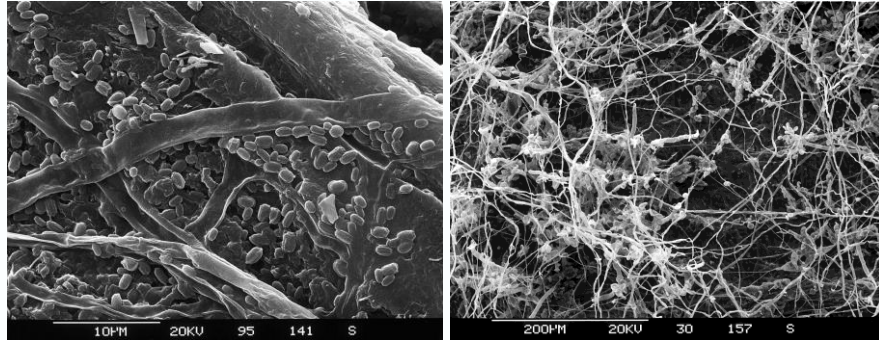
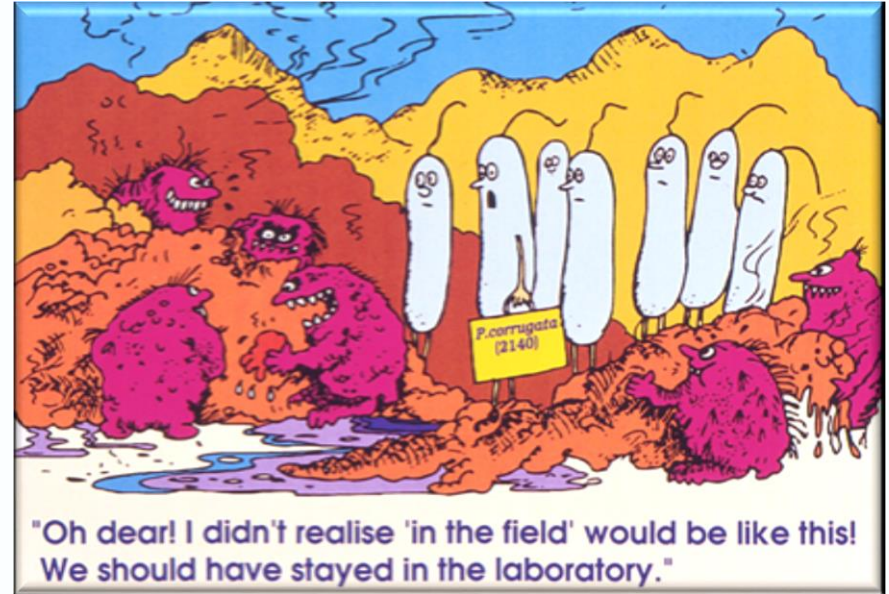


Soil Microbiome – Microbial inoculants

Gupta Vadakattu CSIRO

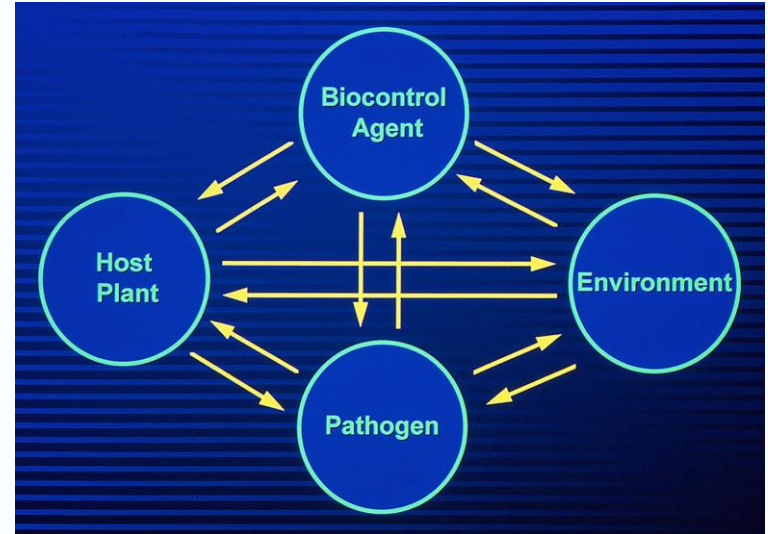
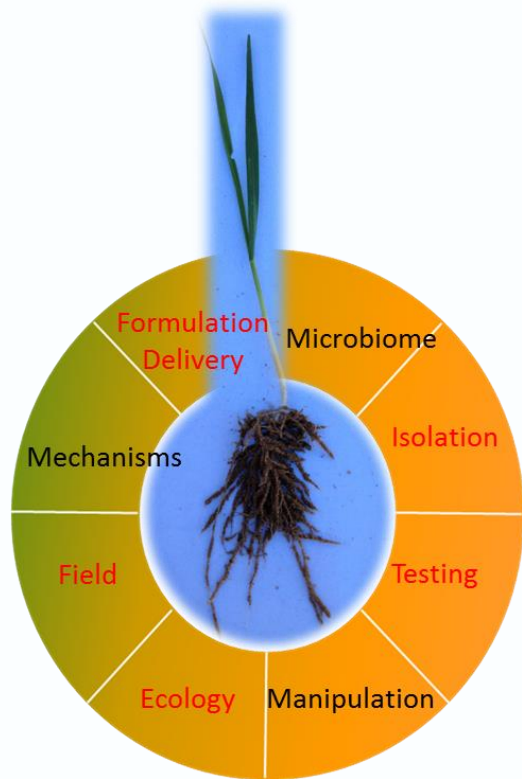


10^9 organisms / gram soil
 10^6 genes

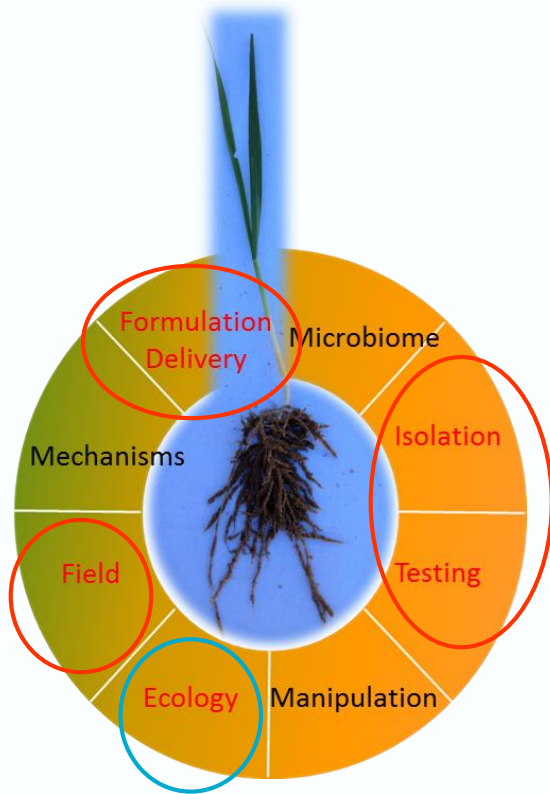


The genetic and functional composition of soil microbiome, general or rhizosphere-specific, plays a key role in the successful development and application of microbial inoculant(s)

The Microbial Inoculant Wheel

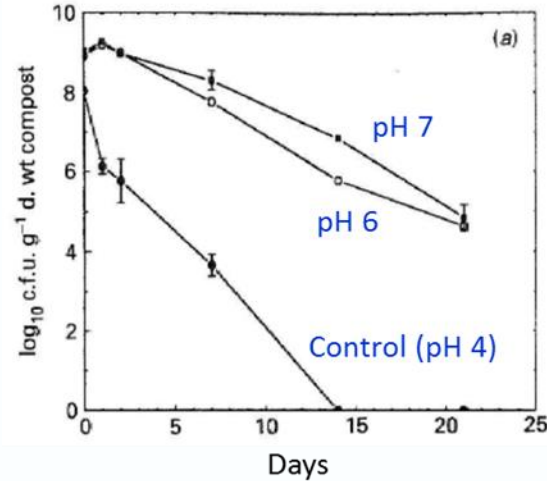


The Microbial Inoculant Wheel

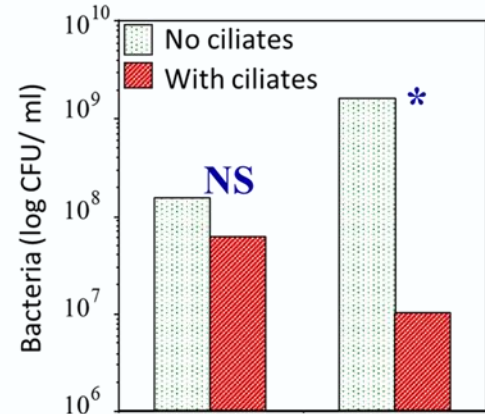


Ecology: Survival, stability and persistence

Peat-based compost



White et al. (1996)

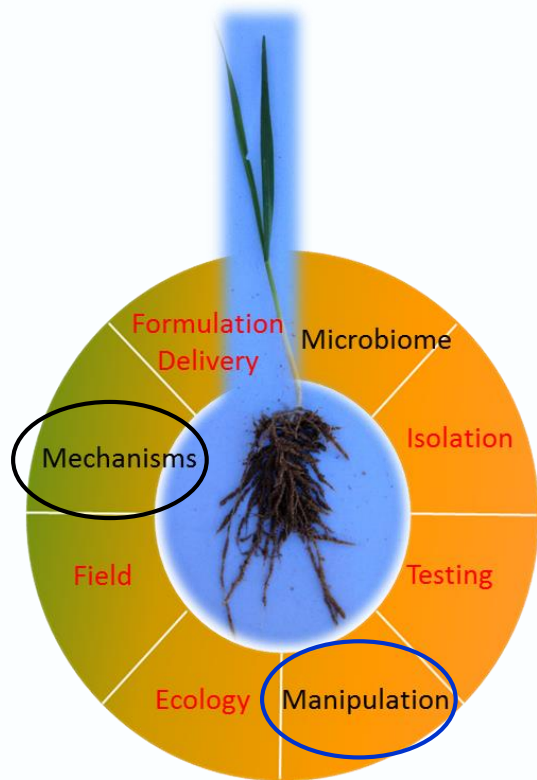


P. corrugata *R. meliloti*

Gupta et al. 1996



The Biocontrol Wheel – Now and What next?

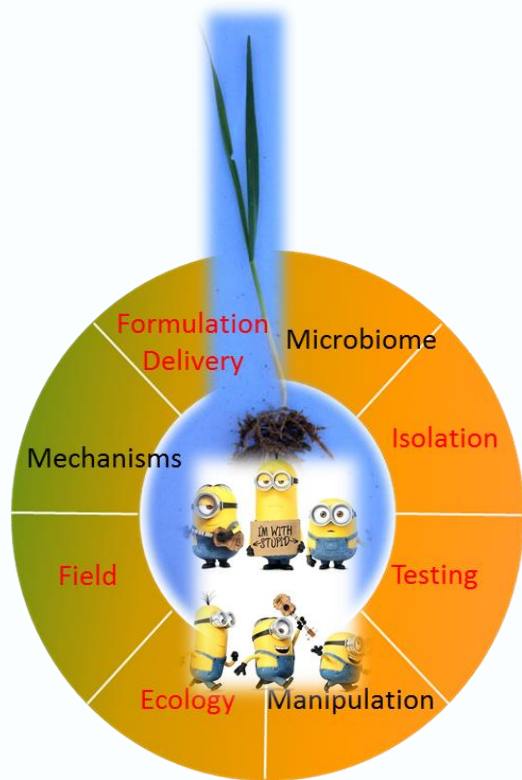


Type	Mechanism	Examples
Direct antagonism	Hyperparasitism/predation	Lytic/some nonlytic mycoviruses <i>Ampelomyces quisqualis</i> <i>Lysobacter enzymogenes</i> <i>Pasteuria penetrans</i> <i>Trichoderma virens</i>
Mixed-path antagonism	Antibiotics	2,4-diacetylphloroglucinol Phenazines and Cyclic lipopeptides
	Lytic enzymes	Chitinases, Glucanases and Proteases
	Unregulated waste products	Ammonia, Carbon dioxide and Hydrogen cyanide
	Physical/chemical interference	Blockage of soil pores Germination signals consumption Molecular cross-talk confused
Indirect antagonism	Competition	Exudates/leachates consumption Siderophore scavenging Physical niche occupation
	Induction of host resistance	Contact with fungal cell walls Detection of pathogen-associated, molecular patterns Phytohormone-mediated induction

Paul and McSpadden Gardener (2006)

1. Gene induction – PGPR mediated induction of ISR in host plant species
2. Genes transfer – genes from potential biocontrol agents transferred into PGPR
3. Molecules for biocontrol – direct application or signal molecules to elicit BO

For Microbial inoculants to be successful.....



1. What type of function is targeted?
2. When is it required to perform?
3. In what type of environment?
 - Soil / rhizosphere / endosphere
4. Mode of delivery required to be effective?

Soil microbiome, general or rhizosphere-specific, plays a key role in the successful application and functioning of microbial inoculant(s)

