



Australian Entomological Society

**Plant
Pathology
and
Entomology
Capability
Study
2012**



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Executive Summary

In 2006 the then Cooperative Research Centre for Tropical Crop Protection commissioned a survey to evaluate capability within Australia and New Zealand in the two important disciplines of plant pathology and entomology. The report on that survey is available on the CRCTPP legacy website (Howie, 2006).

After consideration of the issues raised in the 2006 report and recognition that there remain concerns regarding the current and future capacity in these areas, the Australasian Plant Pathology Society (APPS) and the Australian Entomological Society (AES) jointly commissioned a follow-up survey intended to obtain an updated snapshot of the current capacity in plant pathology and entomology across Australian and New Zealand. The 2012 survey was intended to identify similarities and differences in perceptions of plant pathology and entomology capability along with any trends influencing capacity.

This report focuses on a review of the data gathered in the 2012 survey and comparison of the data with the 2006 survey. It highlights important shifts in the data that might inform decisions and strategic planning for meeting future requirements in plant pathology and entomology.

The 2012 survey followed a similar design to that which was conducted in 2006. Only minor variations were considered in order to ensure consistency for comparison of results. The survey was distributed to universities, state and national government entities, commercial industry, grower and industry associations.

At the close of the survey in excess of 400 responses were received, of which 333 were judged to be complete and became the basis for the analyses in this report. This compared with 359 complete surveys in 2006. The 2012 responses have been further broken down as follows:

Total respondents	333
Administration only	23
Entomologists/Plant pathologists	310
Plant pathologists	175
Entomologists	135
'Active' (employed) specialists	275

The survey was constructed in two parts, each divided into a plant pathology section and an entomology section. Part A collected data from those working within the two disciplines including information about their organisation type, areas of speciality, age profile and activity focus as well as qualitative opinions regarding a range of issues affecting their work environment. Part B collected data from an organisational perspective including information about current capacity, future needs, sources of expertise and training perspectives.

Both Australia and New Zealand continue to have a strong academic achievement in the combined fields of plant pathology and entomology. In 2006 53% of respondents had PhD level qualifications whilst in 2012 this had risen markedly to 65%. Conversely undergraduate qualifications showed a decline to 16% in 2012 from 27% in 2006. This appears to reflect the reduced offerings at the undergraduate level and related fall in student numbers in the science faculties, especially in the fields of plant pathology and entomology.

Distribution of capability across plant pathology sub-disciplines is largely similar when the 2006 and 2012 surveys are compared, however, areas such as bacteriology and virology appear to have declined sharply in representation. Mycology remains the dominant sub-discipline area but there appears to be an upward shift in respondents reporting more generalist roles.

Taxonomy/systematics remains the leading sub-discipline area for entomology. However, there is a large proportion of respondents selecting 'Other' as their primary discipline then identifying ecology as their main area. Genetics and insect pathology are sub-discipline areas that appear to have declined in capacity.

Plant pathologists and entomologists are employed predominantly in government organisations, although there appears to be a decline overall in this sector since 2006. This is particularly the case in the 'applied' sector such as state departments of agriculture and frontline services to producers. A small increase in the government sector engaged in more strategic and basic research does not offset the decline in the applied sector.

The education sector accounts for around 20% of the overall employment of plant pathologists and entomologists, which is similar to 2006. Only 7% of respondents indicated employment in the commercial sector.

In terms of the application of capability, applied research dominates, followed by biosecurity, then strategic and basic research. Education/teaching remains at around 4% of full-time equivalents (FTEs) whilst there is a noticeable decline in extension and support services. It is not evident that the commercial sector sees itself as assuming these latter roles.

Agricultural and horticultural production dominate the primary focus of plant pathologists and entomologists and show little change in percentage FTEs between 2006 and 2012. In fact there are only small changes in primary focus across all areas. There has been an apparent loss of resource in agriculture storage, from an initial low figure in 2006 whilst there is an increase in the resource allocated to horticulture post-harvest.

In assessing the importance of specialty sub-discipline areas in plant pathology, respondents indicated that all remain important in 2012. Mycology, in particular, remains strong but, compared to the 2006 survey, there is increasing importance in the fields of nematology, molecular plant pathology and phytoplasmas. In entomology taxonomy/systematics continues to rate highest in importance with increasing importance in genetics and biochemistry.

The age profile of those employed in these two important disciplines has shifted sharply towards an older profile. The number of plant pathologists now in the over 55 age bracket has increased since 2006 with lower numbers now evident in the under 35 age brackets. It is a similar result for entomology.

These shifting profiles are of concern when put alongside service expectations. Of the 275 currently employed respondents, 28% will retire within the next 10 years and 40% within 15 years. A further 12% will be lost due to other factors and, therefore, in excess of 50% of the current capacity requiring replacement within 15 years just to maintain the status quo.

At the same time, respondents over 45 tend to have a strong likelihood to remain in their specialist field until retirement. Not surprisingly, commitment through to retirement reduces as the age profile becomes younger. This is most evident in the 35-45 age bracket where 20% of the 'Active' respondents indicate the likelihood of leaving their field within the 15 year horizon.

Research, communication and practical skills tend to be the most sought after by employers of plant pathologists and entomologists. Interestingly, many with managerial responsibility don't see their organisations as being particularly supportive of developing these skills internally. There is a tendency to seek post-graduates for employment, with the necessary skills already developed. Willingness to employ undergraduates and support them through internal training and professional development appears to be low. This area may need closer examination.

Finally, the survey gathered information on the areas of concern for respondents. Areas such as employment opportunities, career progression, tenure/funding constraints and work pressure all drew very high to extremely high levels of concern. From open-ended responses other areas to emerge with high levels of concern included the serious loss of skills through, retirements and redundancies coupled with the widespread lack of succession planning to capture departing knowledge. Frequent reference to the inadequate intake of new talent was also a common response in this area.

The following areas for action and follow-up are proposed in the report:

That the APPS and AES convene a joint action committee, with additional representation from the Plant Biosecurity Cooperative Research Centre to review of the 2012 findings and commit to a combined and coordinated strategy to address the key issues including:

- Development of targeted communication strategies for specific audiences including:
 - Politicians and policy makers
 - Science & Technology Australia
 - Funding agencies
 - Industry bodies and representatives
 - Course developers
- Development of retention strategies for employing organisations including:
 - Funding and tenure challenges
 - Commitment to professional development
 - Effective succession planning and knowledge transfer
 - Incentives structures that promote a range of skills (ie not just publication) that will encourage career progression and retention of skilled staff
- Attraction of new talent into the disciplines through:
 - High school recruitment programs
 - Active promotion of plant pathology and entomology careers during generalist undergraduate programs
 - Engagement of the societies with undergraduates to secure participation in society activities and motivate interest in plant pathology and entomology careers
 - Development of a visionary and inspirational career prospectus
 - Motivate an organisational commitment to the recruitment and development of undergraduates
- Coordinate with the tertiary sector and industry to develop innovative and flexible undergraduate training programs that include practical skills-development in key areas of future demand
- Identify and access new funding sources to underpin specialist training programs, for example, industry sponsorship or scholarships/traineeships

