

International Conference on

# ENVIRONMENTAL MICROBIOLOGY & MICROBIAL ECOLOGY

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# ECOLOGY, ECOSYSTEMS & CONSERVATION BIOLOGY

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## **Actinobacterial endophytes: Beneficial partners for agriculture and medicine**

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Actinobacteria are well recognized as prolific producers of bioactive metabolites that have diverse functions depending on their chemical structures and concentration. Many of these 'talented' actinobacteria have been found within their host plants as endophytes- each with their own roles. They were isolated from crop plants-wheat barley, oats, rice, lucerne, medics, peas, faba and soya beans chickpea, tomato, potato and Australian native plants and trees. Low nutrient media in multiple plates and incubation times of up to 16 weeks revealed large numbers of new species and one new genus. Next-gen sequencing informs us that there are a larger number of genera that were previously isolated. Nevertheless, new species were screened by RP-HPLC-Photodiode array against a proprietary database to reveal-new chemical structures. We have isolated novel antibiotics active against multidrug-resistant Gram-positive bacterial strains as well as with broad-spectrum activity. Their functional versatility coupled with their internal location makes them preferred candidates for biocontrol agents. Screening 2000 strains directly onto plants indicate the poor correlation between *in vitro* antipathogenic activity, and also the importance of the priming effect in induced systemic resistance. Ultimately, their ability to increase crop yield in the field is critical and this depends on a multitude of factors including stability and delivery and the relative cost of the inoculant. Other endophytic actinobacteria isolated from legume plants showed synergy with rhizobia when added to the seed to increase biological N Fixation by up to 70% and grain yields by 40%.

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