Australian Government

Assessment Requirements for AHCARB704 Conduct an entomology research project

Release: 1

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Modification History

Release	TP Version	Comment
1	AHCv1.0	Initial release

Performance Evidence

The candidate must be assessed on their ability to integrate and apply the performance requirements of this unit in a workplace setting. Performance must be demonstrated consistently over time and in a suitable range of contexts.

The candidate must provide evidence for and demonstrate:

- describing and identifying anatomical, morphological and taxonomical features of insect specimens
- examining and describe the behaviour, ecology and nutrition of insect interaction with trees
- researching annualised population and generational behaviour of insects
- constructing a database of tree pests and vectors
- developing and documenting an insect collection
- compiling host climatic and geographic distribution data
- researching and identifying natural antagonists, predators and parasitoids of insects
- identifying phytophagous and damaging insect-tree dynamics
- identifying symbiotic/beneficial and insect-tree dynamics
- researching physiology of tree resistance to insects
- researching host-pathogen and pathogen-vector interactions
- evaluating conditions associated with the selection of host trees by subcortical feeding insects and the factors associated with successful attack
- researching and assess insect transmission of disease
- evaluating multi-trophic interactions between host plant-pest-pathogen/parasitoids from a systems approach
- determining economic costs of insects
- evaluating insects as environmental indicators
- determining insect biological hazards
- investigating direct and indirect impact and effects of chemical pesticides or biocontrol agents on target and non-target organisms
- researching insect resistance to pesticides
- investigating fungi as biological control agents of tree pests

- evaluating biological control methods of integrated pest management (IPM)
- researching and evaluating plant health management options to offset the effects of insect damage
- collecting, tabulating, and statistically analysing data for publications
- determining the relevance of the results to arboriculture
- compiling and communicate research and test results in a research paper
- submitting research paper to a professional technical peer-reviewed journal
- reviewing feedback and amend where appropriate
- communicating key facts and conclusions to industry in an article published in a non-technical industry publication or via presentation to an industry training event.

Knowledge Evidence

The candidate must demonstrate knowledge of:

- anatomical, morphological and taxonomical features of insect specimens
- behaviour, ecology and nutrition of insect interaction with trees
- annualised population and generational behaviour of insects
- database construction of tree pests and vectors
- annualised population of insects
- generational behaviour of insects
- insect collections
- generational phenology
- host, climatic and geographic distribution data
- natural antagonists, predators and parasitoids of insects
- phytophagous and damaging insect-tree dynamics
- symbiotic/beneficial and insect-tree dynamics
- physiology of tree resistance to insects
- host-pathogen and pathogen-vector interactions
- conditions associated with the selection of host trees by subcortical feeding insects
- factors associated with successful attack
- insect transmission of disease
- multi-trophic interactions between host plant-pest-pathogen/parasitoids from a systems approach
- economic costs of insects
- insects as environmental indicators
- insect biological hazards
- direct and indirect impact and effects of chemical pesticides or biocontrol agents
- target and non-target organisms
- insect resistance to pesticides
- fungi as biological control agents of tree pests
- biological control methods of Integrated Pest Management (IPM)
- plant health management options to offset the effects of insect damage
- collection, tabulation, and statistical analysis of data for publications

- compilation and communication of research and test results in a research paper
- professional technical peer-reviewed journal
- methods of reviewing and amending feedback
- methods of communicating key facts and conclusions in articles and presentations
- publishing in non-technical industry publications.

Assessment Conditions

It is an industry requirement that competency in this unit requires the identification by anatomical, morphological and taxonomical features of insect specimens, compiled into a collection of a minimum of one hundred (100) specimens of arboricultural concern or benefit from at least four (4) orders of insects. The collection may be digital and/or physical, correctly labelled and containing information on:

- date of collection
- location of collection
- host where applicable
- insect genus, and
- species where possible.

It is an industry requirement that research projects and management strategies include two or more of the following inter-disciplinary programs, and must focus on a specified insect or closely related insect species:

- Conceive, design, and implement safe and efficacious control strategies
- Research and develop alternative management strategies
- Investigate the longevity, infectivity, and virulence
- Monitor and assess infestation levels of outbreaks
- Design and implement biocontrol strategies using predators, parasitoids, and entomopathogenic fungi
- Design and implement methods for monitoring and assessment of population dynamics and distribution of tree pest species
- Conduct and evaluate a comparative ecological field study investigating efficacy and compatibility
- Trial and research a management plan for a phytophagous insect
- Trial and research a breeding program for a beneficial insect
- Conduct research of three model systems to examine tritrophic effects of susceptibility
- Design, implement, investigate, evaluate and report on tritrophic interactions
- Investigate preference and survivability
- Design projects investigating the subsequent risk analysis and tests required
- Develop a tree pest survey strategy
- Research and report on geographical or climatic distribution
- Coordinate an international and domestic multidisciplinary collaborative research initiative

Assessment must be demonstrated consistently over time in a suitable range of contexts and have a productivity-based outcome. No single assessment event or report is sufficient to achieve competency in this unit.

Assessment may be conducted in a simulated or real work environment, however determination of competency requires the application of work practices under work conditions.

The mandatory equipment and materials used to gather evidence for assessment include:

- equipment:
  - computer
  - word processing software
  - internet connection
  - digital camera with macro
  - diagnostic tools including sounding hammer, trowel, probe, cordless drill
  - soil testing equipment
  - digital dissection microscope 10 -100x
  - compound microscope
  - microtome, staining and slide mounting equipment
  - slides and coverslips
  - temporary/permanent mountant
  - histochemical stains
- materials:
  - entomology research paper
  - insect collection/database of pests and vectors

Assessors must satisfy current standards for RTOs in the assessment of arboriculture units of competency.

Assessment must be conducted only by persons who have:

- entomology vocational competencies at least to the level being assessed
- current entomology skills directly relevant to the unit of competency being assessed

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72