Evaluating the effectiveness of mineral oils in minimising the spread of non-persistent viruses in potato seed crops in GB.

Research project R449: Year 1

Aim: To investigate the potential for integration of oils into control measures aimed at reducing the incidence of non-persistent viruses in seed crops in GB, where growing crop inspection is the standard method of seed certification.

Why is this research necessary?
In recent years an increase in the incidence of non-persistent viruses, such as PVY^N and PVA, has focused attention on gaps in current aphid control programmes for healthy seed potato production.

Under particular scrutiny are non-colonising aphids, such as the cereal aphids, which may migrate through potato seed crops in such substantial numbers that their potential impact is far greater than their demonstrated efficiency in transmitting virus. Brief probing of infected potato plants as they search for suitable hosts - and subsequent transmission to healthy plants - often occurs before commonly used aphicides can take effect. The absence of aphid colonies within the potato crop does not give a true reflection of the risk of virus transmission at any given time.

In continental Europe and elsewhere, mineral oils have been used commercially, in addition to insecticides, to help reduce such virus transmission in seed crops.

What are the main challenges to using oils in GB?
There have been phytotoxic effects reported in their use when oils are mixed with some sprays but mineral oils in various strength solutions have also induced these effects on their own.

- In GB, virus levels in seed crops are determined by official crop inspections during the growing season. Concern has been expressed that oil may mask or mimic virus symptoms during growing crop inspections and result in the crop being refused certification.
- Other observations of treated crops have included reduced canopy height and water beading after rainfall on treated leaves.
- Inspectability may be affected if the crop retains excessive amounts of water droplets on the canopy after rain.
- Project R449 was commissioned after a review of available information on the impact of the use of mineral oils (carried out as part of Potato Council Project R428). The review highlighted examples from overseas where the use of mineral oils was reported to reduce the transmission of aphid-borne viruses.
- The effect of mineral oils on blight control is being assessed as part of the three year Potato Council-funded project. One season of trials has been completed and the second year's trials are in progress. At this stage it is too early to draw conclusions or make recommendations from the work.

Who is carrying out this research?
The project involves Scottish Agronomy, SAC, NIAB, BIOSS and SASA.

Key take-home message on regulation
Since mineral oils should not be used after tuber initiation, it is important to note that many of the treatments deployed in the experiments are not currently permitted outwith the scope of an experimental licence. Some of the oil applications, although within manufacturers' label recommendations, are at concentrations known to have induced phytotoxic affects previously.