



Australian Government

Assessment Requirements for AHCARB807 Conduct an entomology research project

Release: 1

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Modification History

Release	Comments
Release 1	This version released with AHC Agriculture, Horticulture and Conservation and Land Management Training Package Version 5.0.

Performance Evidence

An individual demonstrating competency must satisfy all of the elements and performance criteria in this unit.

There must be evidence that the individual has conducted entomological research with a focus in any two of the following research themes:

- conception, design, and implementation of safe and efficacious control strategy
- research and development of alternative pest management strategies
- investigative study on the longevity, infectivity and virulence of tree pests
- monitoring and assessment of infestation levels of a pest outbreak
- design and implementation of biocontrol strategies using predators, parasitoids and entomopathogenic fungi
- design and implementation of methods for monitoring and assessing population dynamics and distribution of tree pest species
- implementation of a comparative ecological field study investigating efficacy and compatibility of pest insect control strategies
- research and test a management plan for a phytophagous insect
- research and test a breeding program for a beneficial insect
- research three model systems to examine tritrophic effects of tree susceptibility
- design, implement, investigate, evaluate and report on tritrophic interactions
- investigate preference and survivability of insects in a tree environment
- design projects investigating the subsequent risk analysis and tests required
- development of a tree pest survey strategy
- research and report on geographical or climatic distribution of insect pests
- coordination with an international and domestic multidisciplinary collaborative research initiative.

There must also be evidence that the individual has:

- investigated anatomical, morphological and taxonomical features of insects
- examined the interaction of insects with trees
- researched annualised population and generational behaviour of insects

- developed and documented a reference collection of a minimum of one hundred specimens of arboricultural related insects and vectors from at least four orders of insects, annotated with the following:
 - date of collection
 - location where insect was collected
 - host tree/plant on which it was collected/feeds
 - name of insect to at least the level of genera
- designed and developed a database to store information of tree pests and vectors
- compiled host climatic and geographic distribution data
- investigated and identified natural antagonists, predators and parasitoids of insects
- investigated phytophagous and damaging insect–tree dynamics
- investigated symbiotic/beneficial insect–tree dynamics
- investigated physiological responses of tree resistance to insects
- investigated host–pathogen and pathogen–vector interactions
- evaluated conditions affecting selection of host trees by subcortical feeding insects and factors associated with attack
- investigated and assessed insect transmission of disease
- evaluated multi-trophic interactions between host plant-pest-pathogen/parasitoids
- determined economic costs of insect damage to trees
- evaluated insects as environmental indicators of health and condition
- determined insect biological hazards
- investigated impact and effects of control strategies on target and non-target organisms
- investigated insect resistance to pesticides
- investigated and evaluate biological control agents of tree pest control
- researched and evaluated plant health management options to manage insect damage
- collected, tabulated and analysed data for publications
- determined relevance of results to arboriculture
- compiled and communicated research and results in a research paper according to standards expected of professional technical peer-reviewed journal
- submitted research paper for review
- reviewed feedback from reviewer and amended paper
- communicated key facts and conclusions to industry in an article or presentation.

Knowledge Evidence

An individual must be able to demonstrate the knowledge required to perform the tasks outlined in the elements and performance criteria of this unit. This includes knowledge of:

- research skills and designing research projects, including:
 - investigative skills and monitoring techniques
 - defining the scope and purpose of research activity
 - data collection, management and storage
 - data processing, analysis and modelling

- statistics and data interpretation
- design and development of formal research papers and the process of peer-reviewed publication
- design and development of industry papers and presentations for communication of research and findings
- entomology and the impact of insects on our environment, including:
 - anatomical, morphological and taxonomical features of different classes of insects
 - insect behaviour, ecology and nutrition and their interaction with trees
 - population and generational behaviour and phenology of insects and impact on plants and trees over time
 - host, climatic and geographic distribution of insects
 - insects as indicators of environmental health
- collecting, storing and documenting insect reference collections, including:
 - catching and preserving techniques
 - taxonomic and naming conventions for insects
 - tagging and labelling specimens
- design and construction of databases and data entry procedures
- insects and their economic impact on society and health of trees, including:
 - natural antagonists, predators and parasitoids of insects
 - phytophagous and damaging insects on tree dynamics
 - symbiotic and beneficial insects and impact on tree dynamics
 - natural responses of trees to insect invasion
 - host-pathogen and pathogen-vector interactions
 - subcortical feeding insects and conditions for selecting host trees
 - factors associated with successful attack
 - insect as a vector for transmission of disease
 - insects as biological hazards
- a systems approach to multi-trophic interactions between host plant-pest-pathogen or parasitoids
- pest insect control strategies, their advantages and disadvantages, including:
 - mechanical control
 - chemical control and pesticide resistance
 - biological control agents
 - managing the environment and tree health to offset infestations
 - integrated pest management (IPM)
- direct and indirect impact of chemical pesticides and biocontrol agents on target and off-target organisms.

Assessment Conditions

Assessment of the skills in this unit of competency must take place under the following conditions:

- physical conditions:
 - trees and forests with insect populations
- resources, equipment and materials:
 - computer with word processing, database and statistical analysis software
 - digital imaging device
 - diagnostic tools, including sounding hammer, trowel, probe, cordless drill
 - soil testing equipment
 - digital dissection microscope 10x – 100x
 - compound microscope
 - microtome, staining and slide mounting equipment
 - histochemical stains
- specifications:
 - standard procedures and quality standards for performing tests and analysis
 - reference materials and keys for insect identification.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards. In particular, assessors must have:

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

Links

Companion Volumes, including Implementation Guides, are available at VETNet: -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72>