Bean YEN Entry Protocol

Welcome to the Bean Yield Enhancement Network (YEN) 2022

Contents

GENERAL INFORMATION

Welcome to Bean YEN 2022, the fourth year of Bean YEN. We're excited to be broadening out the Bean YEN this season to include more growers. A separate checklist of YEN tasks is available for both spring and winter Bean YEN entries. There may be some optional extras available throughout the season which become available (any updates will be emailed to entrants).

SOIL SAMPLING KIT

As part of the YEN, NRM provide free soil assessments for YEN entries up until the end of April. Soil samples after April are still encouraged but will need to be paid for. Once you have registered and confirmed the postal address, a soil sampling kit will be sent to you. Top Tips for sampling soils for YEN are given below; all images in this section are curtesy of NRM.

Top Tips for sampling soils for the YEN

Where & how to sample

- Make sure you have a suitable soil corer or auger for your sampling depth. The sampling depth can be 0 - 15 cm or 0 - 23 cm if the land has been ploughed in the last few years, but should be 0 - 23 cm if min-till or no-till cultivations have been used recently.
- To avoid cross contamination, clean your soil auger and bucket between sampling areas.
- The sample should be taken to represent the whole YEN-entered area. Take 20-25 cores from sampling points forming a 'W or M' pattern across the area.
- Avoid taking samples from headlands, or in the surrounding areas which will not be included in the YEN-entered area (please refer to diagram below).

Preparing & labelling your sample

- Remove all roots, plant material or accumulated surface organic matter in the sample and mix together the sub-samples from all 20-25 positions in a clean container to form a representative sample. See images before and after sample preparation below.

Before sorting and mixing   After sorting and mixing

Place approximately 300g in the packaging provided by NRM (either box or medium grip-seal bag filled to top of middle line)

- Clearly label and seal each sample with your YEN entry number (e.g. BF00XXX) and field name (e.g. Big Field)
- Paperwork (provided by NRM) must accompany the samples.

BEAN YEN ONLINE FORMS

We are collecting Bean YEN entry information such as site details, crop observations, agronomy and yield using online forms. Links to these forms will be made available once you have registered. Please also be aware that once registered, you will receive an automated email confirming your registration along with your YEN **ENTRY ID** (please check your spam/junk folder if an email has not been received within an hour).

Please use this entry ID and the links to the forms to submit your Bean YEN data. For further information or any questions please get in touch at **beanyen@adas.co.uk**.

Site Visits and Crop Observations

This information allows us to understand how a bean crop develops in different situations, helping us understand constraints to yield. All the information you collect can be returned via the online form system and site visit dates are listed below (numbered 1 to 5). The progress of the online forms can be saved, so information can be entered throughout the season. Growth stage information can be found in Appendix 1.

As well as the actions listed under 1-5, there is an option to record further information at each site visit including:

- Score overall appearance of crop
- Score weeds, pests (birds and insects), diseases and viruses
- Control strategy or other notes, if applicable

The PGRO Pea and Bean Guide App

PGRO have developed a free agronomy app, which will be useful in the field. It can aid with pest and disease recognition and is capable of recording and submitting reports of pests and diseases. There is also a built in growth stage guide. The app is available for both Android and Apple devices.

1. Full emergence GS 10 (March /April)

- Record the date of full emergence **(GS 10).** If this is missed please record the growth stage on the date you visit.
- Carry out plant counts.
    - In five locations, using a meter stick or quadrat count the number of plants in a 1 m^2 area. If it's easier, use a 0.25 m^2 quadrat to count the number of plants and multiply that number by 4 to get the number of plants in 1 square metre. Please record the count in each individual location.
- **Alternatively,** plant counts can be calculated from photographs. Take images at three locations from within the 2ha area entered in the YEN. Take the photo from above the crop looking vertically down, showing as wide an area as possible. It is important to include an A4 piece of paper flat on the ground for scale. See examples in Figure 1. Photos can be uploaded using the online forms.
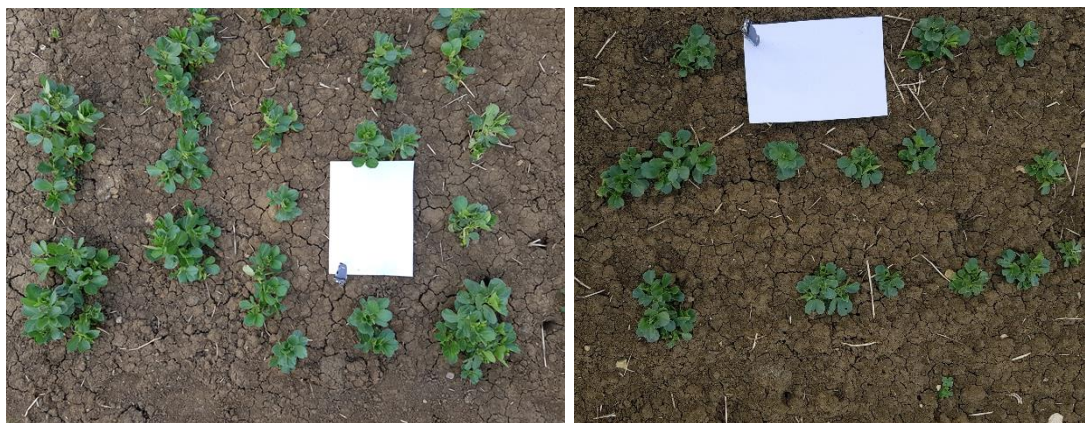

Figure 1. Example photographs for plant population estimate

2. Start of nodulation, Fourth Node (April/May)

- Record date of 4th node - start of nodulation **(GS 34)**
- Collect a representative **leaf tissue sample**, following the method described below.

Leaf Tissue sampling

As part of Bean YEN Lancrop/YARA provide free tissue testing for YEN entrants. Once you have registered you will be sent sampling kits.

At each sampling timing:

- Sample and send Monday to Wednesday to avoid the sample being in the post over the weekend.
- Within your YEN area walk up 2 to 4 representative tramlines and sample tissue at regular intervals from between 5 - 20 points along the sampling path.
- At each sampling site select several plants at the same stage of development and sample the youngest mature leaf without the petiole (first fully expanded leaves away from the growing point) until you have between 300g – 400g of material.
- Avoid leaves showing pest, disease or other damage. Take leaves only, not stems.
- Mix the leaves thoroughly, if wet blot the leaves dry with a paper towel and place into a sample bag, squeezing out the excess air and sealing.

- If foliar nutrition is to be applied to the crop at flowering, please take the second tissue sample **before** any flowering foliar nutrient sprays are applied.

- Fill in the order form including crop and growth stage. **Include your email to ensure you get the results.**

- Place the sample bag and the order form into a Lancrop/Yara pre-paid envelope and post. **Do not put the order form inside the bag with the sample as it may get wet.**

3. First flower (May/June)

- Record date of 1st flower seen sporadically within the crop **(GS 60)**.
- Collect a representative **leaf tissue sample**, as outlined above. If foliar nutrition is to be applied to the crop at flowering, please take the second tissue sample **before** any flowering foliar nutrient sprays are applied.

4. End of flowering

- Record date when crop is out of flower **(GS 69)**.

5. Pre-harvest & harvest (July/August)

- Around one week prior to harvest, take a **Grab sample** of 25 plants. The representative sample should be taken from inside the 2 ha area ensuring that all stems and any branches are collected from 5 plants in 5 locations. The plants should be placed into the large sack provided as part of the harvest pack, and posted to ADAS Gleadthorpe with the address sticker provided. More information on grab sampling will be sent with the harvest pack later in the season.
- Record date when crop is first ripe for harvest, full senescence **(GS 97)**.

- Record actual harvest date **(GS 99)**.
- Provide accurate yield information from either
    a. Whole field of known area with total weights from weighbridge tickets or calibrated combine yield monitor
    b. A selected area with minimum size of 2ha, marked out and measured, with total weights from weighbridge or calibrated yield monitor
    c. Area of a yield map (calibrated yield monitor) ensuring data from cuts of full header width only.
- Record harvest losses by counting number of beans in an A4 paper sized area at 5 locations directly behind the combine and 5 locations between the swaths (ie where beans would only be present by shattering before entering combine, not due to losses over the sieves.) Subject to amendment in the harvest pack.
- Retain combine samples in the bags provided (the **seed sample**) and forward to the appropriate laboratories for analysis as detailed in the harvest pack provided.

Bean YEN HARVEST PACK

Prior to harvest you will receive the Harvest Pack, sent to the address indicated upon registration.

The Harvest Pack will contain:

1. Further guidance on collecting grab and grain samples.

2. Pre-labelled potato sacks, for the grab sample just before harvest.

3. Pre-labelled polythene bags, for the grain samples at harvest.

CONTACTS

Thomas Wilkinson	Thomas.Wilkinson@adas.co.uk	07503570264
Shona Duffy	Shona@pgro.org	07854655331
Charlotte White	Charlotte.White@adas.co.uk	07774701619

Or email beanyen@adas.co.uk for general enquiries. 🐦 @adasYEN

Further information can be found at www.yen.adas.co.uk

Phenological growth stages and BBCH-identification keys of faba bean (Vicia faba L.)

Faba bean Weber and Bleiholder, 1990; Lancashire et al., 1991

Code   Description

Principal growth stage 0: Germination

00	Dry seed
01	Beginning of seed imbibition
03	Seed imbibition complete
05	Radicle emerged from seed
07	Shoot emerged from seed (plumule apparent)
08	Shoot growing towards soil surface
09	Emergence: shoot emerges through soil surface

Principal growth stage 1: Leaf development[1]

10	Pair of scale leaves visible (may be eaten or lost)
11	First leaf unfolded
12	2 leaves unfolded
13	3 leaves unfolded
1 .	Stages continuous till . . .
19	9 or more leaves unfolded

Principal growth stage 2: Formation of side shoots

20	No side shoots
21	Beginning of side shoot development: first side shoot detectable
22	2 side shoots detectable
23	3 side shoots detectable
2 .	Stages continuous till . . .
29	End of side shoot development: 9 or more side shoots detectable

Principal growth stage 3: Stem elongation

30	Beginning of stem elongation
31	One visibly extended internode[2]
32	2 visibly extended internodes
33	3 visibly extended internodes
3 .	Stages continuous till . . .
39	9 or more visibly extended internodes

[1] Stem elongation may occur earlier than stage 19; in this case continue with the principal stage 3

[2] First internode extends from the scale leaf node to the first true leaf node

Principal growth stage 5: Inflorescence emergence

50   Flower buds present, still enclosed by leaves

51   First flower buds visible outside leaves

55   First individual flower buds visible outside leaves but still closed

59   First petals visible, many individual flower buds, still closed

Principal growth stage 6: Flowering

60   First flowers open

61   Flowers open on first raceme

63   Flowers open 3 racemes per plant

65   Full flowering: flowers open on 5 racemes per plant

67   Flowering declining

69   End of flowering

Principal growth stage 7: Development of fruit

70   First pods have reached final length ("flat pod")

71   10% of pods have reached final length

72   20% of pods have reached final length

73   30% of pods have reached final length

74   40% of pods have reached final length

75   50% of pods have reached final length

76   60% of pods have reached final length

77   70% of pods have reached final length

78   80% of pods have reached final length

79   Nearly all pods have reached final length

Principal growth stage 8: Ripening

80   Beginning of ripening: seed green, filling pod cavity

81   10% of pods ripe, seeds dry and hard

82   20% of pods ripe, seeds dry and hard

83   30% of pods ripe and dark, seeds dry and hard

84   40% of pods ripe and dark, seeds dry and hard

85   50% of pods ripe and dark, seeds dry and hard

86   60% of pods ripe and dark, seeds dry and hard

87   70% of pods ripe and dark, seeds dry and hard

88   80% of pods ripe and dark, seeds dry and hard

89   Fully ripe: nearly all pods dark, seeds dry and hard

Principal growth stage 9: Senescence

93   Stems begin to darken

95   50% of stems brown or black

97   Plant dead and dry

99   Harvested product

Faba Bean