

Scholarships help refine novel weed management

Novel weed management methods are the focus of two recently completed fourth year projects by students at the Institute of Agriculture (IOA), The University of Western Australia.

Professor Kadambot Siddique, IOA's Director, says weeds competing with crops and pastures for sunlight, water and nutrients are a major constraint to agricultural production, costing farmers billions of dollars each year in lost production and management costs.

"With global population forecast to exceed nine billion by 2050, there will be a significant and increasing demand for food without increasing the land area used for agriculture.

"Agriculture already uses 70 per cent of the world's fresh water and more than half of its habitable land, so production increases must come from higher crop yields and more effective weed management is a vital part of that," Siddique said.

Robert Alderman of Perth, supervised by Dr Jason Stevens, Kings Park and Botanic Gardens, Dr Michael-Saam Renton, UWA School of Plant Biology and Professor Stephen Powles, Director of the UWA-based WA Herbicide Resistance Initiative, investigated use of karrikinolide, a germination stimulant isolated from smoke.

Stimulate germination

"The idea is to stimulate weed seed germination so more of the weed population is available for control and consequently there are less seeds remaining in the seed bank within the soil," Robert said.

"With the declining effectiveness of some herbicides, there is an increasing need for alternative weed control strategies.

"Understanding the dormancy release characteristics of weed species is essential for predicting when applying karrikinolide to cropping paddocks would be most beneficial, as it can't force dormant deep seeds to germinate," Robert said.

Wild radish, wild oat and wild turnip successfully germinated when seed was exposed to karrikinolide, but the challenge will be translating this to broadacre field conditions.

Like Robert, Honours student Ellen Weetman of Albany is well aware that effective weed management is a key ag-



University of Western Australia Institute of Agriculture Director, Professor Kadambot Siddique, with Ellen Weetman of Albany and Robert Alderman of Perth, who both focused on novel weed management methods for their recently completed fourth year projects.

ronomic practice determining agricultural success.

Tactical pasture and ley phases

Ellen's resource economics project assessed how tactical ungrazed pasture, or ley phases in intensive crop only farms, could address declining soil fertility and increasing levels of herbicide resistance.

"Depressed livestock prices, ongoing rural labour scarcity and elevated cereal prices mean that intensive cereal production and crop only farming systems are becoming increasingly common features of our grainbelt," Ellen said.

A complex simulation model assessed alternative integrated weed management strategies, using tactical ungrazed pasture phases and showed that tactical use of a single year, ungrazed pasture phase was more profitable than using break crops in intensive cereal production systems.

"And in contrast to previous analyses and general practice, alternating short periods of cropping and pasture is more profitable than extended crop and pasture phases," she said.

Ellen indicated flexible land use sequenc-

es had a 10 per cent economic premium compared to fixed land rotations.

"And as the supply of effective selective herbicides becomes more limited, using ungrazed pasture fallows to opportunistically control weeds and improve soil fertility will become increasingly profitable," she said.

Drs Graeme Doole and Michael Renton of UWA and Dr Clinton Revell of the Department of Agriculture and Food WA, supervised Ellen's fourth year research project.

Robert and Ellen were supported by Cooperative Bulk Handling (CBH) scholarships during their fourth year research projects, with Robert also receiving a summer scholarship for his project from Kings Park and Botanic Gardens.

CBH and UWA have a memorandum of understanding to collaborate on undergraduate and postgraduate education and research in agriculture at UWA.

CBH has already supported six agricultural science graduates in their fourth year projects and two PhD top up scholarships at UWA. ■