Sustainable roots: a roadmap towards integrated management of soilborne diseases in onion

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The Problem

Soilborne diseases, such as *Allium* white rot (AWR) and Fusarium basal rot (FBR), affect up to 15% of UK onion crops annually and are estimated at £7M in lost production.

Some practices are being removed or revoked due to potential risks to health and the environment.

However few alternatives currently exist to replace these….

Historic

Soil Fumigants

Historically soil fumigants were sometimes used in fields which had a high level of disease. Since then many of these have been restricted/removed due to adverse environmental and health effects. The need for specialised machinery and operation also makes it prohibitively expensive for those that remain.

Fungicides Applied to: Seed, Soil and Plants

Many fungicides are coated onto seeds or sprayed onto the soil/plant to protect them from disease. However few are available in onion, with some at risk of being revoked due to potential environmental or health hazards/risks.

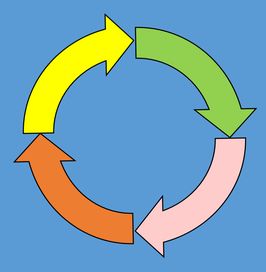
Additionally, it is difficult to deliver these products into the soil where they are needed. This means their effects can be variable when not used correctly.

Decisions

Soil

Crop

Systems



The Future?

Diagnostics*

Use of DNA based diagnostics tests, to predict disease risk in the soil. This allows growers to make decisions before growing a crop. *Both pathogens.*

Stimulants*

AWR disease survive as dormant spores in the soil. When they smell a plants roots they attack the plant. By mimicking these chemicals the disease can be tricked, but cannot survive without the plant. *AWR only.*

Biofumigants*

Some plants, such as mustards, produce compounds which have fungicidal effects. If grown before a crop, these can be used to reduce disease levels. *Both pathogens.*

New Fungicides*

New fungicides are being developed with better environmental and safety credentials. *Both pathogens.*

Resistant Plants*

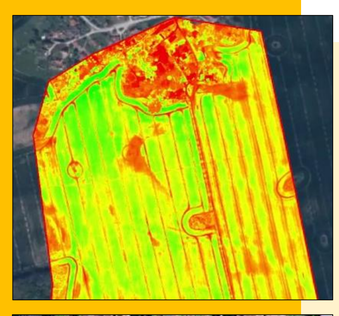
Not all onions are the same, with some showing inherent immunity to diseases. Currently, this is being developed into commercial varieties. *FBR Only.*

Biological Control Agents*

Biological control agents (BCAs) are products based on beneficial fungi, nematodes or bacteria (think probiotic yoghurt). These can be used to fight diseases in the soil protecting the plant. *Both pathogens.*

Smart/Precision Agriculture

Disease outbreaks can be monitored through the use of technology, sensors and computer imaging. This can allow targeted treatments or support future cropping decisions. *Both pathogens.*



Restricted/Removed

In Development

Current Research *

New Tools

Near Market

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