

Agricultural Scientific Collections

– Summer 2011

INTRODUCTION

The Agricultural Scientific Collections Unit (ASCU) presides over Scientific Collections, a valuable national resource housed at Orange Agricultural Institute. The ASCU Scientific Collections contain historical records, physical specimens and associated data of insects, mites and plant pathogens associated with primary industries in New South Wales. Scientific collections held in other Centres throughout the state include plant genotypes, soils, rocks, minerals, fossils, animal pathogens and others. Some of these collections have statutory protection from an Act of the NSW Parliament.

The collections also include living cultures of fungi and bacteria and represent a valuable source of pest and disease DNA. They are of immense quarantine and diagnostic significance and are consulted regularly by scientists from Australia and overseas. The veterinary collections are used in university training and a collection of shark jaws, housed at the Cronulla Centre of Excellence, is used to identify sharks involved in attacks on humans.

RESEARCH CAPABILITIES

- » Internationally recognised taxonomic expertise in Auchenorrhyncha (leafhoppers, planthoppers and their relatives), eriophyoid mites, plant pathogenic fungi and whiteflies.
- » Diagnostic expertise in most other insect, mite and fungal groups.
- » Management of pest data based on verifiable physical records in collections.
- » Integration of morphological and molecular data into diagnostic systems and barcoding libraries.

CONTACT US

For more information on our full portfolio please contact Dr Murray Fletcher (02) 6391 3943 or murray.fletcher@industry.nsw.gov.au

PROJECT UPDATES

TAXONOMIC EXCELLENCE (1977–ONGOING)

I&I NSW is internationally recognised for its taxonomic experience and expertise in the taxonomy of economically important pests. Over the past 30 years the Unit, led by Dr Murray Fletcher, has published more than 100 scientific papers and released numerous electronic online tools to aid quick and accurate identification and understanding of these Australian fauna. This concentration of expertise has also led to I&I NSW staff having responsibility for components of the Australian Faunal Directory relating to leafhoppers, spittlebugs and planthoppers (with more than 3,000 generic and specific names) (Dr Fletcher) and whiteflies (105 species) (Mr Gillespie).

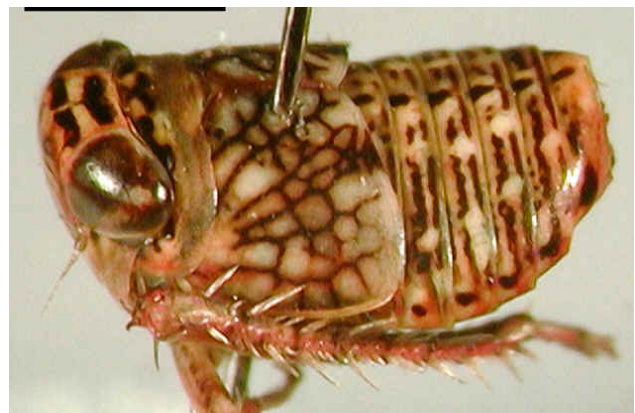


IMAGE: *Gunawardenea pulchra* Fletcher & Moir, 2008

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Partners: Charles Sturt University, Orange and Wagga Wagga; New Zealand Arthropod Collection, Auckland; Northwest Agriculture and Forestry University, Yangling, China; Chinese Academy of Science, Beijing; Russian Academy of Sciences, St Petersburg; Illinois Natural History Survey; The Natural History Museum, London; Australian Museum, Sydney; CSIRO, Canberra; Latrobe University, Melbourne; University of Melbourne; Warsaw Agricultural University, Poland.

FUNDING: The Australian Biological Resources Study, Environment Australia

FINSCHHAFEN DISORDER OF OIL PALMS IN WEST NEW BRITAIN, PNG (2007–2011)

INTRODUCTION: Finschhafen Disorder (FD) causes yellowing and eventual frond death in coconut and oil palm plantations in New Guinea. FD has been associated with a planthopper of the family Lophopidae but the epidemiology of the disorder and the role played by the planthopper was unknown.

FINDINGS: We have demonstrated that there are no pathogens involved in FD but the symptoms are caused directly by the feeding of the planthoppers. Four papers have now been published on the causes of FD, options for biocontrol using egg parasitoid wasps and taxonomy of the planthopper, now known as *Zophiuma butawengi* (Heller) following taxonomic work on the genus *Zophiuma* by Drs Gitau and Fletcher. Mr Woruba, a native of West New Britain, is investigating the potential for entomopathogenic fungi to help manage *Z. butawengi*.

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PARTNERS: Prof. Geoff Gurr, Charles Sturt University (principal investigator); Dr Catherine Gitau (postdoctoral fellow); Dr Charles Dewhurst (PNG OPRA), Dr Andrew Mitchell (I&I NSW, Wagga, now Australian Museum, Sydney), Mr Deane Woruba (John Allright Fellow).
FUNDING: ACIAR

WORLD REVISION OF RUST SPECIES OF THE MYRTACEAE (2001–2013)

INTRODUCTION: The discovery of Myrtle Rust (*Uredo rangelii*) in Australia in early 2010 has led to confusion surrounding the correct name to use for the rust and its relationship to guava rust (*Puccinia psidii*) which is still regarded as an exotic disease. In addition population structures will be determined to ascertain strains or pathotypes that may be present in Australia.

FINDINGS: There are 26 described species of rust which occur on various myrtaceous plants around the world. At present only seven have been studied. All species will be examined to determine the correct name to use.



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PARTNERS: University of Tasmania, DAFF, Royal Botanic Gardens, Sydney

FUNDING: DAFF

MULTIPLE PEST SURVEILLANCE PROJECT (MPS) (FORMERLY HAZARD SITE SURVEILLANCE) (ONGOING)

INTRODUCTION: This project conducts surveillance on a target list of exotic and established plant pests and diseases in NSW focussed on host preferences and entry pathways. Surveillance data is captured and managed using handheld data-capture devices and BioSIRT.

FINDINGS: To date we have discovered no targeted exotics, two non-target establishments and further data on a range of established targets in NSW. Exotic targets include (but are not limited to) Giant african snail, tramp ants and asian citrus psyllid while the established pests include spiralling whitefly, silverleaf whitefly, melon thrips, myrtle rust and non lure responsive fruit flies.



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FUNDING: DAFF

IMAGE: ASCU staff inspecting beans for pests

MITE DAMAGE TO PLANTS (ONGOING)

INTRODUCTION: I&I NSW's mite taxonomist currently supports numerous projects in Australia and overseas investigating eriophyoid mite species damaging plants, including a pilot study on turf grass species, a taxonomic and molecular study of the wheat curl mite, *Aceria tosichella* (the vector of wheat streak mosaic virus), new eriophyoid species on eucalypts and mites as biological control agents of weeds.

FINDINGS: So far plant-feeding mites from two different families have been found on turfgrasses and these are being investigated further. The wheat curl mite, *Aceria tosichella*, has been found to belong to a group of cryptic species. Eriophyoid mite species new to science have been discovered on eucalypts. Two new eriophyoid species as biological control agents of weeds have also been described (*Floracarus perrepae* on Old World climbing fern and *Aceria thalgi* on sow thistles).



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PARTNERS: CSIRO, WA Department of Agriculture, DPI Victoria, DPI Northern Territory, NAQS, AQIS, Queensland Museum, private consultants and overseas mite workers in Poland, USA, Brazil, Italy, South Africa, Serbia and Turkey
FUNDING: HAL & CSIRO

IMAGE: Wheat curl mite *Aceria tosichella*

PIS&R PROJECT UPDATES