



## **BACKGROUND INFORMATION: SOIL-BORNE DISEASES AND EXPERIMENT**

Soil-borne diseases, commonly called 'root rot diseases, damage the roots or stems of a plant or tree stopping it from being able to take up water and nutrients from the soil. The common symptoms are wilting, yellowing, stunted growth and death of the plant. The symptoms can be quite similar to those caused by drought or nutrient deficiency so can often be misdiagnosed.

There are millions of different pathogens (bacteria and fungi) in the soil and whilst many do no harm at all, there are others that damage the roots of plants. Some plants are resistant to soil-borne diseases whilst others are very badly affected. Different varieties from the same species of plant can be affected differently by the same pathogen. Also, some pathogens have a very small number of plants that they will attack.

Three things are necessary before a disease can develop in plants:

1. The plant must be susceptible. Some plants can be surrounded by pathogens in the soil and not be affected in the soil
2. Pathogens must be present in the soil.
3. The environment must be right for the attack. The soil might be full of pathogens but if the conditions aren't perfect for an attack, they won't have any effect on the plant at all.

Soil borne diseases are a major problem for commercial vegetable growers and the nursery industry because they can wipe out crops very quickly. They are also deadly for many of our native species such as eucalypts and because they can be spread on soil that is attached to shoes or car tyres, many areas of bush are quarantined to stop the diseases from spreading. It is almost impossible to control soil-borne diseases in the bush once the area is contaminated.

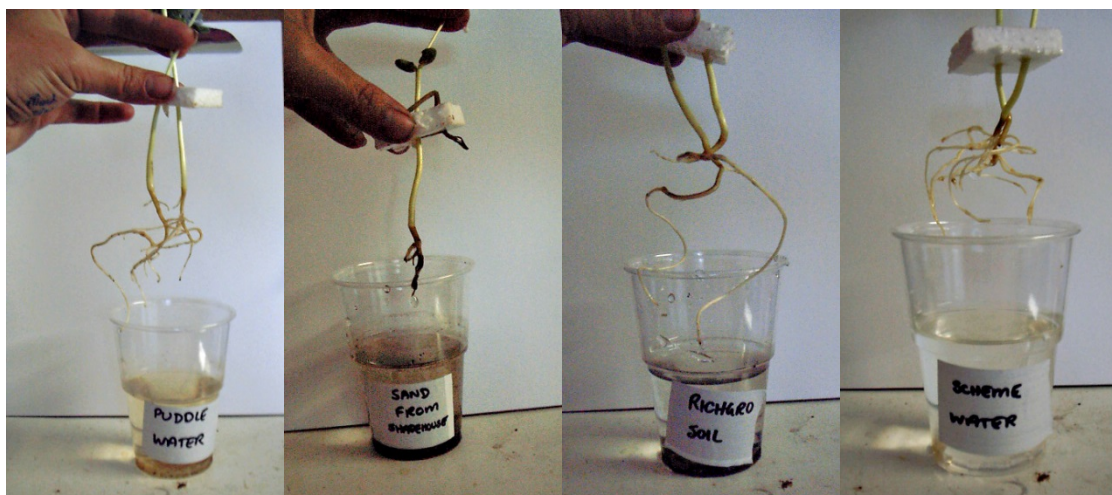
To prevent soil-borne diseases at home or school:

- Don't over-water seedlings or plants in the garden or allow them to continually dry out between being watered. Plants need the soil to be consistently damp but not soggy or dry.
- Ensure that the soil drains properly. Adding lots of compost helps any type of soil but if there's lots of clay, add gypsum as it will hold too much water. If pots are getting water-logged or aren't holding enough water, repot the plant into fresh potting mix. If the soil in the garden or pots is drying out too quickly or the water isn't soaking through, apply a wetting agent.
- Be very hygienic when growing seedlings. For example, never leave hose nozzles lying on the ground as this will spread disease when the pathogens get into the nozzle in one spot but then are shot out with the water onto another. Also, sterilise all used pots or growing trays by soaking them in a bleach solution and only use new potting mix as this will be sterile.



### WHAT WILL THE STUDENTS OBSERVE IN THE EXPERIMENT?

Mung beans are very fast growing and are susceptible to various root rot diseases. This experiment will allow students to watch as the roots form and then to identify brown lesions or rotting on the roots caused by soil borne pathogens from different areas of the garden, plant pots or even water collected from puddles or the garden hose.



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