Pea YEN Entry Protocol

Welcome to the Pea Yield Enhancement Network (YEN) 2020

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IMMEDIATE ACTIONS

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

PRE-HARVEST ACTIONS

- ☐ Complete 1 m^2 plant counts/ take overhead crop photo at GS10
- ☐ Complete and return entry pack throughout season
- ☐ Record dates of crop growth stages
- ☐ Collect and send leaf tissue samples at GS34 and GS51
- ☐ Collect and send grab sample just before harvest

POST-HARVEST ACTIONS

- ☐ Collect and return grain sample at harvest
- ☐ Make sure the Entry Pack essential for full entry information (blue), and extra network benchmarking information is returned
- ☐ 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	31 SEPTEMBER
SEPTEMBER	Return Yield Entry Form	31 SEPTEMBER

GENERAL INFORMATION

Welcome to Pea YEN 2020. We're excited to be broadening out the pea YEN this season to include more growers. There may be some optional extras available throughout the season which become available (any updates will be emailed to entrants), and currently includes:

- PGRO testing your soil for foot rot pathogens. This requires as soil sample that can be taken alongside the NRM soil sampling as detailed below. A separate sample bag and return sticker to **PGRO** will be sent to entrants once registration has taken place. Please note that the NRM soil sample and the PGRO soil sample packaging will arrive separately.

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 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 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)
- Place approximately 500g in the packaging to return to PGRO
- 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 NRM samples.
- Return the 300g NRM soil sample to NRM and the 500g PGRO sample to PGRO.

Visual Evaluation of Soil Structure (VESS)

The visual evaluation of soil structure is a quick assesment of soil structure. This test is a desired optional extra. If you have the time and are interested, please follow the links below and complete the assessment.

The SRUC webpage for information on VESS ad links to methods and videos click here

To download the pdf of the VESS score chart click here

PEA YEN APPLICATION FORM

Please complete the application form (in excel form format), 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 you are not sending off a soil sample to NRM please provide results from a soil sample test from the field from the past 3 years, including date & lab used.
- Confirm method of weighing peas from harvested area – public or farm weighbridge (preferred option), sold weight, or combine yield monitor (which should 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 are in excel forms and contain a number of sections including, the information from the application form, crop observations and actions and crop agronomy. The entrant packs should be updated over the course of the season by entrants and returned to peayen@adas.co.uk. Some of the information fields in the entrant packs are essential for a completed entry as they allow YEN to calculate potential yields or other data characteristics. These information fields are highlighted in blue within the entry pack and include:

- Topsoil texture
- Subsoil texture
- Depth to underlying rock
- If the depth to underlying rock is less than 1m, then the type of underlying rock
- The entered field location (grid reference/ IACs number/…)
- Plant population count/ photo

Other information fields allow the YEN to benchmark agronomy practices and produce a more complete report for individuals and strengthens the data set of the whole network. We build on the feedback from the previous year's YEN year to improve which benchmarking information is requested.

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

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 entry pack system and site visit dates are listed below (numbered 1 to 6). As well as the actions listed under 1-6, please also use the entry pack system to record any observations at each site visit including:

- Growth stage (See Appendix 1)
- Score overall appearance of crop:
- Score weeds, pests (birds and insects), diseases and viruses:
- Control strategy, 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 sowing date
- 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 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 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

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.

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 about 200g 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 as part of the harvest pack, and posted to ADAS Gleadthorpe with the 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 combine sample in the bag provided (the **seed sample**) 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
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

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

(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