



# Technical Update 46

## Vining Pea - growth & harvest

January 2023

### THE ACCUMULATED HEAT UNIT SYSTEM

Accumulated heat units (AHU) may be defined as the difference between the base temperature for crop growth and the mean of the daily maximum and minimum air temperature. The base temperature is that below which no growth occurs, and it varies between different crop species: in the case of peas it is 4.4°C. So, if the daily mean is 12.5°C and after subtracting the base temperature (4.4°C), 8.1 AHU are recorded. A negative AHU value is NOT subtracted from the running total. To plan sowings it is first necessary to consider the conditions which are to be expected during the vining season. Mean temperatures of 16°C, giving 11.6 AHU, are typical of Eastern England. 11.6 AHUs need to accumulate between drillings. Drillings are likely to be relatively infrequent in February and March but could well be made every second or third day in early May.

Often a credit is given to temperatures below 4.4°C with some growth value, such as 0.5 heat unit values being given to mean temperatures between 2.2°C and 4.4°C. Meteorological Office leaflet No. 10 describes a method of heat unit accumulation based on maximum and minimum temperatures and a base temperature (and or upper limit). The only situation where no heat units are collected is when the maximum temperature falls below the base temperature.

### OBSERVATIONS ON GROWTH

Observations on the development of seedlings, in terms of radicle length and emergence, can be used as a means of checking the influence of weather conditions in relation to growth.

### INTEGRATION OF VARIETIES

By using several varieties and exploiting their maturity differences, more effective use can be made of a limited sowing season. To integrate varieties into a sowing program their maturity must be accurately defined. For example, a variety that is 8 days later to mature than Avola. To ensure that it is ready for harvesting on the day following Avola, sowing of the two must overlap by the equivalent of 8 days' worth of AHU (i.e.  $8 \times 11.6 = 92.8$  AHU).

### IRRIGATION

Vining peas are very responsive to irrigation. However, irrigation rarely increases yield if applied before the start of flowering, unless the seedbed is very dry and adequate germination would not otherwise occur, or if the crop is severely wilted. Peas are most responsive when the first flowers are opening. Irrigation at late flowering or petal fall does not result in a yield increase and may encourage *Botrytis* infection if the weather becomes wet. Irrigation is also beneficial if drought is affecting crops during pod filling, but irrigation when the average TR is around 80 delays the maturity by around 2 days. Typical irrigation amounts are 25 mm at the start of flowering and 30 mm during pod filling.

## TIME OF HARVEST AND PEA TENDEROMETER

The Pea Tenderometer is used to measure the stage of maturity of peas to determine whether they are ready for harvesting. It measures the force required to effect a shearing action through a pea sample. Readings are expressed in tenderometer units. The tenderometer reading (TR) and yield of the cleaned produce are often used to determine grower payments. To ensure individual tenderometers give comparable and consistent readings, they should be checked at the beginning of the season and at further periodic intervals, against a 'master' tenderometer. PGRO maintains the 'master' and offers a standardisation service.

PGRO has undertaken research into the combined use of earth observation, historic crop data and machine learning to enable predictions of maturity to be made in advance of the traditional tenderometer sampling period. Using observations of weather, sowing and flowering dates and geographic information, it is possible to generate estimates of harvest date ( $\pm 1$  day) from the date of full flowering onwards. This advanced forecasting has the potential to significantly reduce TR sampling requirements. Yield prediction is also possible with the additional use of satellite-derived multispectral canopy reflectance data, which gives valuable information on growth stage, water content, health and yield potential of individual crops.

PGRO's Vining Pea Prediction Tool will be made available in 2024 as a maturity and yield forecasting service for processors and growers of vining peas.

## HARVESTING

Complete pea harvesters are in operation throughout the world and combine the operations of picking, threshing and cleaning. Pods are stripped from the vine and transferred by a series of conveyers to the threshing drum, where peas are threshed from the pods. The peas fall through a set of screens that are kept clean by rotating brushes positioned along the length of the threshing drum. The peas and some waste exit the threshing drum and pass through cleaning processes to remove further waste material. Waste material is discharged onto the field, and any unthreshed pods are returned to the threshing drum.

Peas are stored on-board in a hopper before being unloaded.

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