



Pea YEN Entry Protocol

Welcome to the Pea Yield Enhancement Network (YEN) 2022

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GENERAL INFORMATION

Welcome to Pea YEN 2022. We're excited to be broadening out the Pea YEN this season to include more growers. A separate checklist of YEN tasks is available for Pea 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

Soil samples after End-April are still encouraged but may incur a charge.

PGRO also analyse soil foot rot risk analysis as part of the Pea YEN until the end of April.

Once registered, NRM and PGRO soil-sampling kits will be sent to you and samples should be collected using the recommended protocol detailed below. Both soil samples can be collected at the same time.

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 courtesy of NRM.



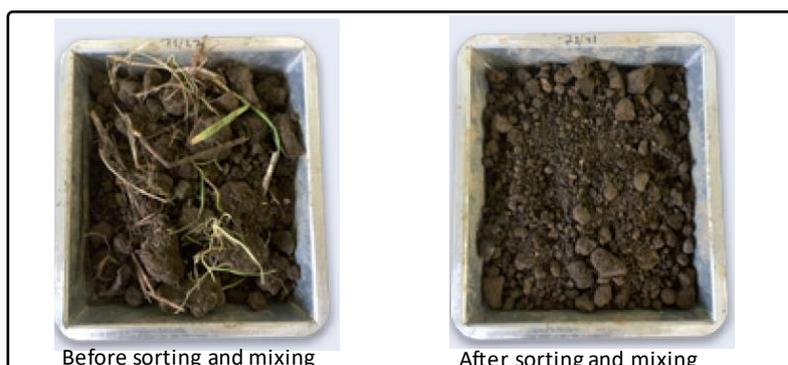
Top Tips for sampling soils for the YEN

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.



For the NRM sampling kit

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. PF22XXX) and field name (e.g. Big Field)
- Paperwork (provided by NRM) must accompany the samples.

For the PGRO foot rot sample kit:

Place approx. 500g processed soil into one of the ziplock bags, affix the Pea YEN entry code sticker (e.g PF22XXXX) to the outside of that bag and seal the bag. Next place all of this inside the second sample bag and seal the second bag.

- Use the pre-paid self-return sticker and envelope to return the soil sample to PGRO.

PEA YEN ONLINE FORMS

We are collecting Pea 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 peayen@adas.co.uk.

Site Visits and Crop Observations

This information allows us to understand how a pea 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 at least five locations, using a meter stick or quadrat count the number of plants in a 1 m² area. If it's easier, use a 0.25 m² 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 and including 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 Pea YEN Lancrop/YARA provide free leaf tissue testing for YEN entrants. Once you have registered you will be sent sampling kits. To speed up collection at GS34 we have amended the sampling protocol for **GS34**.



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 GS34** at each sampling site select several plants at the same stage of development and cut/break off the top **two nodes (4 leaves) with the stems** until you have about 200g of material. Avoid leaves showing pest, disease or other damage.
 - **At GS60** at each sampling site select several plants at the same stage of development and sample the youngest mature compound leaf (see diagram below) until you have about 200g of material. **Take leaves only, not stems.** Avoid leaves showing pest, disease or other damage. 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.



Diagram of pea plant indicating with the arrow, the youngest mature compound leaf, which is to be sampled for tissue testing **at GS60**

- At both timepoints: 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.
- 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 and full flower (May/June)

- Record date of 1st flower seen sporadically within the crop (**GS 60**). Collect a representative **leaf tissue sample**, as described 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 (June)

- 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**).
- Mark out 2 ha area if not already in place.
- Record moisture content of harvested load.
- Collect accurate yield information via
 - 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.
- Retain a combine samples in the bags provided (the **seed sample**) and forward to the appropriate laboratories for analysis as detailed in the harvest pack provided.

PEA 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. One pre-labelled potato sack per entry, 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
Keith Costello	keith.r.costello@btinternet.com	07712120135
Charlotte White	Charlotte.White@adas.co.uk	07774701619

Or email peayen@adas.co.uk for general enquiries.  @adasYEN

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



Appendix 1- Growth stages key

Pea Weber and Bleiholder, 1990; Feller et al. , 1995 b

Phenological growth stages and BBCH-identification keys

of pea

(*Pisum sativum* L.)

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 breaking through seed coat
- 08 Shoot growing towards soil surface; hypocotyl arch visible
- 09 Emergence: shoot breaks through soil surface ("cracking stage")

Principal growth stage 1: Leaf development

- 10 Pair of scale leaves visible
- 11 First true leaf (with stipules) unfolded or first tendril developed
- 12 2 leaves (with stipules) unfolded or 2 tendrils developed
- 13 3 leaves (with stipules) unfolded or 3 tendrils developed
- 1.... Stages continuous till . . .
- 19 9 or more leaves (with stipules) unfolded or 9 or more tendrils developed

Principal growth stage 3: Stem elongation (Main shoot)

- 30 Beginning of stem elongation
- 31 1 visibly extended internode¹
- 32 2 visibly extended internodes¹
- 33 3 visibly extended internodes¹
- 3.... Stages continuous till . . .
- 39 9 or more visibly extended internodes¹

Principal growth stage 5: Inflorescence emergence

- 51 First flower buds visible outside leaves
- 55 First separated flower buds visible outside leaves but still closed
- 59 First petals visible, flowers still closed

¹ The first internode extends from the scale leaf node to the first true leaf node

Principal growth stage 6: Flowering

- 60 First flowers open (sporadically within the population)
- 61 Beginning of flowering: 10% of flowers open
- 62 20% of flowers open
- 63 30% of flowers open
- 64 40% of flowers open
- 65 Full flowering: 50% of flowers open
- 67 Flowering declining
- 69 End of flowering

(*Pisum sativum* L.)

Code Description

Principal growth stage 7: Development of fruit

- 71 10% of pods have reached typical length; juice exudes if pressed

- 72 20% of pods have reached typical length; juice exudes if pressed
- 73 30% of pods have reached typical length;
juice exudes if pressed. Tenderometer value: 80 TE
- 74 40% of pods have reached typical length;
juice exudes if pressed. Tenderometer value: 95 TE
- 75 50% of pods have reached typical length;
juice exudes if pressed. Tenderometer value: 105 TE
- 76 60% of pods have reached typical length;
juice exudes if pressed. Tenderometer value: 115 TE
- 77 70% of pods have reached typical length.
Tenderometer value: 130 TE
- 79 Pods have reached typical size (green ripe); peas fully formed

Principal growth stage 8: Ripening of fruit and seed

- 81 10% of pods ripe, seeds final colour, dry and hard
- 82 20% of pods ripe, seeds final colour, dry and hard
- 83 30% of pods ripe, seeds final colour, dry and hard
- 84 40% of pods ripe, seeds final colour, dry and hard
- 85 50% of pods ripe, seeds final colour, dry and hard
- 86 60% of pods ripe, seeds final colour, dry and hard
- 87 70% of pods ripe, seeds final colour, dry and hard
- 88 80% of pods ripe, seeds final colour, dry and hard
- 89 Fully ripe: all pods dry and brown. Seeds dry and hard (dry ripe)

Principal growth stage 9: Senescence

- 97 Plants dead and dry
- 99 Harvested product

Phenological growth stages of pea

