APPS Fellow Dr Gretna Weste

Gretna Weste was a member of staff of the School of Botany, University of Melbourne, from 1961 (Senior Demonstrator) to 1982 (Associate Professor). Her responsibilities involved teaching undergraduates in Botany, Agriculture and Forestry and post graduates in Plant Pathology. During her time at the School of Botany Gretna made an outstanding contribution to both teaching and research in plant pathology. She has supervised numerous PhD, Masters and Honours students many of whom have followed in her footsteps and made their own impacts in plant pathology.

Gretna's studies in plant pathology began with wood destroying fungi (Basidiomycetes) in Victorian forests of mountain ash (*Eucalyptus regnans*). Blocks of wood were inoculated with isolates to check for subsequent decay and loss of weight, which defined those fungi that were pathogenic. Her PhD was obtained from studies with take-all disease of cereals when attacked by the Ascomycete, *Gaeumannomyces graminis.* At the time there was confusion among cereal growers and Agricultural Stations between take-all and the disease caused by the barley yellow dwarf virus.

In 1969 forest dieback was reported from seven small shrubs growing beneath stringybark eucalypts (*E. obliqua, E. baxteri* and *E. macrorhyncha*) in the open forest of the Brisbane Ranges in Victoria. Dieback was subsequently shown to have invaded open forests of the Grampians, Wilsons Promontory, the Otways and Kinglake. With the assistance of a succession of research

students Gretna established the causal pathogen to be the Oomycete, *Phytophthora cinnamomi,* and tested Koch's Postulates within the forest.Gretna measured its pathogenicity to each native species, its rate of spread and assayed restrictive barriers.

Her subsequent research in Victorian vegetation communities led to her exceptional 30+ year study of the disease in open forests and heathlands. Most recently, and prior to her "real" retirement and move to Tasmania to be with her family, Gretna and her students had concentrated on rare endemic species under threat of extinction from this pathogen.

In 1983 Gretna was awarded a DSc for her collected works and her outstanding contribution to plant pathology and mycology. In that year she was Organising Chair of the highly successful 4th

International Congress of Plant Pathology which was held in Melbourne . In 1989 she was awarded a Member in the Order of Australia (AM) medal for her research in botany and in 1992 the Australasian Plant Pathology Society made her an Honorary Member (one of only six in the Society). Gretna was made Patron of the Australasian Mycological Society in 1999.

Gretna 's numerous contributions to plant pathology, botany and mycology and her unflagging energy and enthusiasm made her the obvious choice to deliver the McAlpine Lecture at the 15th Biennial Conference of the Society held in 2005 in Geelong. Gretna 's richly illustrated lecture was entitled 'A long and varied fungal foray' and she received a standing ovation at its conclusion.

Gretna passed away in September 2006, and is survived by her three children, six grandchildren and one great grandchild. Her death is a great and sad loss to the Society, but we can continue to celebrate her life through her published works and the knowledge that plant pathology in Australia has grown significantly through her contributions.

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OBITUARIES

Gretna Margaret Weste (1917-2006) -

Plant pathologist in Australian forests

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Fire and disease are among the catastrophic interruptions which dramatically shape forest ecosystems and their histories. Unlike fire, to which plants in Australian post Gondwanan ecosystems have long become adapted, the widely destructive "dieback" pathogen, Phytophthora cinnamomi, is a relatively recent intruder - one which we humans have unwittingly introduced and spread. Commonly known as "cinnamon fungus" because of its initial discovery on cinnamon trees, P. cinnamomi (with its swimming spores) is more closely related to certain algae than fungi. Both fire and Phytophthora shaped the research career of Australia's much missed botanist, mycologist and plant pathologist, Dr Gretna Weste (née Parkin), who died last year.

Gretna Parkin learned about Australian forests, their plants and pathogens, at the University of Melbourne in the 1930s when the University's botany department was rich in forest interest and expertise - both staff and students. Students included Creswick-trained foresters, who studied second and third year botany in the Bachelor of Science (BSc) degree course. Professor Alfred Ewart, author of Handbook of Forest Trees for Victorian Foresters, argued for university involvement in Victorian forestry education, and was the long standing chairman of the Board of Examiners of the Victorian School of Forestry at Creswick. Dr Reuben Patton, whose research focussed on forests and timber, taught plant taxonomy and ecology. With a Harvard Master of Forestry (MF) degree and a

Melbourne Doctorate of Science (DSc) degree for his thesis, "The factors controlling the distribution of trees in Victoria", Patton wrote a series of articles on Victorian vegetation, including the Red Box - Red Stringybark and Box - Ironbark associations, and an introductory book on common eucalypts, Know Your Own Trees. Associate Professor Ethel McLennan taught plant pathology and mycology, and supervised research on rot and decay in trees and timber for the Forests Commission of Victoria (FCV) and the Forest Products Division of CSIR (later CSIRO) - often for the University's Master of Science (MSc) degree. This was the university department in which Gretna studied botany during her three year BSc degree course.

In her third year in 1937, Gretna Parkin shared the Botany Part III Exhibition with Alan Gordon, a Creswick-trained forester, and gained a scholarship to undertake research for the MSc degree in 1938. Gretna investigated wood structure in the new South Melbourne premises of CSIR's Forest Products Division - in

H.E. Dadswell's Wood Structure Section where, as Assistant Wood Anatomist, an earlier Melbourne botany graduate, Audrey Eckersley, MSc, had worked for several years on the structure of Australian timbers. Gretna studied the "reaction wood" which forms in response to bending.

Compression wood in softwood trees was understood, but the structure of reaction wood in Australian hardwood trees was undocumented. Using bent logs from Victorian forests and some sent by Max Jacobs from the federal Forestry Bureau in Canberra1, Gretna investigated the anatomy and strength of the tension wood formed above the bend. Her foundation investigations gained her the nickname "Gelatinous Gretna" due to the gelatinous cellulose layer inside the tension wood.

In the spring of 1938 Gretna took a short break from her MSc research project to help introduce Ewart's

newly-arrived successor, Professor John Turner, to Australia's very tall and very flammable Mountain Ash, Eucalyptus regnans, forests beyond Marysville.

The bushfires in January 1939 left vast numbers of Mountain Ash and other eucalypts killed but not incinerated in Victoria's central highlands, and Gretna was appointed to the FCV to investigate the preservation and durability of this huge timber resource. Gretna Parkin was not the first female botany graduate from the University of Melbourne to work in the FCV. She remembered two working there in 1938 - Edna Cromie, BSc, in the library, and Joy Girdwood, MSc2, with a

clerical job - but she, Gretna, was invited by the FCV chairman (A.V. Galbraith) to accept a research officer position. Gretna worked for some months in the FCV library (during Edna's absence), then moved to a laboratory in the Treasury Building, East Melbourne, from where, with her MSc degree (conferred on

1st April 1939), she undertook her work as forest pathologist - research on the fungal decay of living eucalypts as well as the preservation for pulpwood of dead standing trees. Gretna remembered accompanying foresters into the bush to collect samples - always the sole woman and always treated with helpful courtesy and respect. Surprised that, unlike her male research officer colleagues, her salary did not increase incrementally she queried the situation. The Public Service Board investigated her research reports and typewriter free laboratory and, ignoring the apparently irregular paperwork of her appointment, somehow concluded that, as a woman, her classification and salary were those of a temporary typist. Gretna's findings that preservation of timber, including the rot susceptible Mountain Ash, required constant dryness or constant wetness led to the FCV's policy of keeping salvaged timber sprayed with water; but her paper on wood rotting fungi on forest

trees was not published.

In December 1941 Gretna married Geoff Weste, a Creswick-trained forester and, since married women were not accepted in the Public Service, she had to resign from the FCV. Fortunately marriage was not an explicit barrier to university women, and Professor Turner welcomed her back in the wartime-depleted Botany School to continue, albeit briefly, work he claimed was of national importance - research on the pathology and preservation of timber salvaged after the 1939 fires. Professor Turner also arranged for her to undertake research on decay in mine-timber in Broken Hill in 1942. That year the University and the FCV finally reached an agreement on a new University forestry course. A Bachelor of Science in Forestry (BScF) degree course would be available to Creswick-trained foresters and the Forestry School would be established within the Science Faculty.

Gretna Parkin working in the FCV laboratory in 1940. Photo courtesy of Sandra Heard (née Weste).

In 1961, after an absence of nearly two predominantly domestic decades, Gretna returned to the Botany School, where she taught and undertook research in plant pathology. From 1965 she taught forest pathology to BScF students. In 1969 she was awarded a PhD degree for her thesis on a fungal disease of wheat - just as two coincident events propelled her back to Victoria's forests. That year it was decided that University research and teaching in agricultural plant pathology would be transferred from the Botany School to the Agriculture School, and symptoms of a non-agricultural disease were detected in a Victorian forest. Frank Podger had recently completed his University of Melbourne MScF thesis on the devastating "dieback" caused by Phytophthora cinnamomi in Western Australia's Jarrah forests3, and

Gretna's ecologist colleague, Dr David Ashton, took him to the Brisbane Ranges, west of Melbourne, where they noticed symptoms which were confirmed to be caused by P. cinnamomi. This was its first record in eastern Australian forests, P. cinnamomi having probably reached the Brisbane Ranges State Forest during road construction in the early 1960s.

And so, from the Botany School, Dr Gretna Weste transferred her research gaze from an agriculturally important soil-borne pathogen to one which was seriously threatening Australian forests. In the 1970s she undertook and supervised research on diverse aspects of P. cinnamomi in Australian ecosystems, sometimes in collaboration with the FCV, and contributed to inquiries into pulpwood harvesting in Australia, a pulpwood industry in east Gippsland and a woodchip industry. She continued to teach forestry students. When the University's Forestry School was transferred from the Science Faculty to amalgamate with Agriculture in 1973, the Bachelor of Forest Science (BForSc) degree was established and Gretna taught BForSc undergraduates about interactions between micro-organisms and plants in Australian ecosystems.

She was an executive member of the International Society of Plant Pathologists' Committee on Phytophthora, chaired the Organising Committee of the Society's 4th International Congress of Plant Pathology, which was held in Melbourne in 1983, and was research group leader on the Disease Impact Section of the International Union of Forestry Research Organizations. Beyond her official retirement as Reader in 1982, her receipt in 1984 of a DSc degree for her published research papers and in 1989 a Member of the Order of Australia (AM) for her scientific contributions, and subsequent honours and awards, Dr Weste and her postgraduate students continued their investigations of the physiological and ecological consequences of this virulent root rotting pathogen which, unfortunately for Australian forests, uses many hundreds of Australian species as plant hosts.

As stringybark and ash eucalypts, banksias, and whole understoreys of colourful, insect-, bird- and

mammal-attracting species succumbed to dieback, Weste et al followed the fate and fancies of P. cinnamomi in Victoria's Brisbane Ranges, Grampians, Wilsons Promontory and east Gippsland. Long-term studies have allowed them to document the recovery of some vegetation - the common, but not universal, decline in the pathogen's presence and the concomitant reappearance of susceptible trees and understorey species decades after the initial infestation of P. cinnamomi.

Their ongoing investigations in the Brisbane Ranges and Grampians State Forests were begun in conjunction with the FCV whose recent research on rare and endangered plants endemic in the Brisbane Ranges and Grampians (Gariwerd) National Parks have revealed Grampians Rock Banksia, Banksia saxicola, and other species to be highly susceptible to P. cinnamomi and, alarmingly, at high risk of extinction.

The patient, perceptive and persistent investigations of Dr Gretna Weste and her students and colleagues have shown how this alien micro-organism devastates Australian forest and woodland ecosystems, and how logging and other vehicle-facilitated operations have silently spread the infestation. They have revealed the modus operandi of the pathogen, the different susceptibilities of Australian forest plants, and the cyclic nature of the infestation, all of which enrich our understanding of forest histories and management. Forest managers now have scientific data on which to base appropriate management practices to sustain and shape Australian forests into the future.

Of Dr Weste's over 100 papers on P. cinnamomi, the following provide glimpses of a few of her forest research projects and collaborators:

Weste, G. et al. 1971-73. "Invasion of native forest by Phytophthora cinnamomi", Australian Journal of Botany

19: 281-294; 21: 13-29; 21: 31-51.

Weste, G. and Ruppin, P. 1975. "Factors affecting population density of Phytophthora cinnamomi in native forests of the Brisbane Ranges, Victoria", Australian Journal of Botany 23: 77-85.

Weste, G. et al. 1971-73. "Invasion of native forest by Phytophthora cinnamomi", Australian Journal of Botany

19: 281-294; 21: 13-29; 21: 31-51.

Weste, G. and Ruppin, P. 1975. "Factors affecting population density of Phytophthora cinnamomi in native forests of the Brisbane Ranges, Victoria", Australian Journal of Botany 23: 77-85.

Weste, G. and Vithanage, K. 1978. "Effect of Phytophthora cinnamomi on microbial populations

associated with the roots of forest flora", Australian Journal of Botany 26: 153-167.

Hinch, J. and Weste, G. 1979. "Behaviour of Phytophthora cinnamomi zoospores on the roots of forest species", Australian Journal of Botany 27: 679-691.

Weste, G. 1979. "The plant communities" in Phytophthora and Forest Management in Australia: Report of a conference held at CSIRO, Division of Forest Research, Canberra, 18-20 October 1978, ed.

M.K. Old (CSIRO: Melbourne).

Weste, G. 1981. "Changes in the vegetation of sclerophyll shrubby woodland associated with invasion by Phytophthora cinnamomi", Australian Journal of Botany 29: 261-276.

Weste, G. and Marks, G.C. 1987. "The biology of Phytophthora cinnamomi in Australasian forests", Annual Review of Phytopathology 25: 207-229.

Weste, G. 1992. "Phytophthora root rot and dieback of forest trees" in Plant Diseases of International Importance, eds. U.S. Singh et al. (Prentice Hall: Englewood Cliffs, N.J.).

Weste, G. 1997. "The changing status of disease caused by Phytophthora cinnamomi in Victorian open forests, woodlands and heathlands", Australasian Plant Pathology 26: 1-9.

Weste, G., Brown, K., Kennedy, J. and Walshe, T. 2002. "Phytophthora cinnamomi infestation - a 24 year study of vegetation change in forests and woodlands of the Grampians, Western Victoria", Australian Journal of Botany 50: 247-274.

Weste, G. 2003. "The dieback cycle in Victorian forests: a 30 year study of changes caused by Phytophthora cinnamomi in Victorian open forests, woodlands and heathlands", Australasian Plant Pathology 32: 247-256.

(I thank Fintán Ó Laighin, John Dargavel, Alan Brown and Norman Endacott for forestry information.)

1. Forerunner of the Forestry and Timber Bureau.

2. The title of Girdwood's 1937 MSc thesis is "The toxicity of various chemicals to some wood destroying fungi".

3. While working in Western Australia for the Commonwealth Forest Research Institute (newly established from divisions of the Forestry and Timber Bureau), Podger was an external postgraduate student of the University of Melbourne. For his thesis, "Aetiology of Jarrah Dieback", Podger's MScF degree was conferred in absentia in December 1968.