Virus in the GB potato crop and The National Virus Forum.

Potato-infecting viruses cause significant damage worldwide and represent a significant threat to seed potato industries. The incidence of virus in seed potatoes can have a significant impact on crop quality (both seed and ware). Virus infection can result in seed crops not meeting the official standard for a class (downgrading) or even for certification as seed potatoes (failure).  As the cultivation of potatoes involves vegetative (asexual) reproduction, virus infection in the parent tuber is generally passed on to the next generation.  Virus free crops are at risk from transmission of virus from sources of infection outwith the planted crop.  The greatest risk is presented by virus infections in neighbouring potato crops, in groundkeepers originating from previous potato crops that have continued to grow in the soil, and from virus reservoirs in the environment, e.g. weeds.

Work carried out at SASA using data from the Scottish Seed Potato Classification Scheme has shown that crops grown from a parent crop in which symptoms of infection had been seen at the previous year’s classification inspections have a far greater likelihood of exhibiting virus symptoms than crops grown from a parent crop in which no virus had been seen during inspection.  For example, over the period 2009-2011, whilst virus symptoms were observed in 16% of the crops grown, the virus incidence was 52% for stocks grown from parental material, and 13% for crops grown from parent stock in which no symptoms had been visible.  These data indicate a four-fold difference in the likelihood of mosaic being seen in a daughter crop depending upon whether virus had been observed in the parent crop.

The location where crops are grown has an effect on the likelihood of a crop acquiring infection, with the probability increasing when crops are grown in areas where more commercial stocks are in cultivation.  The area of ware potato crops is likely to have a more significant effect than the area of seed crops.

Potato viruses are transmitted by a number of vectors.  Whilst over 75% of the virus infections seen in Scottish seed potato crops are transmitted by aphids (e.g. Potato Leaf Roll Virus – PLRV, potyviruses such as Potato Viruses Y, A and V), other viruses may be transmitted by nematodes (e.g. Tobacco Rattle Virus - TRV), fungi (Potato Mop Top Virus - PMTV) or be transmitted by physical contact (e.g. Potato Virus X).  Under Scottish field conditions the symptoms of virus infection are not usually seen during the growing season in which the transmission takes place.

Aphid transmitted potato viruses may be transmitted in a persistent (e.g. PLRV) or a non-persistent manner (e.g. Potato Viruses Y, A and V).  Persistently transmitted potato viruses infect the vector aphid for its lifetime and any plants on which such an aphid then feeds will be at risk of acquiring the virus.  Non-persistently transmitted potato viruses can only be transmitted immediately after aphids have fed on an infected plant.  Non-colonising aphid species, such as cereal aphids, that do not use potato as a host but alight on potato plants and probe the leaves, can transmit these viruses.

Source: SASA

The National Virus Forum came about due to the challenges faced by the industry in preceding years. In 2018, increased aphid activity coupled with escalating virus levels in seed crops foreshadowed looming troubles for ware crops. By 2019, these issues materialised into substantial problems in ware crops across England, prompting the formation of the Forum in January 2020. Its mission: to address these challenges head-on and restore confidence in the system.

The Forum has met each year since its inception, bringing together all those affected by, and involved in, the virus issue. Out of the forums discussions it was established that there needed to be better communication to producers on how to manage the virus threat. Two guides were produced. The six point guide, aimed at seed growers and the four point guide aimed at ware growers. Both of these guides can be found in the list of resources below as well as notes from previous National Virus Forum meetings. Along with these outputs the National Virus forum meeting in 2024 produced the key agreements.

* Enhanced transparency and communication within supply chains.
* To review and consider appropriate changes to certification.
* Greater scrutiny and management of varieties in particular shorter generation reproduction.
* Share knowledge, across GB and internationally.
* Adoption of best practices across the industry.

Good progress has been made and the profile raised as well as highlighting the increased threat of virus. But despite commendable efforts, 2023 proved to be a tumultuous year, marked by significant downgrades due to virus outbreaks, and with the increase of Leaf Roll in the figures, virus pressures are potentially changing, and we must reflect this in how we approach the management of the issue. The production of the 4 steps guide for ware growers, and the 6 steps guide for seed growers raised the profile and control options, but again not enough impact. More work needs to be done with these to make the industry more aware and to adopt the practices contained within the guides. It is obvious that the risks v’s rewards are becoming more marginal.

Virus remains an on-going and unfortunately increasingly serious concern which needs the whole industry to become involved and we need to formulate a plan! Maintenance of reputation and quality standards to retain customer confidence and market opportunity are paramount. Our high-grade seed production must be protected to secure our future healthy stocks.

The issue of virus reservoirs must be addressed, this to include groundkeeper control, considering old variety portfolio pressures as many of these have a greater propensity to spread the problem. Dual cropped free market varieties with potentially compromised focus on virus control, as well as looking at ware production next to seed crops. Furthermore, renewed emphasis on aphid monitoring and reporting, potentially through a reinstated national network, was deemed essential for early detection and mitigation.

The journey has definitely not finished, though the areas of focus may need to change. We have done lots of talking – now it’s time to turn that talking into actions and doing!

Links to resources.

[SASA - Virology](https://www.sasa.gov.uk/seed-ware-potatoes/virology)

[AHDB 2020 reduction in virus transmission](https://projectblue.blob.core.windows.net/media/Default/Potatoes/SPot%20Week%202021%20Presentations%20/AHDB%20Aphicide%20Spot%20East%202020%203.pdf)

[AHDB research reports](https://potatoes.ahdb.org.uk/knowledge-library/research-reports-on-insecticide-resistance-in-pests-of-potatoes)

[FERA - Aphid transmitted viruses of potato](https://www.fera.co.uk/media/wysiwyg/crop_health/Aphid_Transmitted_Viruses_of_Potato_Factsheet.pdf)

[BSPP -New aphid vectors and efficiency of transmission](https://bsppjournals.onlinelibrary.wiley.com/doi/10.1111/ppa.12561)

[APHA - seed potato classification guide](https://assets.publishing.service.gov.uk/media/66d82d80a399e0dcf5200b41/SPCS_and_AS_explanatory_guide_2024_to_2025.pdf)