



Cereal Yield Enhancement Network

Yield Contest 2022

Rules and Protocol

GENERAL

- 1 The YEN cereal yield contest is open to any cereal crop. The 'absolute' winner will have the highest weight of grain per unit area expressed at 15% moisture content with less than 2% admixture.
The 'relative' winner will have achieved the highest proportion of the estimated potential grain yield for this season at this location.
- 2 There are two classes of entry into the competition: field yields and research trial yields.
- 3 Field yields can be from whole fields or sub-fields but must be from an area of 2 hectares or more. Entries measuring less than 8 ha will not qualify for submission to the Guinness Book of Records.
- 4 Entry to the competition is by return of Registration Form to Yen@adas.co.uk before 15 July, along with payment (or confirmation that site is sponsored by a Corporate Member). Eligible entrants must provide all information requested on the 'Yield Entry' form, along with a 'grab' sample and a combine grain sample, by 15 October.

YIELD MEASUREMENT

- 5 To be deemed credible, each yield must be determined from a verified area, grain weight and moisture content along with a verified representative grain sample. Verification requirements for field and research trial yields are described separately below.

Field & Sub-Field Yields

- 6 Harvest of fields/sub-fields must be witnessed by an independent verifier. An independent verifier must be nominated in the Yield Entry, along with their profession and contact details. The verifier is responsible for witnessing the harvesting, weighing and sampling. They cannot be related to the entrant, their employees or employers, and cannot have financial or direct business ties to the farm.
- 7 Field or sub-field areas must be recorded by precisely marking their main corners on a satellite image or map, obtaining a verifying signature, and submitting this to ADAS. If a Sub-field area is used, the position of its corners in the field must be measured in relation to obvious landmarks (e.g. distance from hedge, gateway, telegraph poles etc.). Ideally length and width of the area should be measured by measuring tape or measuring wheel. Alternatively, corners can be identified on the plan by their GPS locations to within 1 metre (not from a SatNav or mobile phone). Harvest area and grain yield verification will be assisted by providing combine yield monitor printouts or yield maps.
- 8 Weights for field or sub-field entries must be recorded on a weighbridge, and copies of the weighbridge chits sent to ADAS with the Verifier's signature. Yield verification will be assisted by copies of combine yield monitor print-outs or yield maps. 'Sold' grain weights from delivery advice notes after the harvest date will only be accepted if it can be verified that the grain from the whole field was kept separate, and if weights are supported by yield monitor data.
- 9 A representative grain sample (0.5-1kg) must be taken (bulked from each trailer load) and sent in the plastic bag provided to ADAS for determination of moisture content and admixture.

Tramline Yields

- 10 Tramline yields e.g. from tramline trials, must be verified by the entrant and one independent person.
- 11 Tramline trial yields may be from a selected number of tramlines but their total area must exceed 2 ha. The area(s) need not have been selected before harvest but grab samples must have been taken before harvest to represent this area, then bulked & submitted for analysis. The treatments do not have to be disclosed to ADAS; they can be anonymised e.g. given as treatment numbers.
- 12 Tramline yields will be calculated either as for Field & Sub-Field Yields, by dividing a total weight from a weighbridge by a total area
- 13 Grain moisture contents should be measured at the time of harvest from the chosen tramlines, and results submitted, or a representative grain sample (0.5-1kg) should be bulked from all submitted tramlines and sent in the plastic bag provided to ADAS for determination of moisture content.

Research Yields

- 14 Research trial yields must be verified by 2 people who may, or may not, be independent of the entrant organisation
- 15 Research trial yields may be from a selected treatment or treatment combinations from any trial. They must be averaged from at least 3 replicate plots covering a total minimum area of 50m². The treatment need not have been selected before harvest but grab samples must have been taken from each plot of the treatment, then bulked & submitted for analysis. The trial overall must have a coefficient of variation for grain yield of less than 6%. The plots entered must be from a coherent treatment or treatment combination with replication, they cannot simply be chosen from the highest yielding plots in the trial. An ANOVA must be submitted to ADAS with submitted treatment(s) and coefficient of variation identified. The treatments do not have to be disclosed to ADAS; they can be anonymised / given as treatment numbers.
- 16 Research trial plot yields will be calculated from an area including the adjacent path width if the whole width of plot harvested. The length of each individual plot should be measured to nearest 10cm. The plot width should be measured to nearest 1cm from plot centre to plot centre. The cropped width of the plots should be given to nearest 1cm (i.e. from outside row to outside row) along with uncropped or path width to nearest 1cm. Combine cutter bar width should also be given to nearest 1cm. These lengths and widths must be verified at harvest.
- 17 Weights of fresh grain from each trial plot should be recorded using calibrated plot combine weighing equipment. Copies of the latest weight calibration must be provided, and the weights must be signed by both the entrant and a verifier before submission.
- 18 Moisture contents from each plot determined immediately after harvest should be provided. A representative grain sample (0.5-1kg) should be bulked from each plot and sent in the plastic bag provided to ADAS for determination of moisture content and admixture.

DATA REQUIREMENTS

Information required on registration

- 19 An independent verifier must be nominated with Entry for field yields, along with their profession, mobile number, and email address. The verifier is responsible for witnessing the harvesting, weighing and sampling. They cannot be related to the entrant, their employees or employers, and cannot have financial or direct business ties to the farm. NIAB TAG may be able to verify yield at around 20 sites if practical and on a first-come, first-served basis. Contact Ian Midgley to register your entry. Other options for obtaining verifiers are being explored.
- 20 The location of the site must be given by Grid reference. Grid References may be found at <http://www.gridreferencefinder.com/> and right clicking on the field being entered. This will be used to obtain met data and to check soils info.
- 21 Good soil texture, depth and stone content estimates are vital to the estimation of yield potentials. See The Fertiliser Manual, Appendix One (copied below) for how to estimate soil textures. Depth should indicate the average limit to rooting and should be assessed by reference to the UK Soil Observatory ([here](#)) and (if uncertain) by digging several holes. Stone content can be assessed by comparing with the diagrams below.



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Crop information required

- 22 Entrants must provide dates of sowing, GS31, flowering, complete senescence, ripeness to harvest and actual harvest
- 23 Digital photos of the crop should be taken after flowering (ideally at flowering, but before harvest is acceptable) and submitted as pdfs along with the yield data. Take images at three locations from above the crop looking vertically down, trying to cover as wide an area as possible and including a sheet of A4 paper for scale. Photos at flowering can give an impression of canopy size, nutrition and health, as well as providing an independent assessment of ears per m².
- 24 A grab sample of the crop must be taken a day or two before harvest by cutting ~10 neighbouring shoots at ground level (with a hacksaw blade or similar) at 10 points throughout the area to be harvested, and posting / sending to ADAS in the labelled paper sack (provided by ADAS). Grab samples from research trials should be bulked from ~20 shoots per plot, giving ~60 shoots in total; taking 60 shoots out of ~25,000 will have a negligible effect on grain yield (<0.3%).
- 25 If local rainfall data are not provided, ADAS will obtain rainfall data from the database underlying ADAS-IRRIGUIDE
- 26 Basic agronomic information is requested from all entrants but is not obligatory. Winning entrants will be expected to provide at least some basic information, though product names and rates may be withheld.



ADAS Calculation of Potential Yields

- 27 For each site one potential yield estimate will be provided before harvest based on long-term average weather, and one potential yield estimate will be provided after harvest, based on the harvest year's weather
- 28 Yield potential estimates will be made by ADAS, according to best available information on incident solar radiation and rainfall
- 29 The potential cereal yield will be 60% (an assumed highest harvest index) of the lesser of (i) 60% of the incident solar radiation from September to August inclusive converted at 1.4 g/MJ (an assumed highest season-long radiation conversion coefficient) and (ii) the soil's available water holding capacity to 1.5m, estimated from soil data, plus incident rainfall from April to July inclusive, converted at 5.5 g/litre (an assumed highest season-long water conversion coefficient).

AWARDS

- 30 Gold, Silver and Bronze Awards will be made as follows (prizes not yet determined):
 - Absolute Winner: for highest Field (or sub-field) Yield.
 - Absolute Winner: for highest Research trial Yield.
 - Relative Winner: Highest percentage of potential yield for Field (or sub-field).
 - Relative Winner: Highest percentage of potential yield achieved for Research trial (or sub-field).
- 31 There is no restriction to the number of entries per farm or per entrant.
- 32 However, each farm can only win one award (either gold, silver or bronze) in each category. An entrant can submit entries from more than one farm and can win more than one award (gold, silver or bronze) in a category if these come from different farms.
- 33 If an entry has won the highest yield, it may also win the highest percentage of potential yield.
- 34 All wheat entries for which grain samples are received will be considered by UK Flour Millers for the Wheat Quality Awards. A shortlist will be drawn up from information on variety, protein and specific weight. Gold, Silver and Bronze awards will then be made according to the results of baking tests. Awards will be announced early in the New Year.

SUMMARY

Commitments from entrants

- Register and pay (if not sponsored by Corporate Member) by 15 July
- Provide contact details and site location
- Provide verifier details
- Provide soil information
- Provide basic crop information: (variety, sowing date, date GS31, flowering date, senescence date, harvest maturity date, harvest date)
- Provide digital photos taken in March
- Provide digital photos taken at / after flowering
- Provide grab samples taken before harvest
- Provide verified measures of harvested area
- Provide verified measures of harvested weight
- Provide representative combine grain sample
- If field entry, send signed 'Yield Entry' sheet, plan, weighbridge tickets, digital photos, grab sample and grain sample by 15 Oct
- If trial entry, send signed 'Yield Entry' sheet, copy of calibration, datafile, digital photos, grab sample and grain sample by 15 Oct
- Provide 'Agronomy' information (optional for all but obligatory for winners of gold, silver & bronze awards)

What entrants will receive

- Access to YEN website and Newsletters
- PDF copy of the HGCA Wheat Growth Guide
- Entry into Yield competition
- Protocols for crop sampling & yield measurements, with labelled sample bags
- Attendance at autumn conference to receive site-specific yield report, hear competition results & share ideas
- Each site-specific yield report will include:
 - Soil information including available water holding capacity
 - Average potential yield for site
 - Potential yield for this harvest season
 - Verified actual yield
- Grain Yield Analysis including:
 - Dates of sowing, GS31, GS61, complete senescence & harvest maturity
 - Length of foundation stage, construction phase and grain filling (calendar days and thermal time?) Crop height (cm)



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Total dry matter per shoot (g)
Grain dry matter per shoot (g)
Harvest Index
Dry matter per grain (mg (& TGW g))
Grains per ear
Ears per m²
Total crop Biomass (t/ha)
Straw yield (t/ha)
Grain N%, Grain protein %
Straw N%
N Harvest Index
Grain N offtake (kg/ha)
Total N uptake (kg/ha)
How crop characteristics above relate to benchmarks (in the AHDB Wheat Growth Guide) and to other YEN crops in this season
Photos of crop at flowering
Brief commentary on how the entered crop performed, explaining yield achieved, noting anything exceptional and suggesting how yield may be improved



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What ADAS & partners will do

- Validate soil description against soil survey information
- Collate long term weather data for site
- Collate harvest-season weather data for site
- Calculate potential yield using average weather
- Calculate potential yield using harvest season weather
- Send protocols for crop & yield measures
- Send labelled plastic bag for grain sample
- Send labelled paper sack for grab sample
- Advise on verification arrangements
- Determine grain moisture and admixture of grain sample
- Check areas & weights and calculate combine grain yield
- Process grab samples: count shoots, measure height, separate ear and stem, weigh, oven dry, weigh, thresh ears, dry & weigh grain, count grains, submit grain & straw for N% analysis
- Calculate harvest index, yield components and N uptake
- Collate crop and agronomy information
- Produce brief report for each entry giving yield potentials, yield achieved, crop data collated and analysis of yield
- Identify winners of highest yields and highest percentage of potential yields
- Analyse all data to explain the season's yields in general, to understand how high yields were achieved & suggest how yields may be improved. Present results, findings & awards at November Conference & facilitate sharing of ideas.

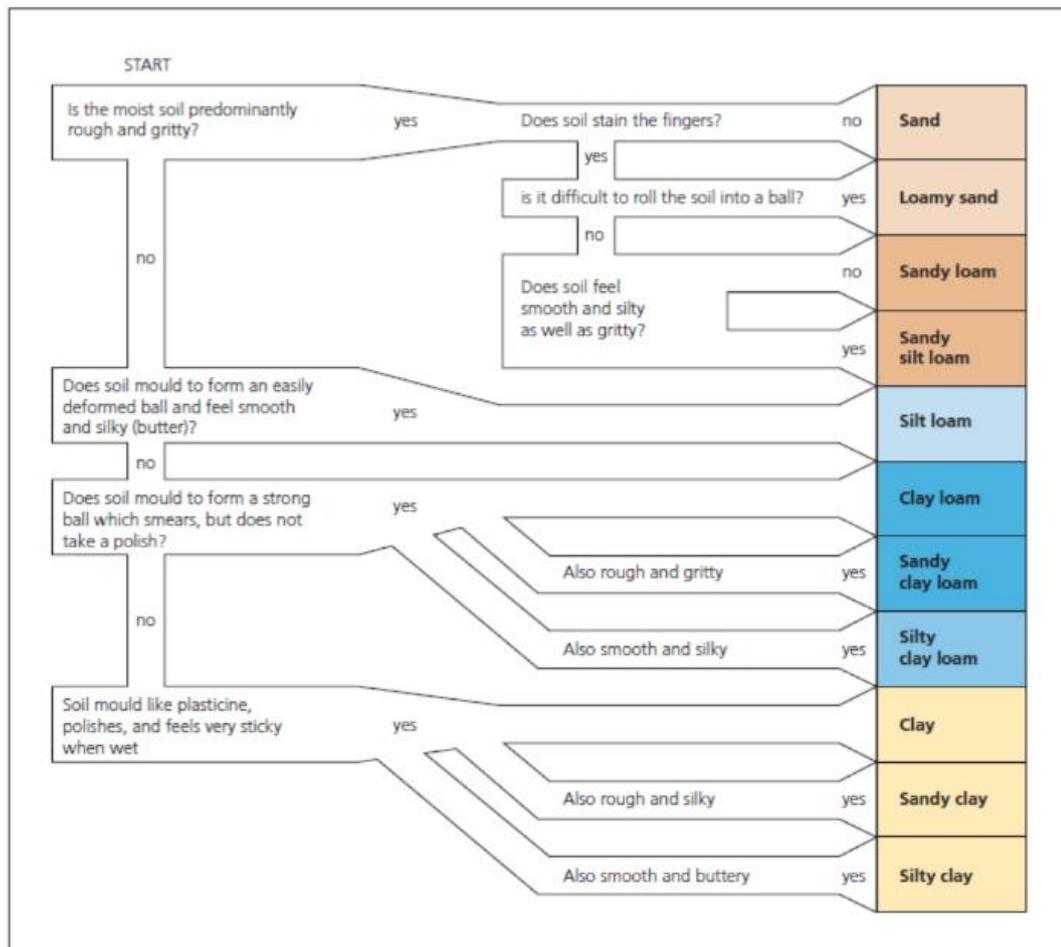


Appendix 1 - From The Fertiliser Manual (RB209), Defra 2010

Assessment of Soil Texture

Accurate measurement of soil texture requires laboratory analysis, but for practical purposes texture can be assessed by hand using the following method:

Take about a dessert spoonful of soil. If dry, wet up gradually, kneading thoroughly between finger and thumb until soil crumbs are broken down. Enough moisture is needed to hold the soil together and to show its maximum stickiness. Follow the paths in the diagram to get the texture class.



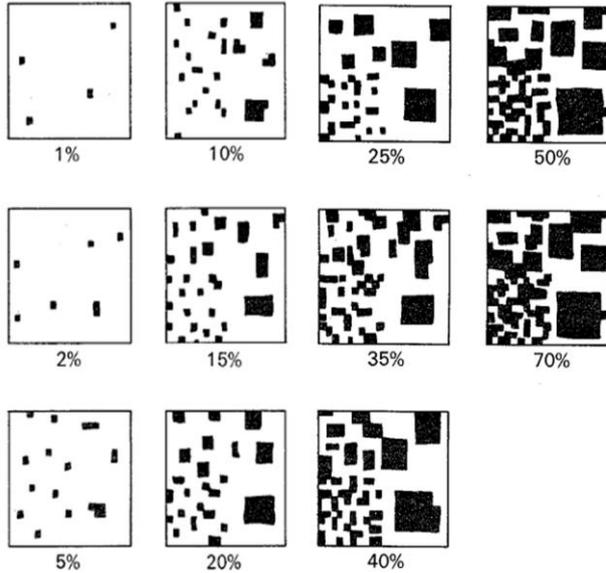
A texture triangular diagram, defining the particle size distribution for each named texture class, is given in Appendix D of *Controlling Soil Erosion (MAFF PB4093)*.



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Assessment of stone content

Chart for estimating mottles, stones, nodules etc.



Each quarter of any one square has the same area of black