



# Mobilising The Troops

## How pests and pathogens reach the plant



Some pathogens use **living vectors** (carriers) to transport them between host plants. We can think of these vectors as troop carriers.



Aphids and whiteflies both transmit viruses between plants. As the insects feed from the phloem, or sample other cells, virus particles are injected into the plant.



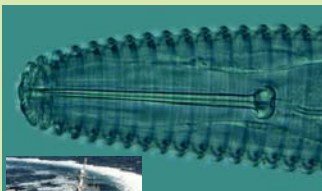
Spongospora is a fungus that infects potatoes but can also transmit Potato Moptop Virus.



Cuscuta is a parasitic plant that attaches to other plants and connects to their phloem. It can form bridges between 2 plants and transmit viruses between the plants.



Blackcurrant reversion associated virus is transmitted by tiny mites.

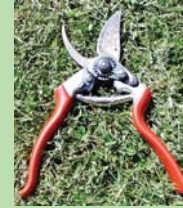


Nematodes have sharp stylets that they use to puncture cells for feeding. Viruses such as Tobacco Rattle Virus can be injected into the cell as the nematode feeds.

**Humans** can also transport pathogens



Although usually accidental, dirty farm equipment and tools can transfer soil-borne diseases from one field to another.



Wounds inflicted on plants during planting or pruning can allow pathogens to enter plant tissues and start an infection.

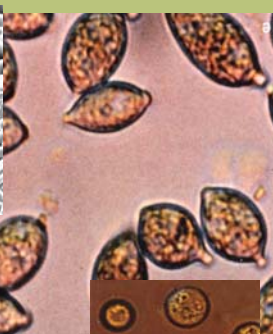
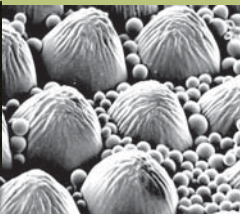


Pathogens can use **elemental vectors** - soil, water or wind, to transport them between host plants. Some pathogens also use tactics to allow them to survive in the environment for long periods of time.



Some fungi produce light, dry spores that can be carried over long distances in the wind. Plant surfaces can be covered in fungal spores (as in the rose petal above, 2nd from left).

Other fungi, such as Phytophthora infestans which causes late blight in potatoes, produce oospores which can survive in soil for many years. They also produce zoospores that swim through water in the soil to reach and infect new plants.



Nematodes can be moved between plants as water flows through the soil.



Female nematodes become cysts - long-lived globular structures which allow them to survive in the soil or plant material under unfavourable conditions.



This microscopic mite infects blackcurrants and causes 'big bud' disease. To move between plants, it stands on its front legs in a breeze and lets the wind carry it away!



Other pests and pathogens are **able to move by themselves** - they can walk, fly, swim or grow to a new plant.

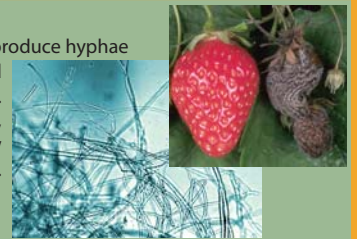


Pests such as raspberry beetles, black vine weevils and red spider mites can all walk or fly from one plant to another.



Nematodes can swim in the film of water that coats soil particles to move between plants.

Fungi produce hyphae to grow and spread into new tissues. If plants are touching, fungi can also grow to infect a new plant.



Cuscuta, is a parasite that can grow long stems to reach out and strangle other plants.

