



GLYPHOSATE DAMAGE IN SEED POTATOES

Seed potatoes are very sensitive to low levels of glyphosate contamination with severe crop loss or damage from planting contaminated seed. Glyphosate can contaminate the mother crop, then translocate to the developing daughter seed tubers. These develop abnormally or not at all. Glyphosate levels below the level of detection (0.05ppm) may cause substantial damage to seed tubers and can be hard to detect in the absence of visible damage to the mother crop. Glyphosate use has increased recently due to more use in set aside and combinable crops. Potatoes are often grown on rented land where there is little or no control over adjacent crop management.

How potatoes become contaminated

- There is limited experimental evidence of either root to root transfer or true soil residual uptake of glyphosate. It is assumed that all cases of potato seed contamination with glyphosate are due to foliar uptake in the mother crop.
- Contamination of the mother stock may be due to:
 - Spray-tank or -line contamination with glyphosate due to poor washing out.
 - Drift from use in neighbouring crops or other vegetation.
- The optimal timing for such contamination to have greatest effect on the developing daughter tubers is after flowering and before the crop desiccation starts.

Glyphosate damage symptoms

Mother crop damage The mother crop itself may show signs of glyphosate damage if levels of contamination are relatively high. Low level contamination may not be visible. Symptoms can vary and are similar to many other stress factors and visual identification in the absence of other risk factors is often difficult. Typical symptoms include:

- Yellowing (particularly younger leaves)
- Growth suppression



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Tuber (daughter crop) damage Daughter tuber damage may occur at levels where mother crop symptoms are not visible. Seed tuber damage may occur below the minimum level of detection (0.05 ppm). Similar to mother crop, symptoms can vary in severity. Typical symptoms include:



Multiple sprouting from eyes

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Weak and distorted stems and little potato syndrome

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Cauliflower sprouts

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Root distortions / excessive root growth

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Other symptoms that may be seen with glyphosate damage include:

- Failure or delay in opening of eyes.
- Rotting of tubers in field or store.

Note: Both foliar and tuber symptoms of contamination with glyphosate can be confused with symptoms from other types of damage or contamination. Examples of other factors that can mimic glyphosate damage include:

- Hormonal or sulfonyl-urea herbicides, growth regulators or CIPC contamination.
- Bacterial rots like *Erwinia*, Symphalid grazing, Dry Rot or *Rhizoctonia* infection.
- Planting into cold soil, waterlogged seed beds or chilling after planting.

Single symptoms cannot be taken as absolute evidence of glyphosate damage.

The interaction between any of these symptoms and very low levels of glyphosate contamination is not fully understood. In some cases, environmental factors may exacerbate potential glyphosate damage.

Voluntary code of practice for use of glyphosate near seed potato crops

To help reduce future incidents of contamination, Potato Council have recruited SAC and Scottish Agronomy to develop a code of practice for best use of glyphosate. This is summarised below.

To help avoid potential contamination of seed crops from glyphosate, the following guidelines have been prepared. **Your neighbours need to be aware of the risks.**

1. Where possible, leave a suitable headland of an unsprayed crop (grass or cereal) around potato crops or avoid planting up to the fence/dyke/wall/hedge side.
2. Good communication with land owners and contractors is essential at all spraying times if seed crops are grown next to combinable crops (particularly when on rented land).
3. When spraying glyphosate within 100m of potatoes, take note of all the following precautions:
 - Wind direction.
 - To help minimise drift, follow the appropriate Code of Practice for Using Plant Protection Products for England & Wales or Scotland. They recommend that spraying of herbicides should be avoided when the air speed at boom height exceeds 4 mph (6.5 km/hr) and spraying any chemical is inadvisable when air speed at boom height exceeds 6 mph (9.6 km/hr).
 - Avoid very hot and calm days to reduce air movement carrying spray droplets.
 - Where possible, use low drift nozzles which have a LERAP 3 star rating, especially in windy or gusty conditions. The percentage of small droplets is less when using low drift nozzles compared to conventional nozzles.
 - Consider using an anti-drift agent based on polyacrylamide with glyphosate, (e.g. Companion Gold).
 - Forward speed of sprayers. Make sure forward speed is consistent with ground conditions. Spraying at excessive speed promotes boom bounce, which may send pockets of spray droplets higher into the air to drift further.
 - Weather conditions and presence of hedges, trees and other boundary obstacles when spraying glyphosate can influence deposition of drift and pattern of damage. Spraying near sensitive seed crops should be avoided in conditions of high air temperature, low relative humidity or where temperature inversion is likely, i.e. following clear nights. Presence of trees and hedges can cause eddies, especially in gusty conditions.
 - Contractors employed to spray seed crops must be reputable and must provide evidence of relevant PA certification, ideally with a dedicated sprayer for potatoes. Emphasise the importance of following good wash out procedures at all times using a double rinse procedure (e.g. with All Clear Extra).
4. Record keeping is a legal requirement. The importance of good recording keeping should not be underestimated if the result of glyphosate drift onto a potato seed crop goes undetected until the daughter tubers are replanted.

While every effort has been made to ensure that this information is accurate, no liability can be accepted for any error or omission in the content or for any loss, damage or other accident arising from the use of this information. It is essential to follow the instructions given on the approved label before handling, storing or using any herbicide or other crop protection product.

USE PESTICIDES SAFELY – ALWAYS READ THE LABEL