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Mechanical Vibration and Dynamics of Plants for Robotic Pollination

Mechanical stimulations by vibration or sound may promote pollination in high-value crop varieties. The development of robotic pollinators tailored to the specific frequencies of Australian crops, can generate significant cost savings for the Australian indoor cropping industry.

Competitive advantage

- Ability to identify frequency-specific stimulations that promote pollination in high-value crop varieties
- Skills and experience to characterise the effects of frequency and modes of sonic vibration on flowering and reproduction, fruit development and nutritional quality
- State-of-the-art sound and vibration generation and measurement equipment, such as scanning laser vibrometers, electromechanical shakers, acoustic cameras, sound level meters, multi-channel signal analysers, sensors and accelerometers
- Expertise in Finite Element Analyses of vibration, acoustics and dynamics
- Expertise in signal processing techniques and programming to develop in-house custom processing tools best suited for the analysis experimental and numerical data

Impact

- Automated pollination could save \$60,000/year per acre of protected cropping

Successful applications

- Signature management of maritime platforms
- Optimisation of mufflers for improved acoustic performance
- Diagnostics of helicopter gearboxes and gas turbine engines
- Modelling of faults in IC engines, geared systems and rolling element bearings
- Machine condition monitoring

Capabilities and facilities

- Vibration and acoustic wave generation, including electromagnetic shaker, speakers and transducers, and associated electronic hardware, including signal function generator, amplifiers and a dedicated instrument control software. This allows any type of excitation (or stimuli) to a structure to be applied
- Vibration and acoustic wave measurement, using state-of-the-art scanning laser vibrometer (Polytec PSV-500), accelerometers, microphones, and acoustic camera
- Computer-based modal analysis and computational modelling capability
- Comprehensive capability in generation, characterisation, and modelling of the vibration responses of plants and

More Information

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