KEY AREAS OF RESEARCH EXPERTISE:

- Weed biology, seed ecology and soil seedbank management;
- Ecology and management of invasive and native weed species;
- Impact of grazing on arid woodland species and community dynamics in grazing systems;
- Environmental impact assessment;
- Systems optimization and modeling;
- Sustainable resource management.

OTHER RESEARCH CAPABILITIES:

- Developing guidelines for weed management;
- Examining the biology, seed ecology, physiology of newly emerging weeds.

NANYA

The University manages Nanya Station, a 40,000 hectare Research Station in far western New South Wales, which acts as a living laboratory. Nanya supports a variety of intact and unique ecosystems including of natural salt lakes and old-growth Mallee vegetation. It provides excellent research opportunities for large scale studies of natural vegetation communities and is a unique opportunity for the University to showcase its track record by putting research into practice.

Federation University Australia (FedUni) researchers are contributing to knowledge generation in Australia and worldwide.

In line with national, state and institutional research priority areas, a programmatic research theme of weed science has been established at FedUni. This work has already gained significant traction within the environmental management community, and has attracted a number of influential external partners.

We have developed a strong profile in weed ecology and weed management, and the success of this initiative can be measured in terms of its tangible outputs to date. There have been numerous peer reviewed publications, completed weed biology projects, assessments of biological control agents, postgraduate research degree completions and first class Honours student awards. In addition, there has been the attraction of over $1 million of external research funding over the past 10 years through both national competitive grant schemes and commissioned research with industry partners.

Collaborative, multi-disciplinary research between FedUni and other Australian leaders in weed science research has been a successful part of the strategy for this program. FedUni weed science researchers have developed strong research and development collaborations with colleagues at other universities and at various state and federal government institutions across the country. These are in the areas of ecology, weed ecology and management, biological control, and a range of specialized topics in relation to management of arid woodland tree species. Collaborating organisations include: Charles Sturt University’s (CSU) Weed Research Team, the University of Queensland (UQ), the Victorian Government Department of Environment, Land and Water Protection (DELWP), the New South Wales Department of Primary Industry (DPI), the Queensland Alliance for Agriculture and Food Innovation, the Botanic Gardens and Parks Authority (Kings Park) in Western Australia, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Research Division of Agriculture Productivity, and the Department of Economic Development, Jobs, Transport and Resources (DEDJTR).

The University has also conducted research related to grain and oilseed cropping in the western Victoria region, including collaborative research with Southern Farming Systems and the Birchip Cropping Group. One of the central contributions of the Weed Science Research Program at FedUni was an assessment of past restoration efforts within the Murray Water Catchment system, which has enormous implications for Victoria’s future food security.

The Faculty of Science and Technology has recently completed a major infrastructure upgrade at the Mt Helen Campus (Ballarat) with the commissioning of a new science complex housing state-of-the-art research and analytical facilities including a weed ecology laboratory with facilities for study of plant growth and development including seed incubation and controlled environment growth cabinets with CO₂ control.
A SAMPLE OF CURRENT PROJECTS:

- Factors affecting seed germination of Feather Fingergrass (Chloris virgata Sw.);
- Optimising the management of invasive aquatic plants targeted for extirpation from catchments and waterways; utilising alligator weed (Alternanthera philoxeroides) as an indicator species;
- Weed seed ecology and management of low rainfall agricultural weeds: Marrubium vulgare, Citrullus lanatus, and Salvia verbinanca;
- Will rising atmospheric CO2 levels affect the Glyphosate resistance of C3 and C4 weeds to a different extent?;
- Seed dormancy and germination requirements of Dinebra panacea and Amaranthus hybridus;
- Influence of environmental factors on seed germination, and seedling emergence of the agricultural weed Wild Lettuce (Lactuca serriola L.);
- Ecology and management of aquatic weeds in Lake Wendouree;
- Influence of various environmental factors on seed germination and seedling emergence of Galenia pubescens (Carpet Weed);
- An investigation of the ecology and invasion impacts of a native Australian shrub Acacia longifolia ssp. longifolia in southeastern Australia.

Recently completed projects

- Detection, quantification and management of the dispersal of Nassella neesiana (Chilean needle grass) seeds in hay bales;
- Dry lakes and drifting seed–heads: the ecology of fairy grass Lachnagrostis filiformis.
- What ecological and environmental conditions facilitate the establishment and persistence of the weed Lachnagrostis filiformis (G. Forst.) Trin. in western Victorian Lakes?
- The impact of site history on the viable soil-seed bank in Leptospermum laevigatum infested areas of the Yanakie Isthmus, Wilsons Promontory National Park.
- Effects of Tetranychus lintearius (Acari: Tetranychidae) on the structure and water potential in the foliage of the invasive Ulex europaeus (Fabaceae) in Australia.
- Ecology of the invasive weed Salvia verbenaca (Wild sage) in the rangelands of western New South Wales.

International Project

This multifaceted international investigation totalling over $3M and involves collaboration between Universities across the world, is funded by Brunei Research Council. It is concerned with the spread of exotic Acacia species into native habitats within Brunei Darussalam, and is titled ‘Understanding the causes of, and management strategies for these invasive species’. This is a three-year joint initiative with University Brunei Darussalam University of Aberdeen, University of Cambridge and Federation University in the key research areas of invasive ecology and management.