



Lessons from the Bean YEN 2022 – Physiological characteristics of high yielding bean crops

At the end of 2022, the [Bean YEN](https://www.yen.adas.co.uk/resources/pulse-yen-2022-end-year-meeting) yield set increased to 106 yields, allowing us to take a deeper dive into the data and further investigate the characteristics associated with the higher yielding crops. This article focuses on crop physiology but more info on nutrition and other crop parameters can be found here: <https://www.yen.adas.co.uk/resources/pulse-yen-2022-end-year-meeting> .

The **principal components of yield** are **seeds/m²** (the number of seeds per unit area in the crop at harvest) and **seed size** (often measured as TSW). **Seeds/m²** results from a combination of **plants/m²**, **shoots per plant**, **Pods per shoot** and **seeds per pod**. A summary of the key yield component results from the Bean YEN are below. Whilst these yield components can be measured in any single crop, it should be noted that extra value arises from benchmarking your own crop with others, so you can see whether these factors in your crop are on the low or high side given the unique conditions of that particular year. Benchmarking nutrition and agronomy choices can give immediate comparisons to other crops, and as development of each yield component (e.g plant population, shoots per plant, pods per shoot, seeds per pod, seeds per m² at harvest and seed size) occurs during different phases of growth, this means the analysis of these characteristics can indicate when a crop may have been positively or adversely affected by management or conditions.

Bean YEN Crop Development *

- Spring beans: Higher yields were associated with earlier sowing (-0.03 t/ha per day after the YEN average), later senescence and a longer growing season
- Winter beans: low sample size restricted our analysis on growth stages

Yield Components*

- In spring beans higher yields were positively associated with the following yield components:
 - Pods/shoot, seeds/pod and seeds/m², but not plants per m² or shoots per plant
 - Bean seed size (TSW)
 - Plant height, individual plant and shoot biomass, crop biomass and Harvest Index
- Similar associations were found in winter beans
 - but negative association with shoots per plant and no effect of pods/shoot

Conclusions

- The higher yields come from large well podded plants with several seeds per pod and fewer, but larger, stems per plant - Maximise light capture and avoid stress through flowering to increase sink size
- Seed filling important for seed size - Avoid stress during seed fill and maximise canopy duration

**It should be noted that the analysis used is an association analysis and cannot disentangle cause and effect (cannot say what is driving yield) but combined with expert judgement we should be able to develop practical messages. 'Effect sizes' help explain the average variation of an average yield, but it should be remembered that many factors will be influencing yield. A straight line is fitted to give the REML effect size above the average, but in reality, effects may level off eventually. Whilst associations with higher yields were seen in earlier sown crops in the YEN, the importance of ensuring the crop goes into the best seedbed and soil conditions as possible should not be overlooked.*



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