Modification history

Release	Comments
Release 2	This version released with AHC Agriculture, Horticulture, Conservation and Land Management Training Package Version 4.0.
Release 1	This version released with AHC Agriculture, Horticulture, Conservation and Land Management Training Package Version 1.0.

AHCARB8XX	**Analyse mycology cultures**
Application	This unit of competency describes the skills and knowledge required to safely work within a laboratory environment, collect and identify wood decay fungi specimens from the field, prepare in vitro cultures, and carry out primary experiments on fungi cultures. Work is performed using laboratory hygiene and safety procedures for sampling, sterilisation and cleaning of laboratory equipment and instruments. This unit applies to individuals with advanced theoretical and technical knowledge and skills for professional or highly skilled work and/or further learning in one or more disciplines or areas of practice. This unit applies to individuals with advanced cognitive, technical and communication skills to provide specialist advice, analysis and generate and transmit solutions to complex problems. They demonstrate autonomy, well-developed judgement, adaptability and responsibility as a practitioner or learner. No occupational licensing, legislative or certification requirements are known to apply to this unit at the time of publication.
Prerequisite Unit	Nil
Unit Sector	Arboriculture (ARB)

Elements	**Performance Criteria**
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Research pathogenic and saprophytic wood decay fungi species	1.1 Investigate role of microbiological organisms on tree and forest health 1.2 Investigate the role and contribution of wood decay fungi to forest and tree health, and responses 1.3 Examine the taxonomy and evolutionary relationships of corticoid and polypore wood decay fungi 1.4 Investigate the role of fungal species on specific host trees 1.5 Analyse lifecycle, biology, ecology and effects of wood decay fungal species 1.6 Examine relationship between fungal species and tree defects and failures 1.7 Analyse biosecurity implications of pathogenic fungal species 1.8 Review state and federal biosecurity plans and procedures
2. Evaluate decay and identify fungi in trees	2.1 Observe and evaluate signs and symptoms of fungi causing decay in trees 2.2 Identify wood decaying fungi to generic level in field 2.3 Identify non-pathogenic fungi to generic level in field 2.4 Recorded location, size, and condition of wood decay fungi and mycoparasites of hollows and cavities in trees 2.5 Document details of environmental characteristics of fungal affected trees 2.6 Determine methods of dissemination and infection to other trees and vegetation 2.7 Sample wood decay fungi and mycoparasites from trees for in-vitro culture and identification

Elements	Performance Criteria
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
3. Prepare in-vitro media, cultures	3.1 Decant and prepare standard laboratory chemicals and materials 3.2 Prepare selective media to isolate and culture mycology specimens 3.3 Prepare field samples ready for culturing on media 3.4 Excise specimens and apply to media 3.5 Maintain cultures and repeat excise procedures to isolate clean specimens 3.6 Prepare and maintain cultured samples for further testing 3.7 Update records and store securely according to chain of evidence protocols
4. Conduct laboratory identification and assays	4.1 Prepare microscope slides of isolated cultures 4.2 Examine and identify cultured fungal samples 4.3 Perform laboratory identification of wood decay fungi to generic level 4.4 Record digital images of identified fungi 4.5 Perform laboratory assay tests to evaluate fungal characteristics 4.6 Document experimental assay test results 4.7 Develop and maintain mycology culture collection and submit to government database and culture collections according to procedures 4.8 Prepare a diagnostic report on suspected emergency plant pest according to state and federal biosecurity procedures

Foundation Skills (NB - To be completed following confirmation of PC's)

This section describes those language, literacy, numeracy and employment skills that are essential for performance in this unit of competency but are not explicit in the performance criteria.

Skill	Description
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Unit Mapping Information

Code and title current version	Code and title previous version	Comments	Equivalence status
AHCARB8XX Analyse mycology cultures	AHCARB702 Analyse mycology cultures	Change of AQF level. Minor edits to Elements Changes to Performance Criteria for clarity Updated Performance Criteria and Knowledge Evidence	Equivalent unit

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

TITLE	Assessment requirements for AHCARB702 Analyse mycology cultures

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 collected, cultured and analysed mycology samples for the following:

- conducted field identification of a minimum of ten (10) wood decay fungi to generic level
- conducted field identification of a minimum of ten (10) non-pathogenic fungi to generic level
- analysed the lifecycle, biology, ecology and effects of a minimum of ten (10) saprophytic wood decay fungi species on trees
- analysed the lifecycle, biology, ecology and effects of a minimum of ten (10) pathogenic wood decay fungi species on trees
- collected, cultured, analysed and identified a minimum of five (5) wood decay fungi to generic level.

There must also be evidence that the individual has:

- researched the role of microorganisms in the health of trees and forests
- researched the role and contribution of wood decay fungi to forest and tree health and responses
- examined the taxonomy and evolutionary relationships of corticoid and polypore wood decay fungi
- investigated the role of fungal species on various hosts
- analysed lifecycle, biology, ecology and effects wood decay fungi species
- examined relationships of fungal species with tree defects and failures
- analysed biosecurity implications of pathogenic fungal species
- reviewed state and federal biosecurity plans and procedures
- observed and evaluated signs and symptoms of fungi causing decay in trees
- Recorded location, size, and condition of wood decay fungi, presence of mycoparasites, and size, condition and extent of hollows and cavities
- documented details of environmental characteristics of fungal affected trees
- determined methods of dissemination and infection of adjacent trees and vegetation
- sampled wood decay fungi and mycoparasites from trees for in-vitro culture and identification
- decanted and prepared standard laboratory chemicals and materials
- prepared selective mycological culture media to grow and isolate field samples
- prepared field samples of fungi for culturing on media
- excised fungal specimens and applied to media
- maintained cultures and repeat excise procedures to isolate clean specimens
- prepared and maintained cultured samples for further testing
- updated records and securely stored evidence according to chain of evidence protocols
- prepared microscope slides of isolated cultures
- examined and identified cultured fungal samples to generic level
- recorded digital images of identified fungi
- performed laboratory assay tests to evaluate fungal characteristics
- documented experimental assay test results
- developed and maintained a mycology culture collection and submitted to government databases and culture collections according to procedures
- prepared a diagnostic report on a suspected emergency plant pest according to state and federal biosecurity procedures.

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:

- microbiological organisms and their impact on the health of forests and trees including:
  - bacteria
  - fungi
  - protozoa
  - algae

Knowledge Evidence

- viruses
- fungi in the forest environment including impact on:
  - biodiversity
  - tree nutrition
  - forest health
  - environmental biochemistry
  - pathology
- taxonomy and evolutionary relationships of corticoid and polypore wood decay fungi including:
  - lifecycles, biology and ecology
  - important pathogenic and saprophytic tree wood decaying fungi
- tree infections of tree components by fungal species and tree failure
- visual symptoms of decay and tree decline including:
  - dieback
  - reduced growth rate and chlorosis
  - presence of basidiocarps
  - decayed wounds
  - hollows and cavities
- State and Federal biosecurity plans and procedures including:
  - biosecurity implications of known and threat fungal species
  - Australian Emergency Plant Pest Response Plan
- field identification fungi and fungal infections of trees including
  - pathogenic fungi
  - non-pathogenic fungi
  - recording and describing location, size, and condition of wood decay fungi
  - presence of mycoparasites
  - size, condition and extent of hollows and cavities
- environmental characteristics and growing conditions of trees affected by fungi including:
  - site characteristics and site history
  - soil conditions
  - climate and microclimatic variables
  - proximity of adjacent trees and vegetation
  - movement of people and vehicles
  - potential impact on assets, property and landscape
- tree infection methods and introduction, establishment, spread, and susceptibility of trees
- collecting and sampling of fungi in the field including:
  - field sampling techniques of wood decay fungi and mycoparasites
  - storage of collected samples
- standard laboratory techniques for preparing, measuring and decanting chemicals and materials
- culturing fungi for identification in the laboratory environment including:
  - species specific media and growing environment for culturing fungi
  - techniques to prepare and extract field samples for culturing
  - methods of excising and inoculating media with specimens
  - isolating clean cultures from primary cultures
  - preparation and maintaining clean cultured samples
- laboratory assay tests for fungal species identification including:
  - deoxyribonucleic (DNA) based assay techniques
  - growth rate
  - temperature range
  - pathogenicity
  - mycoparasitism
  - documentation of assay test results
- laboratory identification of wood decay fungi including:
  - procedures and techniques for the preparation of microscope slides of isolated cultures
  - identification of cultured fungal samples
  - use of guides, keys and reference materials for identifying fungi
- development and maintenance of culture collections

Knowledge Evidence

- the importance and procedures for chain of evidence protocols including:
  - secure storage of digital and physical evidence
  - storing and recording field samples
  - maintaining accurate records for slides, cultures and DNA samples
  - digital imaging techniques and importance in evidence and record keeping
- maintaining fungi collections including:
  - methods of submission to relevant government databases and culture collections
- record keeping, reports and documentation requirements including:
  - state and federal biosecurity procedures
  - emergency plant pest (EPP) and PLANTPLAN guidelines.

Assessment Conditions

Assessment of skills must take place under the following conditions:

- physical conditions:
  - access to a trees with fungal infections or environment that accurately represents this workplace conditions
- resources, equipment and materials:
  - computer with word processing software
  - digital imaging device
  - diagnostic tools including sounding hammer, trowel, probe, cordless drill
  - soil testing equipment
  - digital dissection microscope 10 -100x
  - compound microscope
  - laboratory equipment to perform aseptic techniques in a sterile environment
  - culture growing environment
- specifications:
  - access to standard procedures and quality standards for growing culture, performing tests and conducting assessments
  - access to reference materials for fungi identification.

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

Assessment must be conducted only by persons who 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.education.gov.au/Pages/TrainingDocs.aspx?q=c6399549-9c62-4a5e-bf1a-524b2322cf72