Pea YEN Simple Protocol

Welcome to the Pea Yield Enhancement Network (YEN)

CONTENT

IMMEDIATE ACTIONS

- ☐ Collect and return your soil sample
- ☐ Complete and return application form

PRE-HARVEST ACTIONS

- ☐ Take overhead crop photo at GS10
- ☐ Record dates of crop growth stages
- ☐ Collect and send tissue samples at GS34 and GS51
- ☐ Collect and send grab sample just before harvest

POST-HARVEST ACTIONS

- ☐ Collect and return grain sample at harvest
- ☐ Complete and return the Entry Pack
- ☐ Return Yield Entry Form

DO-IT dates		… and the Final day
APRIL	Return Soil Samples and GS 10 overhead photos	30 APRIL
APRIL/MAY	Return tissue sample GS34	30 MAY
MAY/JUNE	Return tissue sample GS51	30 JUNE
SEPTEMBER	Return Grab and Grain samples	30 SEPTEMBER
SEPTEMBER	Return Yield Entry Form	15 OCTOBER

GENERAL INFORMATION

Welcome to Pea YEN 2019. We're excited to be broadening out the pea YEN this season to include more growers. There are a couple of optional extras available and these include:

- PGRO testing your soil for foot rot pathogens. If you would like this please get in touch with Keith Costello to arrange this.
- Pea Moth Traps. These will require intensive monitoring, every two days between May and July. If you are interested in hosting these traps please contact Keith Costello for further information.

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.

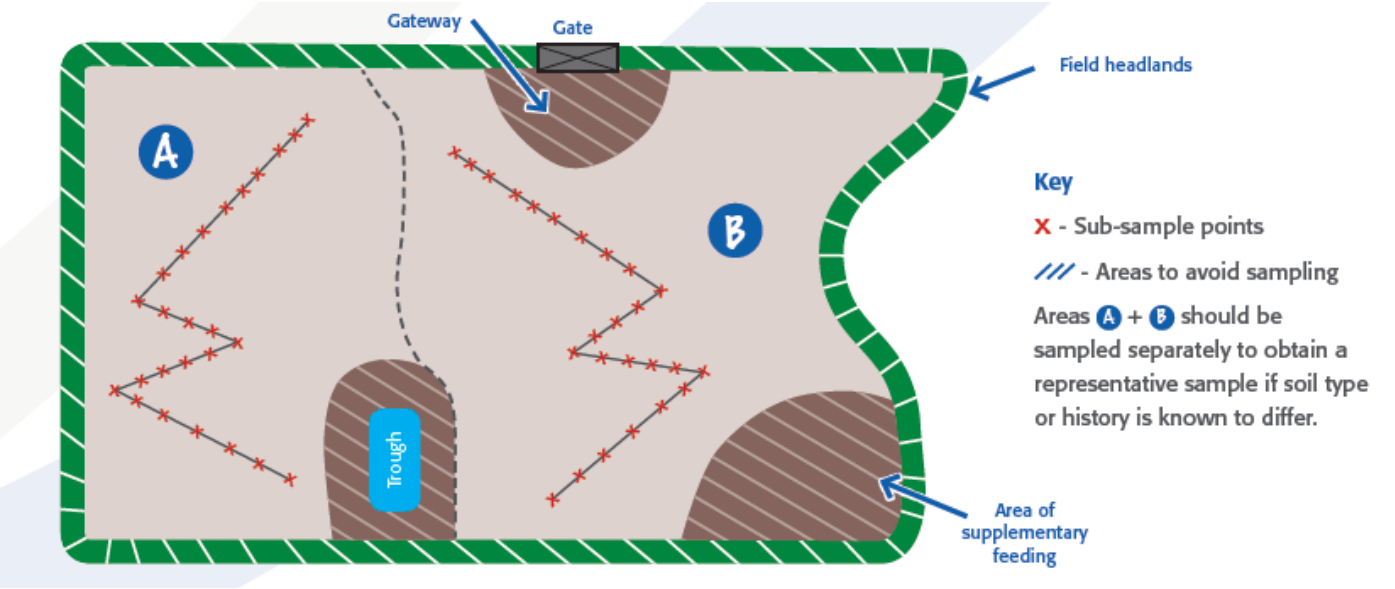
Top Tips for sampling soils for the YEN

Before taking the sample

- A fresh soil analysis on the YEN-entered area is needed to assess soil health etc. Previous soil analyses are only useful if sampling of the YEN-entered area proves impossible.
- Ideally sample by February but leave more than 4 months after P or K fertiliser or lime applications and more than six weeks after any organic manure application. NRM provides free analysis for YEN entrants before May.

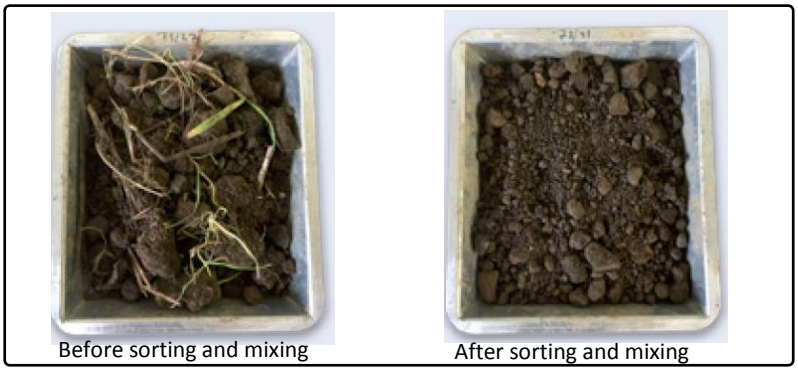
Where & how to sample

- 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 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. PF00XXX) and field name (e.g. Big Field)
- Paperwork (provided by NRM) must accompany the samples.

PEA YEN APPLICATION FORM

Please complete the entry form, which includes the following:

- Grower and agronomist name (if applicable) and contact details.
- Farm address & postcode, grid ref / location of field, field name, previous cropping, pea type and variety name.
- If for whatever reason you're not sending off a soil sample to NRM please give us the results of a current soil sample test prior to any fertilizer application (pre sowing) or from the past 3 years, and tell us where you had this done. However, we encourage you to send a sample to NRM and prefer this option.
- Confirm method of weighing peas from harvested 2 ha area – public or farm weighbridge (preferred option), combine computer for yield mapping, must be calibrated.

Return information to **peayen@adas.co.uk** as soon as completed

PEA YEN ENTRANTS PACK

The Pea YEN Entry Pack will be sent out to entrants after we have received an application form. These contain a number of sections including, the information from the application form, crop observations and actions and crop agronomy. The entrant packs will need updating over the course of the season.

Contact details should be kept up to date to ensure you receive information and sampling packs throughout the season.

Site Visits and Crop Observations

At each site visit:

- Record growth stage (See Appendix 1)
- Score overall appearance of crop:
  - 0 = Crop failure; 1 = Poor; 2 = Satisfactory/Average; 3 = Good; 4 = Very Good; 5 = Excellent
- Score weeds, pests (birds and insects), diseases and viruses:
  - 1 = Present (very); 2 = Present (common); 3 = Present (infrequent); 4 = Present (rare); 5 = None.
- Record control strategy, if applicable
- Record at least 2 photos (panoramic, side on shots with scale if possible) and any other observation of interest (pest, disease, deficiency, etc.)
  - Save and name the photo with your YEN field ID number and the month e.g. PF000XXX
  - Send the images as jpeg files to peayen@adas.co.uk

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 sowing date
- Record the date of full emergence **(GS 10).** If this is missed please record the growth stage on the date you visit.
- Take overhead photographs. These will be used to estimate the plant population at full emergence.
    - 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.
    - Save and name the photo with your YEN field ID number and the month e.g. PF000XXX
    - Send the images as jpeg files to peayen@adas.co.uk

Figure 1. Example photographs for plant population estimate

- Desired optional extra, carry out plant counts.
    - In the same three locations as the photographs, 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.
    - In an additional seven locations please take a photograph as above and count the number of plants in a 1 m^2 area using a meter stick or a quadrat. 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.

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.
- Set up Pea moth traps up near 2 ha area if using.

Leaf Tissue sampling

As part of Pea 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 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 compound leaf (see diagram below) until you have between 300g – 400g of material.

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

- 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.
- 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 florets visible (May/June)

- Record date when the first florets are visible outside the flower bud **(GS 51)**
- Collect a representative **leaf tissue sample**, as described above.

4. First flower and full flower (May/June)

- Record date of 1st flower seen sporadically within the crop **(GS 60)**.
- Record date of full flower, first 1 inch pod not on the headland **(GS 65)**

5. End of flowering & Senescence (July/ August)

- Record date when crop is out of flower **(GS 69)**.
- Record date of seed senescence **(GS 89)**
- 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, and posted to ADAS Gleadthorpe with address sticker provided.

6. Harvest (July/August)

- 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 (low, medium or high), provide an estimated weight/per m^2 if medium or high.
- Retain a 2 kg combine sample in the bag provided and forward to ADAS Gleadthorpe, Netherfield Lane, Meden Vale, Mansfield, Nottinghamshire, NG20 9PD

PEA YEN HARVEST PACK

Prior to harvest you will receive the Harvest Pack, sent to the address indicated in your Entry Pack.

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. One pre-labelled polythene bag per entry, for the grain sample at harvest.
4. One yield entry form per entry, which should be completed and returned to ADAS as soon as possible. This can either be by post or preferably scanned / photographed and emailed to peayen@adas.co.uk

CONTACTS

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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 internode[1]
32	2 visibly extended internodes[1]
33	3 visibly extended internodes[1]
3….	Stages continuous till . . .
39	9 or more visibly extended internodes[1]
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

‘ 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