PNG biosecurity research puts Australia on the front foot

A long-standing collaboration with researchers in Papua New Guinea has broadened Australia's understanding of important diseases that pose a possible biosecurity threat to Australian sugarcane.

Sugarcane is almost everywhere in Papua New Guinea (PNG).

You see it in gardens, roadsides, creek banks, grasslands, and in commercial paddocks.

PNG is the original home of sugarcane, so it is not surprising that it is prolific there. It is also unsurprising that these conditions also mean that it is home to several exotic biosecurity threats that we don't have in Australia.

Because of this nearby biosecurity risk, Australian researchers have had a long relationship with PNG researchers to ensure that our industry is on the front foot should an exotic incursion ever occur.

This has been the particular focus of a recent research project that has looked at diseases including Ramu stunt and downy mildew, both of which are in PNG.

Partnering with PNG's commercial sugarcane producer, Ramu Sugar Limited, SRA researchers have learnt valuable information about these pathogens, including their differences to the usual types of pathogens that we currently face in Australia.

For example, SRA scientists now know that there are at least four variations of the downy mildew fungus, and two variations of the Ramu stunt virus.

"Normally with diseases such as red rot or Fiji leaf gall here in Australia, there is very little variation in these pathogens," said Dr Rob Magarey, who is one of the researchers on the project and SRA's Leader for Disease Management. "But with PNG being the home of sugarcane, it also has many genetic species of cane, which also provides the opportunity for variation in these pathogens."

Understanding this variation is crucial to ensuring a better response should these pathogens hit Australia. If an outbreak occurs and if we can understand which variation of the pathogen it is, this could then allow for a better management response and also a better understanding of resistance ratings of our sugarcane varieties.

Dr Nicole Thompson (Principal Researcher, Disease Management) has led the work on downy mildew, while Dr Kathy Braithwaite (Senior Researcher, Disease Management) has led the work on Ramu stunt.

Both of the pathogens can severely impact yield, as the researchers observed through their trials and work in PNG.

Downy mildew can reduce yields by 30-50 percent in susceptible cane. About half of Australian varieties are susceptible, although it is a pathogen that has previously been successfully eradicated from Australia.

Ramu stunt can kill susceptible cane and nearly wiped out the PNG industry in the 1980s. However, SRA researchers have learnt that most Australian varieties are resistant to Ramu stunt.

"Both pathogens are potentially devastating, although the risk from both downy mildew and Ramu stunt is less than it is for some other pathogens. Downy mildew is transmitted by spores over a short distance, unlike smut spores that can travel thousands of kilometres. With Ramu stunt, the main issue would be transmission via planting material, which is a lower risk because of our strong quarantine in Australia," Dr Magarey said.

"Ramu stunt is transmitted by a planthopper, and although Australia has this planthopper in the Torres Strait, it is relatively low risk that Ramu stunt would

Sugarcane growers and millers can learn more about biosecurity risks and management in the publication Biosecurity Manual for Sugarcane Producers, available on the SRA website or in hardcopy by contacting Adoption Officer, Matt Reynolds, on (07) 4963 6803.

come into Australia. However, it is vital that we are equipped with strong knowledge that would allow us to manage it if we have to."

Low risk does not mean no risk.

This has long been the approach of the Australian sugarcane industry with biosecurity, and is typified by the industry's readiness and fast approach to the smut incursion on the east coast in 2006. Preparation for a possible smut incursion, far ahead of time, allowed for a swift and coordinated approach to smut.

The research has also looked at moth borers, which Dr Magarey said posed a significant risk for Australia. This includes variety resistance screening, as well as a separate project that is looking at knock-down insecticides. This project is looking at a range of other issues such as accurate identification.

(Over Page) The project team rating a Ramu Stunt resistance trial. *(Top Left)* Sugarcane leaf with downy mildew symptoms. *(Top Right)* SRA staff Rob Magarey, Andrew Greet, and Judi Bull setting up a downy mildew pot trial in PNG. *(Above)* Moth borer damage with larvae.