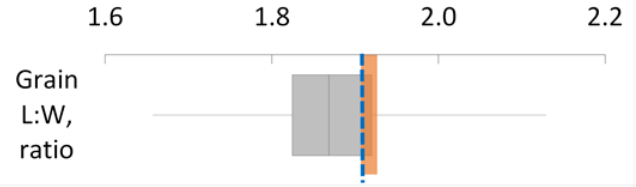
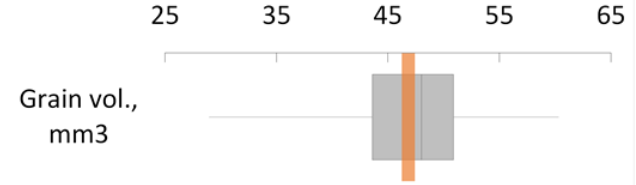
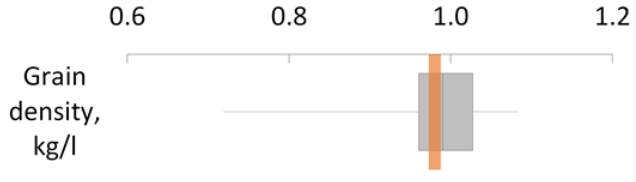
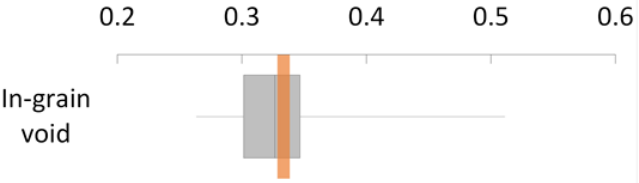
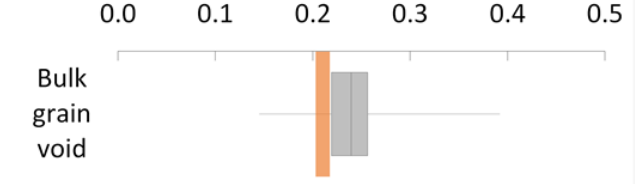
Grain numbers were high this year. High numbers of grains (say >25,000/m2) are normally necessary for very high yields.

More than 90/g chaff is good; less than 80/g is poor, indicating conditions around flowering may have been counter-productive. Values are high this year.

Grain formation & size

We use your combine-harvested grain sample to provide the analysis of grain size and grain filling on the next page. Grain filling depends mainly on photosynthesis after flowering, therefore relying on canopy health and longevity, but sugars stored in the stem can also provide 2-4 t/ha of assimilates for grain growth and most of the protein from senescing leaves is also redistributed to form grain protein (benchmark 1.1 t/ha).

If grain number per m^2 is low (see above), or if conditions during early grain-fill are limiting, final grain filling, hence yield, may be constrained even if later conditions are good – this is sometimes described as 'sink' limitation. We try to use analysis of grain volume and grain density to deduce whether crops were sink limited.

	Thousand grain weights (TGW) were small in 2019; they can be small either because of low storage capacity (set in the 2 weeks after flowering) or poor conditions for filling, later.
	Specific weight is a quick indicator of milling quality, and shows weights of bulk grain for storage & transport.
	Grain length is set before grain width, and tends to indicate potential grain storage capacity.
	Grain width reflects the success with which grain storage capacity is filled.
	A high ratio indicates that the grain may not have achieved its potential for filling, set soon after flowering. Past ADAS grain data show L:W of 1.9 to be 'normal'.
	Grain volume here is the product of length and cross sectional area, assuming grains are ovoid, so this volume includes the grain's 'crease'.
	High density grains probably indicate that grain filling has been constrained by storage capacity (volume), limiting import of later assimilate – often termed 'sink limitation'. In 2018, on average grain density was 1.03kg/l.
	The density of starch, the main grain constituent, is 1.5, so it is possible to estimate the proportion of grains' unfilled volume. The mid-value is 33% here. This includes the crease. In 2018, grains had a average in-grain void of 0.3.
	Did you know more than half of a load of grain is air?! High specific weight is achieved by having both dense grains and small voids between grains (under standard packing conditions). In 2018, the average bulk grain void was 0.26.

CROP NUTRITION POST MORTEM

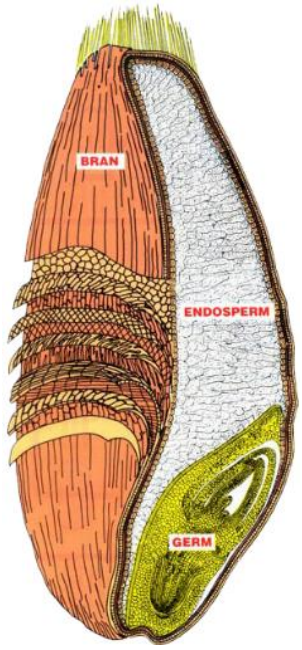
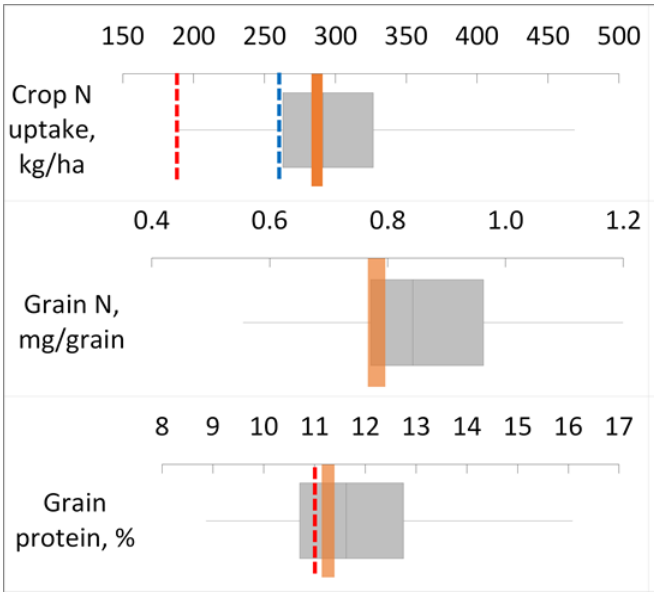


Diagram showing the structure of a wheat grain; most nutrients other than N and S are held in the bran (e.g. K, Mg), or germ (e.g. P).

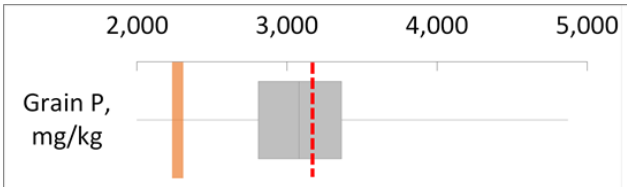
- The YEN is trail-blazing use of grain analysis to provide a general post-mortem on cereal crop's nutrition. NRM analysed nutrients in 305 grain samples from the Cereal YEN in 2019, as well as analysing 268 soil samples with their soil health package.
- N and S are primarily used to form endosperm proteins. These, and the mineral nutrients in grain (contained mainly in the bran or germ), may usefully be taken to reflect the nutritional history and status of the crop through its life. The literature suggests 'critical' concentrations in grain for a few nutrients, but for all nutrients it is possible to relate their individual levels to both all other nutrients in the sample, and all other YEN samples, hence indicating which nutrients were most limiting.
- Grain protein levels can be compared to those reported in the AHDB Recommended Lists for the same variety. If the observed protein level is significantly more or less than the RL value we attribute this to the level of nitrogen nutrition of the crop.
- Reliable low limits (deficiency levels) in grain are only available for N, S and now P. However, from the following benchmarking charts, you should be able to identify the nutrient(s) most likely to have limited your crop by comparing with the mid-level in all the other YEN samples.



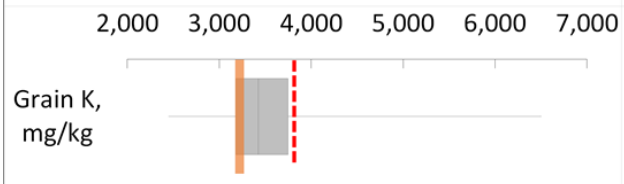
Uptake of 180 kg/ha N is required to build a canopy that fully intercepts light (GAI=6) . However, beyond yields of 9 t/ha, more N than this is needed to form grain protein - around 23 kg N / tonne.

The majority of N in wheat grains is held in the endosperm as the storage proteins, gliadins (providing dough extensibility) and glutenins (providing dough elasticity).

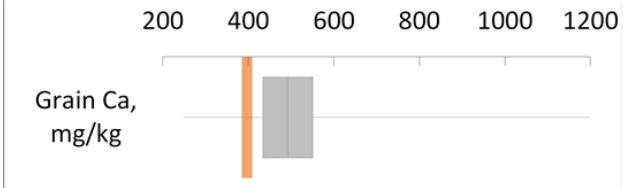
Low protein indicates a liklihood of inadequate N supply. A variety's protein value given on the AHDB RL probably provides the best benchmark for this (see page 7).



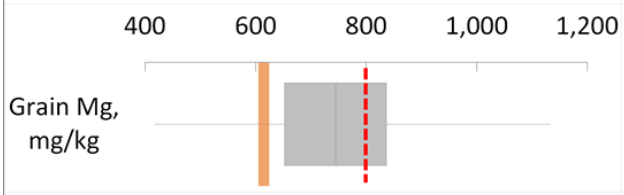
Recent work has shown grain P analysis can provide a useful check on sufficiency of phosphorus. Values less than 3,200 mg/kg indicate a need for further checks on P supply and capture.



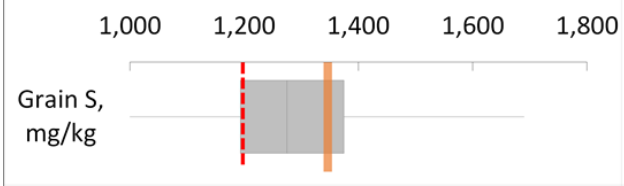
RB209 assumes a standard value of 5,400 mg/kg potassium (K) in grain. Values less than 3,800 indicate a need for further checks on K nutrition, especially by soil analysis (page 9).



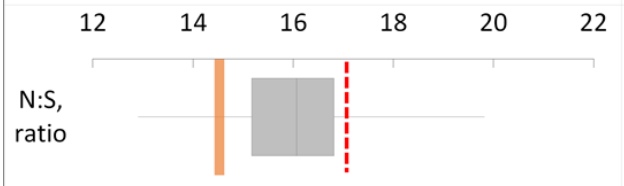
Almost all the crop's calcium remains in the straw at harvest, so grain calcium may not be meaningful.



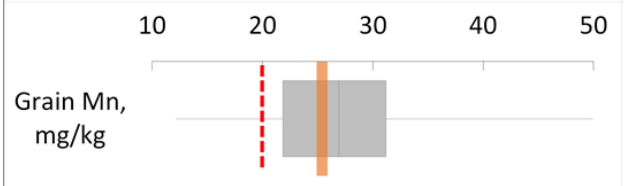
Literature shows low magnesium (Mg) values in grain are <800 mg/kg. With further experience, grain Mg levels may provide a useful double check on soil levels and crop symptoms.



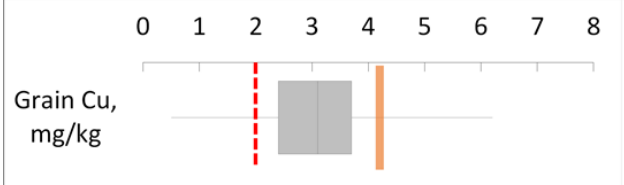
S is required in proportion to grain protein (especially glutenin) formation. N:S ratio (<17) best indicates sufficiency. Milling varieties need more S than feed varieties.



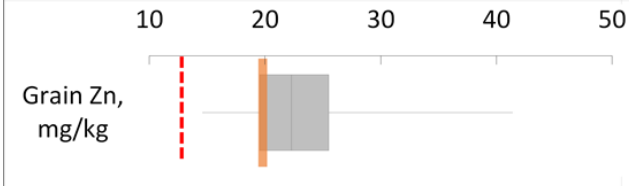
The higher the N:S ratio, greater than about 17, the more likely the crop is to have suffered from sulphur deficiency.



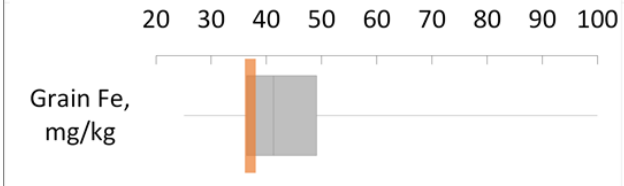
Literature shows low manganese (Mn) values in grain are <20 mg/kg. Further experience will show whether lower values indicate crops that were deficient.



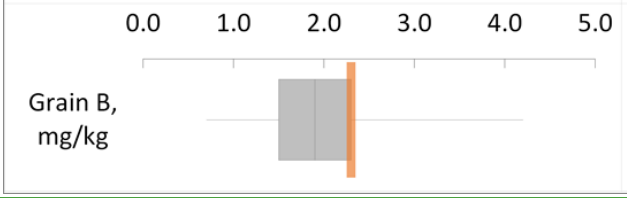
Grain copper (Cu) less than 2 mg/kg indicates possible deficiency.



Zinc (Zn) values below 15 mg/kg are low, but whether these should be regarded as limiting is uncertain. Literature shows grain zinc is increased by nitrogen availability.



Whilst grain iron (Fe) may prove useful with further experience, we currently have no guidelines for its interpretation. Average Fe was also around 40 mg/kg in 2016, 2017 & 2018.



Grain analysis may not be useful for assessing boron sufficiency. YEN boron values have varied hugely with season.

SUMMARY

The 2018-2019 competition:

- ❑ Congratulations and thank you for providing the information necessary to complete this report; the collective efforts of all YEN contributors serve to maximise the value of what can be reported and the deductions that can be made for everyone – we call this 'share-to-learn'.
- ❑ We have more participants in Cereal YEN this year than ever, with nearly 250 entries; the more participants we have, the more robust and confident we can be in the comparisons we make, both at the individual 'benchmarking' level, and when analysing the whole set of data.
- ❑ The winning grain yield in 2019 was **16.3** t/ha (in Lincolnshire), the highest yield in any previous YEN season, except for the YEN's record yield of 16.5 t/ha achieved in 2015.
- ❑ Clearly there is an element of luck in achieving high yields at a particular site in any particular year. Most crop management decisions must be taken to maximise grain yield in the majority of years, rather than every year. However, it is striking that some farms are consistently achieving high yields, and several farms have achieved YEN Awards over several seasons. We are coming to recognise that there is an important 'farm factor' which plays a big part in governing yield levels. This gives real value to being a YEN participant – through having an opportunity to compare with and learn from others.
- ❑ In terms of physiology, results over all seven years of the YEN continue to show that high yields tend to be associated with high ear numbers and high total biomass; the latter is more important than high harvest index in explaining high yields. This indicates the importance of striving for better light and water capture.
- ❑ Crops got off to a good start in 2018-2019 with good shoot numbers. Average final biomass growth this year was second only to average biomass growth of 2015, suggesting that early light capture must have been unusually good.
- ❑ However, a relatively dull summer across much of the arable area of the UK in 2019, particularly through June, meant that late growth, grain set and grain filling were all disappointing, making the average harvest index in 2019 less than in any previous year of the YEN.
- ❑ The dull summer months, along with dry conditions at some sites, e.g. around Cambridge, meant that ultimate grain yields were a relatively large proportion of a relatively low potential (average 18 t/ha, which compares with 2016, but is 1 t/ha less than 2015). Good realisation of potential was probably due to good early light capture, and possibly also good rooting.
- ❑ In summary, summer weather in 2019 did not allow UK cereal crops to realise the very promising start made through the autumn, winter and spring.

Comments on the next page are generated automatically from your data, with the aim of high-lighting features of your crop which may point out routes to yield-enhancement on your land.

Your entry:

- ❑ Your entry yield of 12.6 t/ha ranked 59 for absolute field yield within all YEN field entries.
- ❑ This represents 65% of an estimated yield potential of 19.4 t/ha at your site in 2019, which ranked 105 for achieving the highest percent of potential yield within all YEN field entries.
- ❑ High YEN yields have generally been associated with high biomass production. Your yield arose from an average total biomass and a high harvest index.
- ❑ Our target for annual light interception by annual crops (whether sown in autumn or spring) is 60%, compared with 50% achieved by this crop.
- ❑ The grain protein level of your entry was 11.1%, which was normal for this level of yield and this variety, indicating that it was adequately fertilised with N, having received relatively modest N applications.
- ❑ Your soil P was 14 mg/l. Less than 18 mg/l can indicate deficiency: check your grain P to see if P was sufficient.
- ❑ Your soil K was 117 mg/l. Levels below 120 mg/l can indicate deficiency.
- ❑ Your grain is estimated to have had 2271 mg/kg P. Less than 3,200 mg/kg indicate a need for further checks on P nutrition.
- ❑ Your grain is estimated to have had 3221 mg/kg K. Less than 3,800 mg/kg indicate a need for further checks on K nutrition.
- ❑ Your grain is estimated to have had 615 mg/kg Mg. Less than 800 mg/kg indicates a need for further checks on Mg nutrition.

Short review of Oilseed YEN 2019

The average gross output yield for the YEN entrants in 2019 was 5.1 t/ha across 50 entrants, with some entrants achieving more than 6 t/ha. Sunny conditions during April/May helped crops to set many seeds, but dull weather and lodging during the summer limited seed filling in some crops. The average yield potential in 2019 was 10.3 t/ha, ranging from 7-9 t/ha on light soils to 9-11 t/ha on heavier soils with greater water holding capacity.

Update on Wheat Quality Competition

The YEN Wheat Quality Award, which is sponsored by nabim will take place again this year. This is open to all Group 1 wheat entries to the Cereal YEN. High-quality eligible grains have now been shortlisted and are undergoing further analysis. The winners will be announced at the AHDB Milling Wheat Conference on Thursday 27th February 2020 at the Huntingdon Marriot Hotel.

Visit the event page for more details.

AHDB events

Several AHDB Monitor Farms entered the YEN competition for 2019 and a series of YEN-related events organised by AHDB Cereals & Oilseeds will be continuing through 2020. The full programme for 2020 will be listed on the YEN & AHDB websites.

YEN Yield Testing

The YEN Yield Testing project, which is funded through the EIP-Agri scheme, supports farm trials that test yield enhancing ideas and will complete in spring 2020. Several farmer innovation groups (FIGs) have been formed that were developed by participants at previous YEN Ideas Labs. These FIGs have focused on crop momentum, amino acids, cultivation effects on deep rooting, oilseed rape cross drilling, and spring potash. A 'messages lab' is planned for 6 February 2020; look out for details nearer the time if you are interested in learning about the conclusions from this project.

The European Agricultural Fund for Rural Development: Europe investing in rural areas

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

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Or email yen@adas.co.uk for general enquiries. @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 2020.