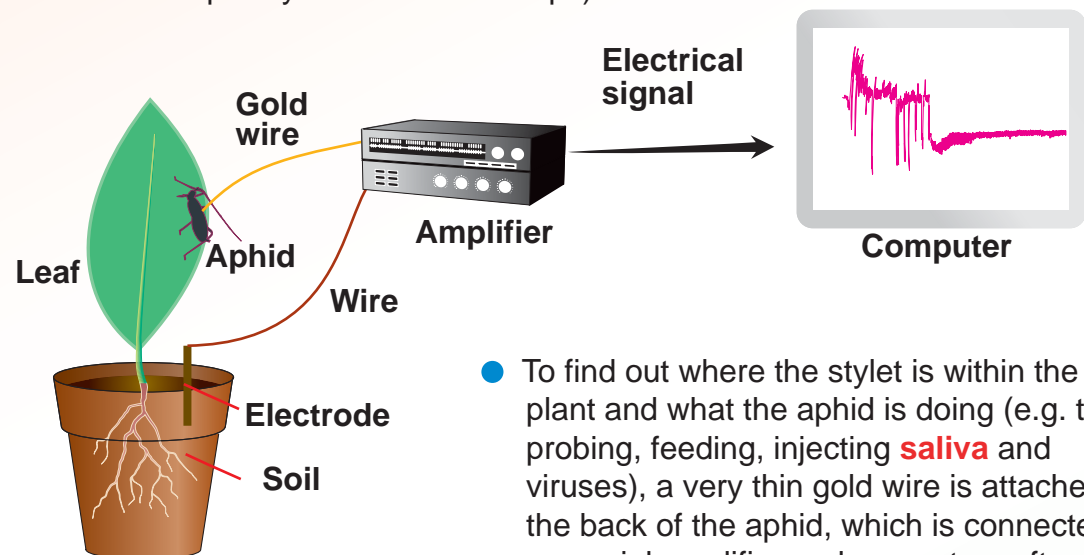


Super-charged greenflies:

Breaking the code for aphid feeding behaviour on different plants.

- Aphids ('greenflies' causing damage to garden and crop plants) feed by sucking plant sap through a hollow tube called a **stylet**. Aphids probe down between and through plant cells in the leaf and stem until they reach the source of their 'liquid lunch' for sap, the **phloem**.
- SCRI scientists are studying aphid feeding inside leaves, to find out why aphids like some plants and not others, and what affects their ability to spread **plant viruses** (causing serious plant diseases like 'potato leaf roll' and 'raspberry mottle' in UK crops).



- To find out where the stylet is within the plant and what the aphid is doing (e.g. test probing, feeding, injecting **saliva** and viruses), a very thin gold wire is attached to the back of the aphid, which is connected to a special amplifier and computer software.

Different types of electrical signals ('**waveforms**') are measured, which have characteristic patterns. This system for breaking the 'feeding code' for aphids is called the '**Electrical Penetration Graph**' system.

- SCRI scientists can automatically monitor 4 aphids at the same time, to see how different **aphid species** or **genotypes** (genetically different forms of the same species) differ in their ability to feed and transmit plant viruses. We work closely with virologists and plant breeders at SCRI and around the world.

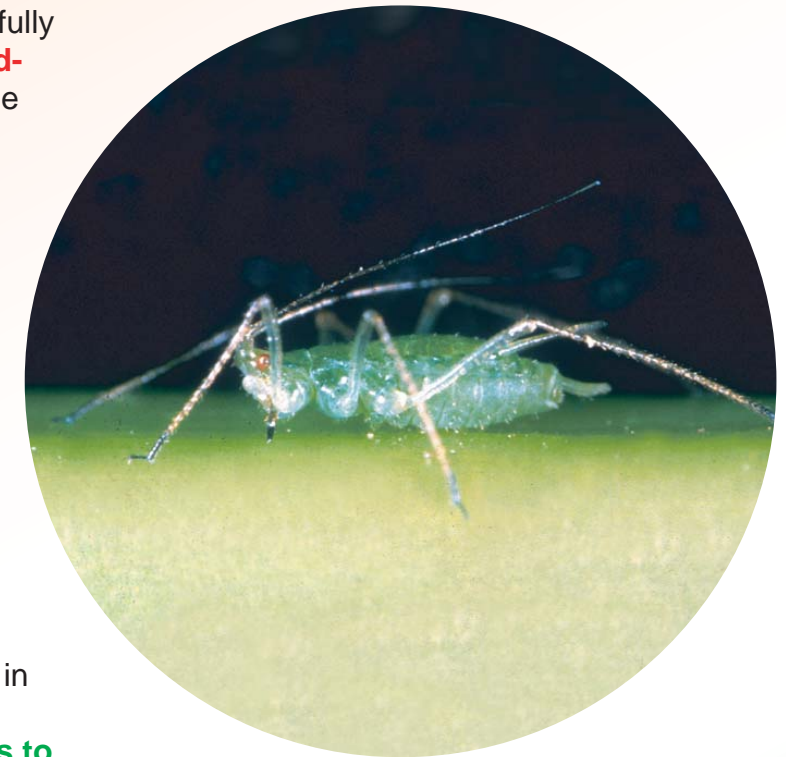
Scientific contacts: Nick Birch, Brian Fenton, Louise Kasprovicz.

Breeding crops with built-in pest resistance:

The co-evolutionary battle between raspberries and virus-transmitting aphids.



- SCRI scientists have successfully bred several varieties of **aphid-resistant raspberries** over the last 30 years (e.g. **Glen Prosen, Glen Moy, Glen Rosa**).
- Unfortunately, pests like raspberry aphid (a vector of 4 plant viruses causing serious diseases in the crop) have adapted to the genetic pest resistance introduced by plant breeders.
- The timescales in this '**co-evolutionary battle**' are tipped in favour of the pest: **It takes breeders more than 10 years to breed a new type of aphid-resistant raspberry. However, raspberry aphid can now overcome single resistance genes in less than 10 years!**
- This means we have to change the way we breed for resistance to aphids (using **new combinations of resistance genes**) AND we have to use **Integrated Pest Management** to reduce selection pressure for adaptation by the pest population.
- **SCRI scientists work together to devise future crop protection strategies which will be more durable and rely on less pesticides (which are now being banned in UK and Europe).**



Scientific contacts: Nick Birch, Stuart Gordon, Hugh Barker, Rex Brennan.