

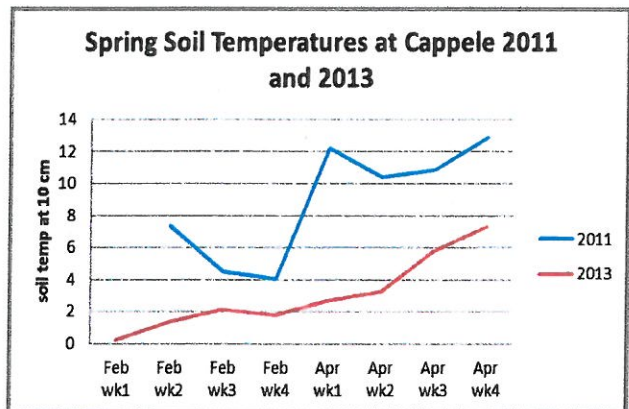
Soil Temperature

Warm soils are key for effective nutrient applications, sowing, crop root and shoot growth.

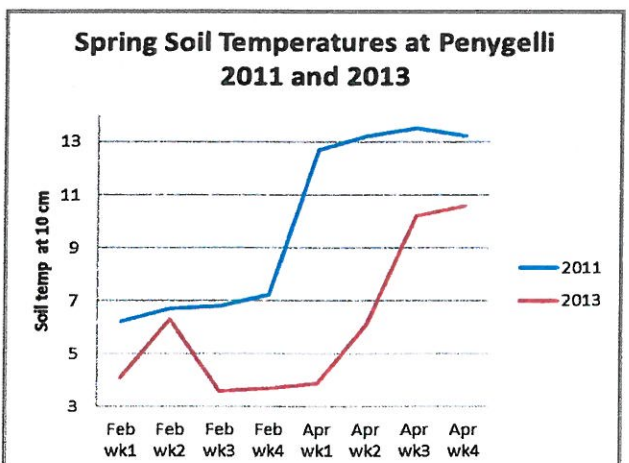
Perennial ryegrass starts to grow when the soil temperature at 10 cm depth reaches 5.5°C for 5 consecutive days. Nitrogen fertiliser applied before the soil reaches the minimum temperature is not used efficiently, and risks losses to the environment. Making the most of spring grass growth is a key factor in reducing feed costs on farm, with 1 kg grass dry matter costing 75% less than the equivalent energy provided in bought-in supplementary concentrates. Applying fertiliser at the correct time is key to minimising costs and optimising grass growth for many farming systems in Wales.

Minimum Soil Temperature °C for Crop Growth*	
*at soil depth of 10 cm	
Crop	Temperature when Growth begins (°C)
Ryegrass	5.5
Clover	8.0
Lucerne	10
Brassica	10
Forage Maize	8-10
Multispecies ley	5.5-10

Soil temperature also affects soil biological activity; for example, earthworm activity is reduced when soil temperatures are above 21°C or below 5°C. This influences mineralisation of nutrients and their availability for plant growth. Poor drainage and soil compaction will also affect soil temperature, reduce biological activity and the length of the growing season.



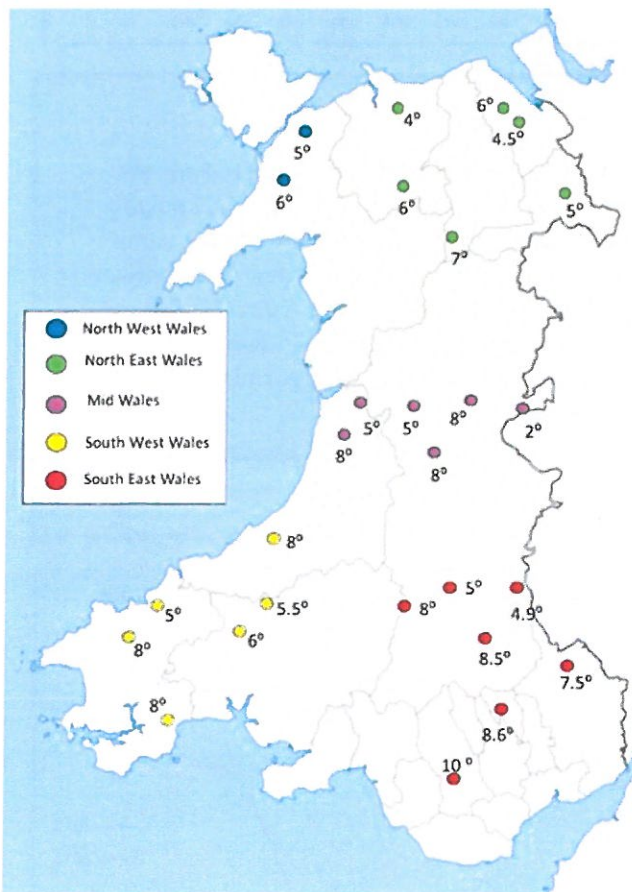
PROSOIL Commercial Development Farmers regularly took soil temperatures and showed how soil temperature measured at the same time of year varied between years and between fields. This highlights that it is vital for farmers to take the temperature of their own fields to optimise nutrient use, seed germination and grassland performance.



Soils

PROSOIL farmers taking part

Some farmers in Wales told the PROSOIL project team that they used daffodil flowering to identify when to apply nutrients. To test the theory PROSOIL Regional Development Group farmers took part in a farmer-led experiment, planting daffodil bulbs (early-flowering variety "Tamara") and sent valuable information about flowering date and soil temperature by text, postcard or via twitter. The soil temperatures when the "Tamara" daffodils flowered showed that this is not a reliable indicator for nutrient applications.



Soil temperatures at daffodil flowering, Spring 2015

Measuring grassland soil temperature

- Insert soil thermometer probe 10 cm into the ground
- Wait for the reading to settle and record
- Measure in the middle of the day or morning and evening and calculate the average of the readings

