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Investigating the potential for crop diversity and commercial AMF inoculation to enhance bottom-up resistance to green peach aphids in potato

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Background

The green peach aphid, *Myzus persicae* feeds on sap from the potato leaves, stems or apex phloem tissues, reducing its growth and development, often leading to significant crop losses. Potato leaf roll virus(PLRV) and potato virus Y (PVY) are among the numerous viruses that can be transmitted into the plant by *M. persicae.*

Synthetic insecticides are routinely used to control *M. persicae*. However, applying these insecticides causes environmental contamination and has led to *M. persicae* pesticide resistance development.

Through induced systemic resistance, AMF has the potential to change plant responses to herbivore attack through direct effects on plant quality and palatability to the aphids.

Diversifying crops in agricultural systems could increase and enrich soil biodiversity and AMF communities in both natural and commercial agricultural systems.

Fig. 1&2: The rotating core approach

• **Aphid inoculation:**

Fig. 3: The leaf bag

Fig.. 4: The plant bag

• **Aphid collection**

Fig. 5: Brush

Fig. 6:Sticky tape set-up

• **Aphid growth rate = Final aphid count - Initial aphid count**

• **Plant biomass = Dry root weight/Dry shoot weight.**

• **AMF Quantification**

Objective

The aim of this research project is to:
• Investigate the effects of commercial AMF inoculation in strip-crop and monocrop soil in potato plant resistance to an aphid pest (Myzus persicae).

• Separate the effects of crop diversity (strip-crop edge and monocrop soil impacts) and management (AMF inoculation) on the plant biomass and aphid growth
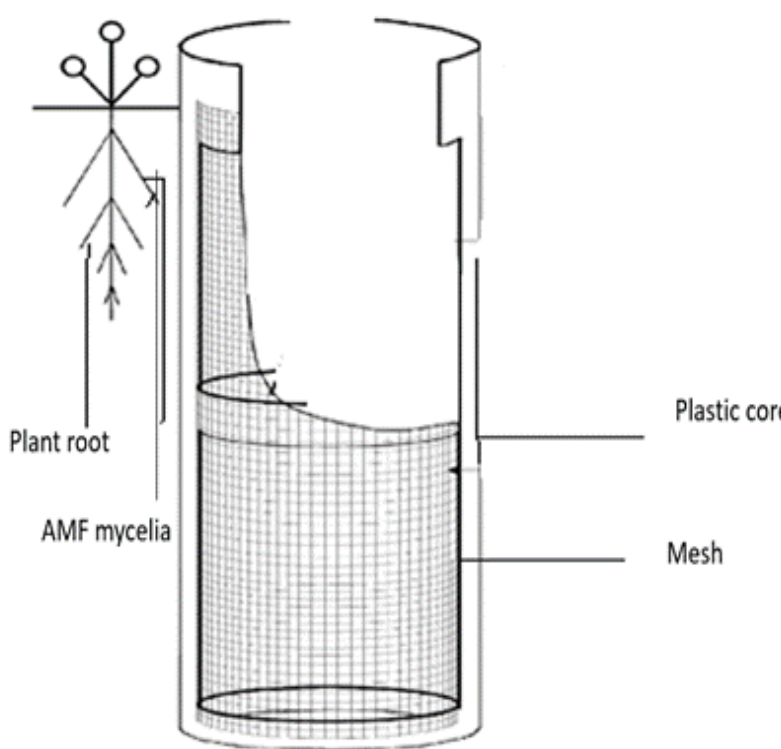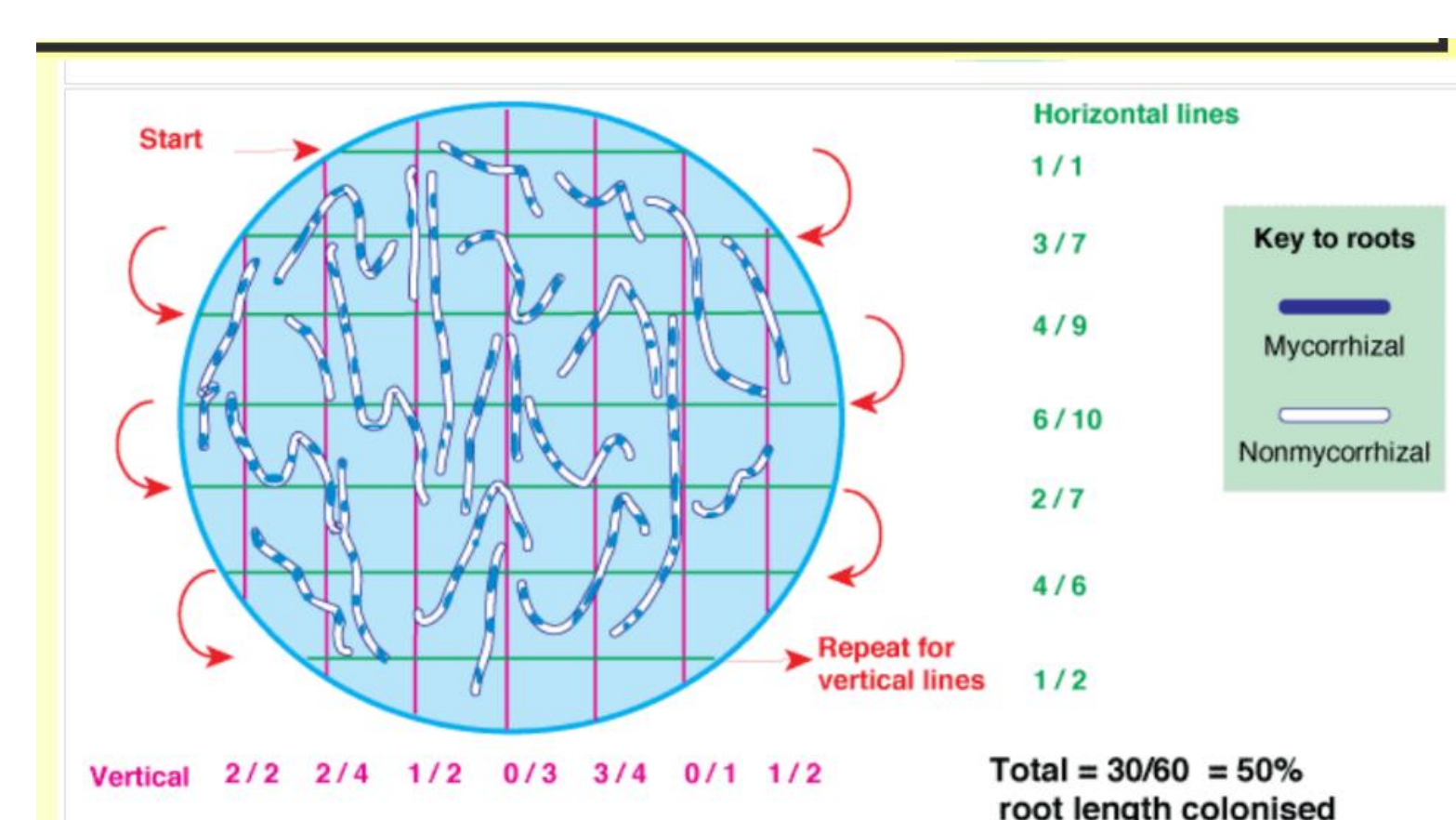
Methods

• **Experimental set-up**

Expected Results

• Higher AMF colonization in roots of strip-crop soils than roots in monocrop soils.
• Higher AMF root colonization = higher potato plant biomass
• AMF causes higher herbivore-induced systemic resistance = fewer aphid populations.

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