Nutrient Benchmarking Report 2020

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Date ADAS benchmark reported: 26 November 2020

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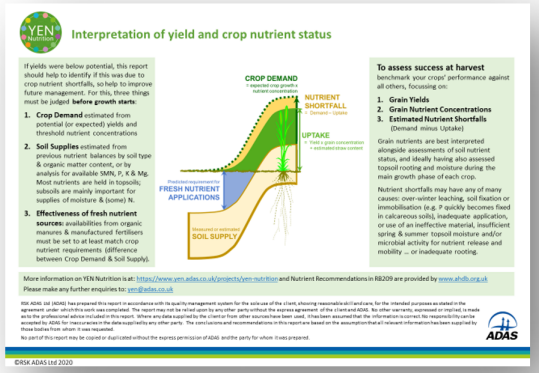
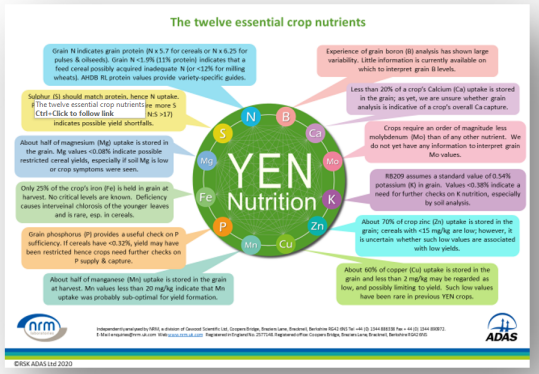
Your Benchmarking Report contains...

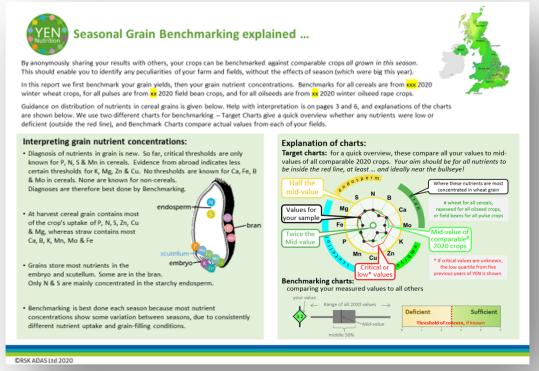
Nutrition Guidance



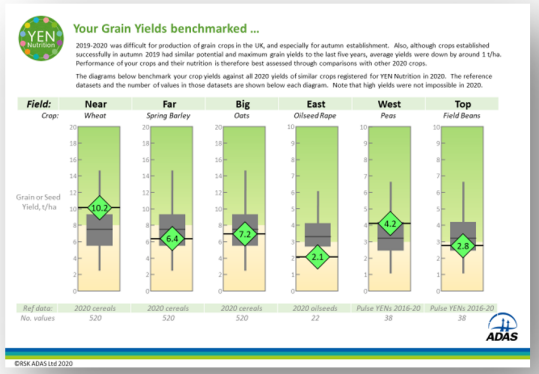
Nutrient Roles



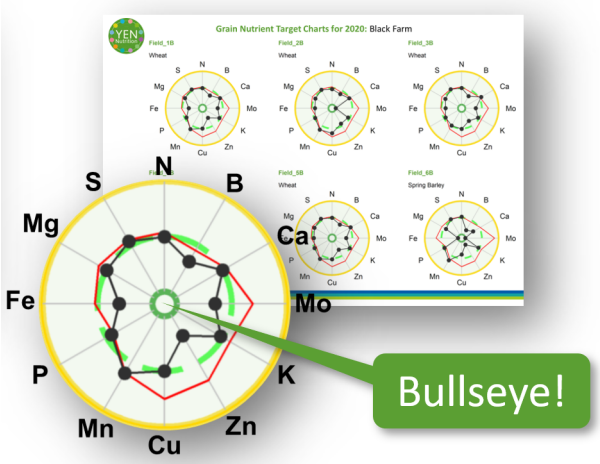
Keys to Chart



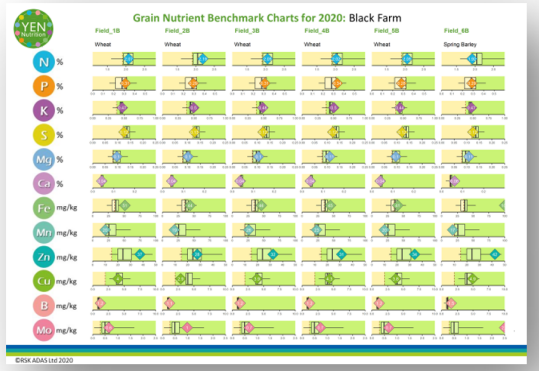
Yield Charts



Target Charts



Nutrient Benchmarking



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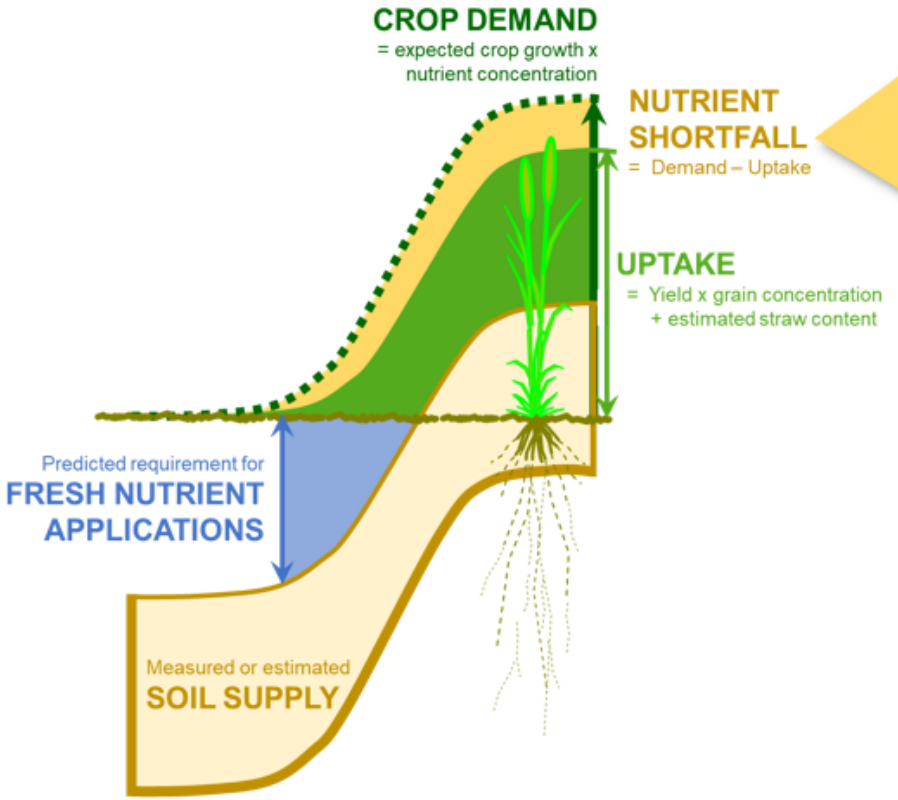
Interpretation of yield and crop nutrient status

If yields were below expected, this report should help to identify if this was due to crop nutrient shortfalls, so should improve future management. For this, three things must be judged **before growth starts**:

1. **Crop Demand** estimated from expected (or potential) yields and threshold nutrient concentrations
2. **Soil Supplies** estimated from previous nutrient balances by soil type & organic matter content, or by analysis for available SMN, P, K & Mg. Most nutrients are held in topsoils; subsoils are mainly important for supplies of moisture & (some) N.
3. **Effectiveness of fresh nutrient sources:** availabilities from organic manures & manufactured fertilisers must be set to at least match crop nutrient requirements (difference between Crop Demand & Soil Supply).



Nutrient shortfalls

… may have any of many causes:

- over-winter leaching,
- soil fixation or immobilisation (e.g. P quickly becomes fixed in calcareous soils),
- inadequate application, or use of an ineffective material,
- insufficient spring & summer topsoil moisture for microbial activity, nutrient release & mobility, or …
- inadequate rooting.

To assess success at harvest

benchmark your crops' performance, focussing on:

1. **Grain Yields**
2. **Grain Nutrient Concentrations**
3. **Estimated Nutrient Shortfalls** (Demand minus Uptake)

Grain nutrients are best interpreted alongside assessments of soil nutrient status, and ideally having also assessed topsoil rooting and moisture during the main growth phase of each crop.

More information on YEN Nutrition is at: www.yen.adas.co.uk/projects/yen-nutrition and Nutrient Recommendations in RB209 are provided at www.ahdb.org.uk
Please make any further enquiries to:yen@adas.co.uk

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The twelve essential crop nutrients

Grain N indicates grain protein (N x 5.7 for cereals or N x 6.25 for pulses & oilseeds). Grain N <1.9% (11% protein) indicates that a feed cereal possibly acquired inadequate N (or <12% for milling wheats). AHDB RL protein values provide variety-specific guides.

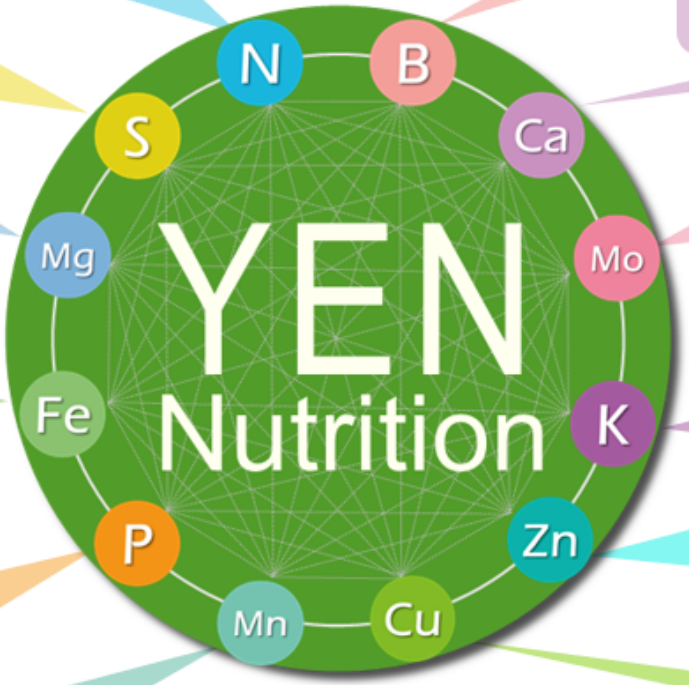
Sulphur (S) should match protein, hence N uptake. Pulses, oilseeds & milling wheats require more S than feed cereals. Grain S <0.12% (or N:S >17) indicates possible yield shortfalls.

About half of magnesium (Mg) uptake is stored in the grain. Mg values <0.08% indicate possible restricted cereal yields, especially if soil Mg is low or crop symptoms were seen.

Only 25% of the crop's iron (Fe) is held in grain at harvest. No critical levels are known. Deficiency causes interveinal chlorosis of the younger leaves and is rare, esp. in cereals.

Grain phosphorus (P) provides a useful check on P sufficiency. If cereals have <0.32%, yield may have been restricted hence crops need further checks on P supply & capture.

About half of manganese (Mn) uptake is stored in the grain at harvest. Mn values less than 20 mg/kg indicate that Mn uptake was probably sub-optimal for yield formation.



Experience of grain boron (B) analysis has shown large variability. Little information is currently available on which to interpret grain B levels.

Less than 20% of a crop's Calcium (Ca) uptake is stored in the grain; as yet, we are unsure whether grain analysis is indicative of a crop's overall Ca capture.

Crops require an order of magnitude less molybdenum (Mo) than of any other nutrient. We do not yet have any information to interpret grain Mo values.

RB209 assumes a standard value of 0.54% potassium (K) in grain. Values <0.38% indicate a need for further checks on K nutrition, especially by soil analysis.

About 70% of crop zinc (Zn) uptake is stored in the grain; cereals with <15 mg/kg are low; however, it is uncertain whether such low values are associated with low yields.

About 60% of copper (Cu) uptake is stored in the grain and less than 2 mg/kg may be regarded as low, and possibly limiting to yield. Such low values have been rare in previous YEN crops.

Independently analysed by NRM, a division of Cawood Scientific Ltd, Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS Tel +44 (0) 1344 886338 Fax + 44 (0) 1344 890972.
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Seasonal Grain Benchmarking explained …

By anonymously sharing your results with others, your crops can be benchmarked against comparable crops *all grown in this season*. This should enable you to identify any peculiarities of your farm or fields, independent of seasonal effects (which were big this year).

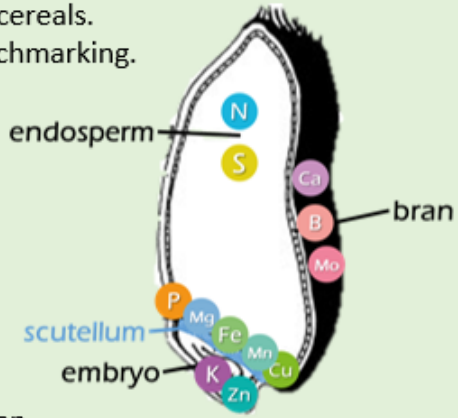
In this report we first benchmark your grain yields, then your grain nutrient concentrations. Comparative 2020 data for all cereals (other than barley) are from wheat crops, for barley are from all barley crops, for all pulses are from all bean crops, and for all oilseeds are from all OSR crops.

Guidance on distribution of nutrients in cereal grains is given below. Help with interpretation is on pages 3 and 4, and explanations of the charts are shown below. We use two different charts for benchmarking – Target Charts give a quick overview of whether any nutrients were low or deficient (i.e. outside the red line), and Benchmarking Charts which compare the actual values from each of your fields with comparative data from the 2020 growing season.

Interpreting grain nutrient concentrations:

- Diagnosis of nutrients in grain is new. So far, critical thresholds are only known for P, N, S & Mn in cereals. Evidence from abroad indicates less certain thresholds for K, Mg, Zn & Cu. No thresholds are known for Ca, Fe, B & Mo in cereals. None are known for non-cereals. Diagnoses are therefore best done by Benchmarking.

- At harvest cereal grain contains most of the crop's uptake of P, N, S, Zn, Cu & Mg, whereas straw contains most Ca, B, K, Mn, Mo & Fe

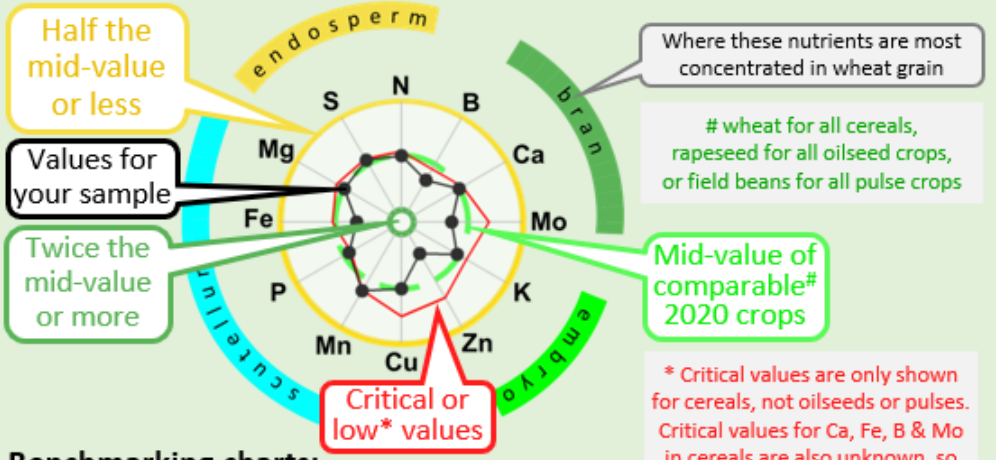


- Grains store most nutrients in the embryo and scutellum. Some are in the bran. Only N & S are mainly concentrated in the starchy endosperm.

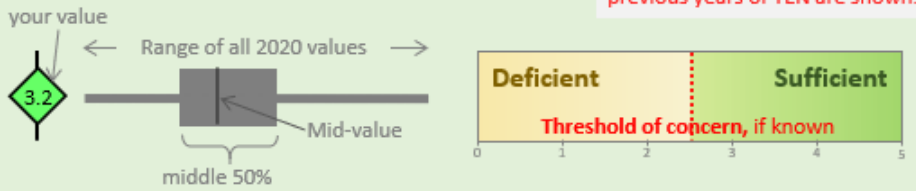
- Benchmarking is best done each season because most nutrient concentrations show some variation between seasons, due to consistently different nutrient uptake and grain-filling conditions.

Explanation of charts:

Target charts: for a quick overview, these compare all your values to mid-values of all comparable 2020 crops. *Your aim should be for all nutrients to be inside the red line, at least … and ideally near the bullseye!*



Benchmarking charts:
comparing your measured values to all others



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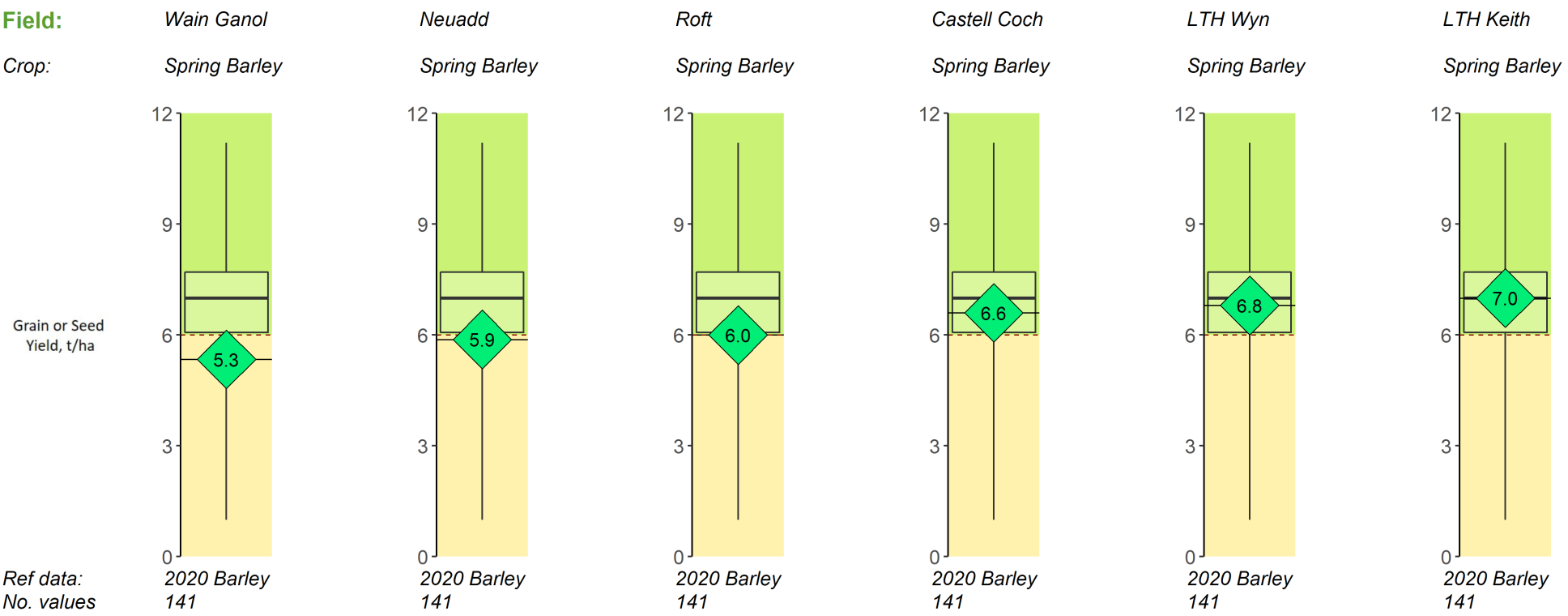
Your Grain Yields benchmarked ...

2019-2020 was difficult for production of grain crops in the UK, and especially for autumn establishment. Also, although crops established successfully in autumn 2019 had similar potential and maximum grain yields to the last five years, average yields were down by around 1 t/ha. Performance of your crops and their nutrition is therefore best assessed through comparisons with other 2020 crops.

The diagrams below benchmark your crop yields against all 2020 yields of similar crops registered for YEN Nutrition in 2020. The reference datasets and their size are shown below each diagram. The same reference datasets are used for Grain Nutrient Benchmarking on later pages.



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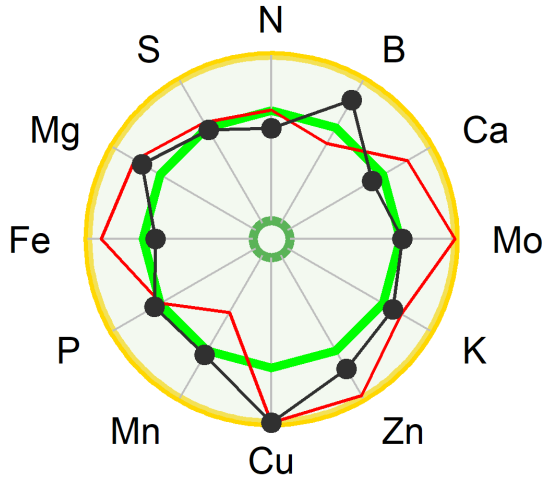
Grain Nutrient Target Charts 2020: TW Jones, 2020

Target Key

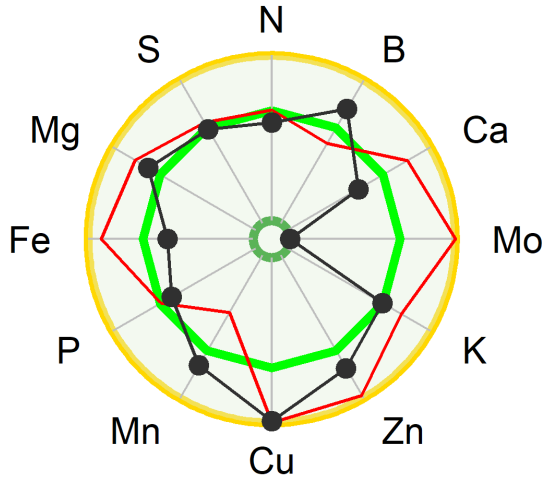
Wain Ganol

Spring Barley



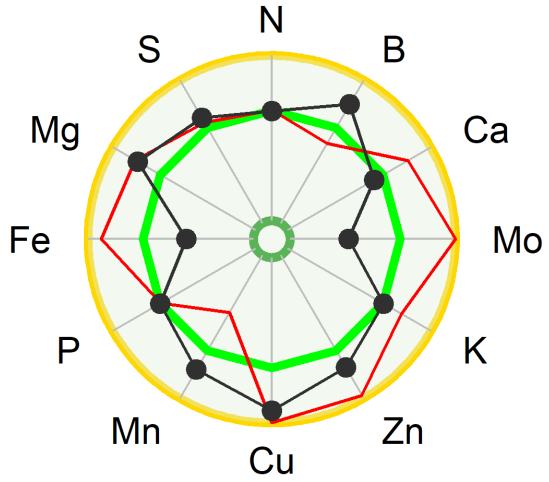
Neuadd

Spring Barley



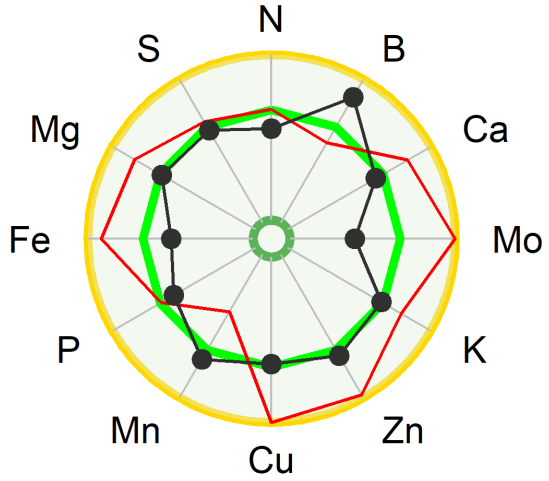
Roft

Spring Barley



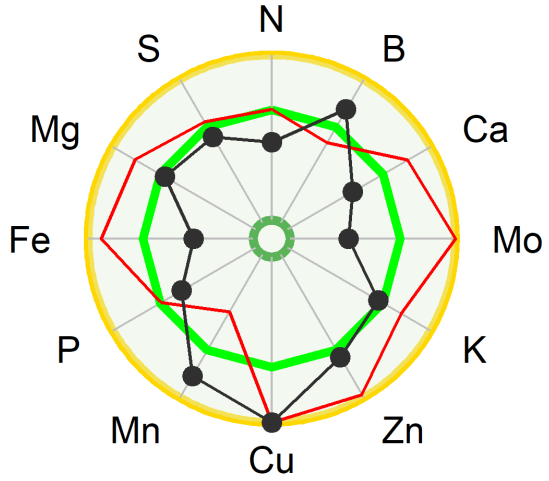
Castell Coch

Spring Barley



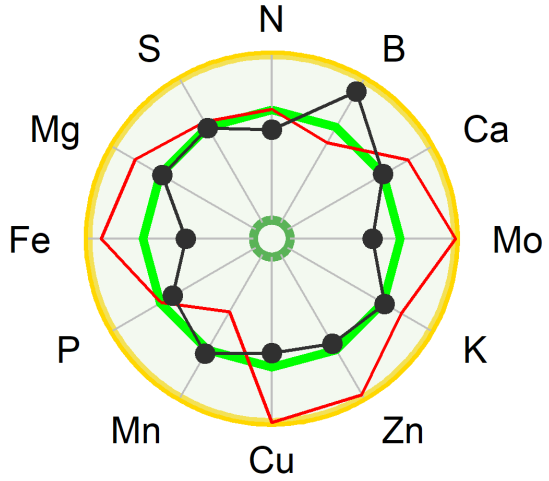
LTH Wyn

Spring Barley



LTH Keith

Spring Barley



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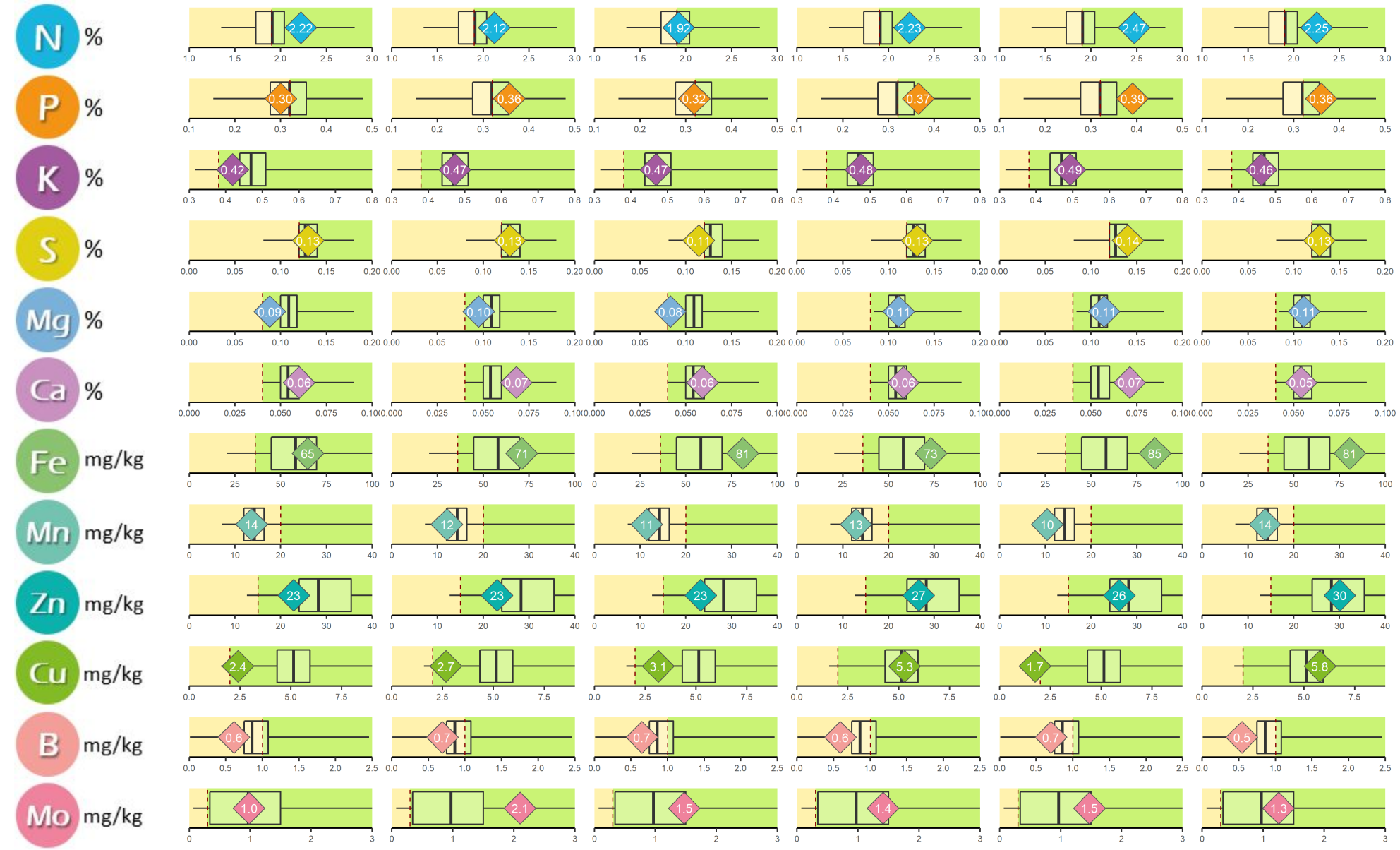
Grain Nutrient Benchmarks Charts 2020: TW Jones, 2020



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