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SECTION 1: THE SCHOOL OF PLANT BIOLOGY

1.1 INTRODUCTION

The School of Plant Biology was established in 2002 when, as a result of the academic restructuring of The University of Western Australia (UWA), Plant Sciences and the Western Australian Herbicide Resistance Initiative (WAHRI), in the former Faculty of Agriculture, merged with the Department of Botany, in the former Faculty of Science. The School is one of four Schools (Agricultural Resource Economics (SARE), Animal Biology (SAB), Earth and Geographical Sciences (SEGS), and Plant Biology (SPB)) that, together, comprise the Faculty of Natural and Agricultural Sciences (FNAS). Because of the nature of its teaching and research activities, the School interacts closely with the Faculty of Physical and Life Sciences. It also has close associations with the Botanic Gardens and Park Authority (BGPA), through a Strategic Alliance; the Centre for Legumes in Mediterranean Agriculture (CLIMA); the Bushfire CRC; the CRC for Coastal Zone, Estuary and Waterways Management; the CRC for Plant-based Management of Dryland Salinity; and the Centre for Microscopy and Microanalysis (CMM).

In this portfolio we describe the teaching activities of the School, how these activities are evaluated by our students and peers, and how our research is integrated into the teaching activities. Significantly, we outline how the School over the past three years has successfully approached the teaching challenges posed by the academic restructuring. This approach has been built on the long history of teaching-related endeavour by the former Botany and Plant Sciences staffs, thus, where applicable, evidence of teaching-related strengths prior to 2002 is presented.

1.2 SCHOOL MISSION

In 2002, the School developed a vision statement to ensure that the academic opportunities offered by the merger were used to the School’s and its students’ maximum advantage. This vision statement was subsequently developed into a Strategic and Operational Plan 2004-2009, and has become a model within our Faculty. The Plan identified five key areas for the School as related to the functioning of plants in natural and managed ecosystems, terrestrial as well as aquatic. These five areas were considered by the staff to offer the greatest potential in teaching and research, from regional, national, and international perspectives. The five key areas on which the School focuses its activities are:

- Conservation Biology
- Crop Science
- Marine and Estuarine Science
- Plant Genetics and Molecular Biology
- Plant Physiology and Ecology

The mission of the School is to produce graduates with a sound knowledge and understanding of the plant sciences, and who are able to apply and communicate their knowledge in areas that address the needs of community as related to agriculture, horticulture, the pastoral industry, forestry, the mining industry, and the natural environment. To facilitate this mission the School draws on the experience and knowledge of a large number of adjunct appointments from organisations such as the BGPA, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Department of Agriculture of Western Australia (DAWA), and the Department of Conservation and Environment (CALM).

1.3 STAFF
The School of Plant Biology has some 25 academic staff under the leadership of Professor Hans Lambers. The teaching and research activities of the School are further complemented by contributions from 47 research-only staff, 29 adjunct appointments, and 14 honorary appointments. Supporting staff comprise the School Manager, five administrative staff and four technical staff. All members of the academic staff and the School Manager have PhD qualifications. Appendix 1 lists all academic staff members, the key area(s) in which they participate and their expertise.

Staff of the School are spread over three main locations, the Botany Building, the Central and Northern wings of the Agriculture buildings with small research groups in a further two annexes. School members, staff and post-graduate researchers have sought to minimise the challenges of their different locations by coming together for a communal morning tea each Friday. Two or three School members on each occasion are responsible for providing morning tea from funds provided by the School.

The School has a sound national and international reputation, attracting national and international students of high quality. It has strong publication and citation records, and high success rates in competitive grant applications. An independent study, carried out at the Australian National University, recently established that the publications in agricultural sciences at UWA, over a decade, attracted more citations than those of any other Faculty of Agriculture in Australia. UWA has seven of the world’s most highly cited researchers amongst its staff, an outstanding record in itself, but more outstanding still is the fact that three of these are from the School of Plant Biology, Professors Hans Lambers and Steve Powles, and Emeritus Professor John Pate.

SECTION 2: CORE INDICATORS OF TEACHING AND LEARNING FOR THE SCHOOL OF PLANT BIOLOGY

2.1 INTRODUCTION

The School of Plant Biology contributes to the following undergraduate programmes:

3-year degrees— BSc (Botany major)  
                    BSc (Environmental Science)  
                    BSc in Conservation Biology (new in 2005)  
                    BSc in Marine Science

The aim in the 3-year programmes is to produce highly competent discipline-based graduates who, if they continue into the end-on Honours year, will have the ability to enter a research-focused career, either directly or following further post-graduate studies.

4-year degrees— BSc in Agriculture  
                    BSc in Animal Science  
                    BSc in Conservation Biology and Management (new in 2005)  
                    BSc in Horticulture and Viticulture  
                    BSc in Landscape Management  
                    BSc in Natural Resource Management

The aim in the 4-year programmes is to produce graduates who, in addition to a strong discipline base, also have some management training, and an experience of independent research. Such graduates will be well qualified for a professional career in the applied sciences of agriculture, horticulture, viticulture and natural resources, but could also consider a career in research.
A complete listing of undergraduate units taught within the School or in collaboration with other Schools in 2004, together with the names of the coordinators, enrolments, relationship to the BSc degrees, and assessment, is provided in Appendix 2. Enrolment numbers are summarised by Level in Table 1. The range of units taught focus on basic and applied areas embraced by the five key areas of the School’s operations. The aims, outcomes and procedures for each unit are described in Unit Outlines, a selection of which is shown in Appendix 3.

Table 1: Enrolment numbers in units taught wholly or in part by SPB arranged by Level for the period 2003-2005.

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1:</td>
<td>705</td>
<td>936</td>
<td>1062</td>
</tr>
<tr>
<td>Level 2:</td>
<td>311</td>
<td>356</td>
<td>419</td>
</tr>
<tr>
<td>Level 3:</td>
<td>496</td>
<td>408</td>
<td>343</td>
</tr>
<tr>
<td>Level 4: 4-year</td>
<td>26</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>End-on Honours¹</td>
<td>7</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>1545</td>
<td>1731</td>
<td>1863</td>
</tr>
</tbody>
</table>

¹ units for end-on honours have been combined

The School recognises that first-year students enter the University with a variety of backgrounds and subject knowledge, and they are not always clear as to what course they want to study. For this reason the School favours as common a first-year course as possible, one that provides a university experience, an introduction to concepts important to a range of disciplines, and allows for the possibility of an early change in study direction.

One effect of the introduction of the 6-point unit structure has been increased difficulty in establishing core disciplines of the School in second-year along with encouraging students to take other, desirable, but non-core disciplines. For this reason the School has only one core unit, Whole Plant Physiology 201, but another three electives (Plant Cell Biology 202, Aquatic Botany 203, and Land Plant Diversity 204) are available depending upon the direction the student wants to go. To achieve additional flexibility, the School is encouraging further development of cross-School units such as Introduction to Genetics (from the former Faculty of Agriculture, now taught by SPB and SAB). The new unit, Introduction to Ecology 250 (details see §2.4) in 2005 is an excellent example of this strategy. Such units provide economies of teaching and the background to permit students to enrol in a range of related disciplines in different Schools. The School also contributes to the other FNAS ‘generic skills’ units, Ecosystem Processes 101, Biometrics 210 and Biometrics 301.

Following their introduction in the second academic year, the main plant biology disciplines are consolidated in the third/fourth year. Staff increasingly show-case their own areas of speciality as indicative of the type of research students might engage in during their final year, either through the end-on honours or as a 4th year project.

2.2 EXTENT TO WHICH TEACHING AND LEARNING IS REVIEWED AND INDICATORS OF SUCCESS

In 2004 a campus-wide survey, the Students’ Unit Reflective Feedback (SURF), was made of student views of their learning experiences at UWA. The average responses for each of the six questions asked were consistently higher across the School than for either the University overall or the Faculty (Table 2). Of particular significance was the much higher rating for Q6, the overall quality of the educational experience.
Staff are encouraged by the Head to use Student Perception of Teaching (SPOT) surveys to assess the quality of units and their own teaching. The surveys are commonly structured with three items selected from a small set of core or global items and a further 7-20 items of specific concern to the co-ordinator or staff member. While the surveys are confidential to the staff, most staff volunteer results from their personal or unit surveys (Table 3) and comments from some selected units are shown in Appendix 4. Student comments are often the most informative result from SPOT evaluations and give unit co-ordinators a clear idea of where important changes need to be made. The evaluations demonstrate the strength of the teaching abilities across the School and suggest why the SURF responses were distinctly above the general University and Faculty averages.

Table 2: Average of student responses from SURF across the University (UWA), the Faculty (FNAS) and School (SPB).

<table>
<thead>
<tr>
<th>Semester</th>
<th>Group</th>
<th>Response rate (%)</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UWA</td>
<td>62</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.1</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>FNAS</td>
<td>82</td>
<td>2.9</td>
<td>3.0</td>
<td>3.2</td>
<td>3.0</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>SPB</td>
<td>85</td>
<td>3.2</td>
<td>3.1</td>
<td>3.3</td>
<td>3.2</td>
<td>3.2</td>
<td>3.5</td>
</tr>
<tr>
<td>2</td>
<td>UWA</td>
<td>56</td>
<td>3.0</td>
<td>3.1</td>
<td>3.2</td>
<td>3.1</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>FNAS</td>
<td>75</td>
<td>2.9</td>
<td>3.0</td>
<td>3.2</td>
<td>3.0</td>
<td>3.0</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>SPB</td>
<td>92</td>
<td>3.2</td>
<td>3.2</td>
<td>3.4</td>
<td>3.2</td>
<td>3.1</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Responses were made across a 4-point scale. The mid-point of the scale is a rating of 2.5
Q1 It was clear what I was expected to learn in this unit
Q2 The assessment requirements were clearly stated
Q3 The assessment tasks were closely linked to the unit objectives
Q4 The unit was well organised
Q5 The learning resources (handouts, text, web resources, etc) were adequate for my study in the unit
Q6 Overall, this unit was a good educational experience

Table 3: Average of student responses to SPOT items grouped by standard items, selected items, and all items. Names in ( ) are co-ordinators unless indicated otherwise indicated. Responses are made across a 5-point scale. All responses for 2004 unless otherwise indicated.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Standard items (3)</th>
<th>Selected items (7-20)</th>
<th>All items (7-23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem Processes 101 (Prof Graeme Martin, SAB)</td>
<td>Not used</td>
<td>3.68</td>
<td>3.68 (2003)</td>
</tr>
<tr>
<td>Whole Plant Physiology 201 (A/Prof David Turner &amp; Dr Tim Colmer)</td>
<td>3.80</td>
<td>3.54</td>
<td>3.59 (2003)</td>
</tr>
<tr>
<td>Whole Plant Physiology 201 (Dr Martha Ludwig-participating lecturer)</td>
<td>3.83</td>
<td>3.69</td>
<td>3.72</td>
</tr>
<tr>
<td>Whole Plant Physiology 201 (Dr Martha Ludwig-participating lecturer)</td>
<td>4.40</td>
<td>4.21</td>
<td>4.24</td>
</tr>
<tr>
<td>Plant Physiological Ecology 301 (Prof Hans Lambers)</td>
<td>4.24</td>
<td>4.09</td>
<td>4.11</td>
</tr>
<tr>
<td>Physiological Adaptations in Plants 302 (Dr Patrick Finnegan (Co-ordinator) with lecturers Drs Penny Smith and Martha Ludwig)</td>
<td>4.57</td>
<td>4.31</td>
<td>4.37</td>
</tr>
<tr>
<td>Molecular Genetics in Managed &amp; Natural Systems 304 (Dr Susan Barker &amp; Dr Phil Vercoe (SAB))</td>
<td>3.97</td>
<td>4.15</td>
<td>4.11</td>
</tr>
<tr>
<td>Rangeland Ecology &amp; Management 308 (A/Prof Bill Loneragan)</td>
<td>4.18</td>
<td>3.86</td>
<td>3.91</td>
</tr>
</tbody>
</table>
As the Level 2 ‘flagship’ unit for the School, staff were particularly concerned that problems identified by both staff and students in the first run (2003) of Whole Plant Physiology 201 were addressed in 2004. A/Prof David Turner made an excellent analysis of the SPOT item scores and comments and showed that although there was definitely a positive change in students’ perception for 10 of the 14 items, for only two (amount of work is reasonable, clear view of the field) was the change significant (Appendix 4a). As pointed out in his response to the students, the analysis of the SPOT scores was made before the comments had been received. Taken together, it was clear that further changes were required and, for 2005, the number of lecturers has been reduced and substantial changes made to the organisation of the laboratory classes to develop more integrated themes linking structure with function. Of particular interest was the email response from one student to A/Prof Turner’s analysis:

“After i berated you (and gave you a poor mark!) for your spot test assignment, you've come back with a fabulous effort!! I shall amend your mark!! I was really impressed with your write up. Thank you for explaining all that. And thanks for the chance to offer feedback, only about half the units i do give the chance to do a spot test, which is unfortunate. Thank you for running a fantastic unit too. It was a big one, and quite information 'heavy', but all good info. I would certainly recommend it to anyone else. I have to say i was most impressed with your (and ALL the other lecturers) professionalism. I'm a bit older than the run of the mill Ag student, and hence, i have different demands and expectations, some of which don't often get met at uni! You guys gave me nothing to complain about, you all made the effort to do your jobs extremely well!! Congratulations!!”

Comments returned for the units, Rangeland Ecology and Management 308 (Appendix 4b) and Rainfed Cropping Systems 312 (Appendix 4c) indicate the importance students attach to their field trips.

2.3 COURSE OUTCOMES

Course Experience Questionnaire responses are frequently used as a measure of course outcomes, however, the sample size is, typically, small in number. For example, in 2003, the most recent available figures, the sample varied from 1 (Viticulture) to 9 (Agriculture) and included no honours students, the minimum recommended qualification for a career in plant science disciplines. More indicative are the SURF responses which, while limited to undergraduate units, are based on far higher numbers of responses. If the SURF responses are to be taken as a guide of how well students are being prepared for careers in the plant sciences, then the School is performing at or above average on every indicator (Table 2).

For a University that prides itself on its research output, a large measure of which comes from its research students, the nexus between teaching and research is particularly important (see also §2.6 below). Table 4 summarises post-graduate enrolments and completions over the period 2002-2004. As UWA moves to a system where scholarships are awarded to faculties and schools based on numbers of completions it is pleasing to see the ratio of completions to enrolments for School of Plant Biology improved markedly between 2003 and 2004.

Table 4: Post-graduate enrolments, completion rates and numbers of PhD theses passed with distinction.

<table>
<thead>
<tr>
<th>Category</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfed Pasture Systems 311 (Dr Megan Ryan)</td>
<td>4.43</td>
<td>4.13</td>
<td>4.17</td>
</tr>
<tr>
<td>Rainfed Cropping Systems 312 (Prof Len Wade)</td>
<td>4.23</td>
<td>4.46</td>
<td>4.42</td>
</tr>
</tbody>
</table>
Post-graduate enrolments are spread across all five key areas of the School (Table 5). Numbers are expected to increase in the conservation biology area as the new Conservation Biology degrees become fully operational over the next four years. Publications for the School have shown a healthy increase over the last two years, in part a reflection of the positive encouragement by the Head of School for students and their supervisors to publish early. Given its small number of academic staff, the performance in the Marine Science area has been especially note-worthy.

Table 5: Distribution of staff, post-graduates (PG’s) and publication numbers (2003, 2004) among the five key areas of the School

<table>
<thead>
<tr>
<th>Key Area</th>
<th>No. of Staff</th>
<th>Number of PG’s</th>
<th>Number of publications 2003</th>
<th>Number of publications 2004</th>
<th>Publication Ratio1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation Biology</td>
<td>42</td>
<td>3</td>
<td>7</td>
<td>18</td>
<td>1:2.6</td>
</tr>
<tr>
<td>Crop Science</td>
<td>5</td>
<td>18</td>
<td>30</td>
<td>36</td>
<td>1:1.8</td>
</tr>
<tr>
<td>Marine and Estuarine Science</td>
<td>2</td>
<td>15</td>
<td>11</td>
<td>17</td>
<td>1:1.0</td>
</tr>
<tr>
<td>Plant Genetics and Molecular Biology</td>
<td>8</td>
<td>14</td>
<td>15</td>
<td>19</td>
<td>1:0.9</td>
</tr>
<tr>
<td>Physiology and Ecology</td>
<td>8</td>
<td>35</td>
<td>44</td>
<td>38</td>
<td>1:0.9</td>
</tr>
<tr>
<td>Totals</td>
<td>27</td>
<td>85</td>
<td>107</td>
<td>128</td>
<td>1:1.1</td>
</tr>
</tbody>
</table>

1 Publication ratio is for Staff + PG’s to number of publications in 2004
2 Includes two adjunct appointments from BGPA

2.4 CURRICULUM REVIEW AND DEVELOPMENT

Academic developments within FNAS are overseen by a Committee of Associate Deans, which makes recommendations to the Faculty Board. Members of this Committee from the School include Professor Craig Atkins (Deputy Dean and Chair), Professor John Considine (Viticulture and Horticulure), Associate Professor Bill Loneragan (Botany), Dr Megan Ryan (Agriculture), and Professor Di Walker (Marine Biology). These staff have also contributed to the revision of all 4-year degrees and the specialist programmes for Environmental Science and Marine Science following reviews of these programmes in 2003. It is anticipated that some of the Associate Deans will be similarly involved in 2005 with revision of the 3-year degree programmes resulting from the 2004 review of these degrees.

Although undergraduate teaching is controlled at Faculty level, the introduction of new techniques, curriculum and programme development depends largely on initiatives at the School level. The School is proud of the leadership it has been providing to academic developments within the Faculty.

The School holds regular meetings of all staff and research student representatives fortnightly at Monday lunchtimes. These meetings discuss general operational matters including teaching-related activities such as reports from the Associate Deans. On alternative Mondays, other ‘teaching’ meetings may be held to discuss specific teaching initiatives, difficulties, assessment procedures etc. It is through these teaching-focussed meetings the academic concerns within the School can be given full and proper attention.

COURSE INITIATIVES
Prior to restructuring the 3-year and 4-year programmes were administered by different Faculties. In the new academic environment there are opportunities for greater integration while preserving the different emphases. Our School is attempting to develop a course structure that would allow students more flexibility to switch, as late as their third year, from a 3-year to a 4-year programme and vice versa. Three specific course initiatives have been proposed since the formation of the School.

**Conservation Biology** represents a major opportunity for the School of Plant Biology to develop and consolidate unique research and teaching resources of direct public worth, in a State world-renowned for its rich and diverse terrestrial and marine, flora and fauna. For example, our School, under the guidance of Dr Jenny Chappill, is the only institution within Western Australia and one of only two in Australia, offering comprehensive training in formal plant taxonomy. Our School recently appointed the first Chair in Plant Conservation Biology, Professor Stephen Hopper.

BSc degrees in Conservation Biology specialised programme (3-years) and Conservation Biology and Management (4-years) have been introduced at Level 1 in 2005. The courses are being progressively developed through the combined efforts of physiologists, ecologists, geneticists and taxonomists, from within the Schools of Plant Biology and Animal Biology, research staff from the BGPA, and CALM, under the leadership of Professor Hopper.

Graduates from these two degrees will learn techniques in how to conserve flora and fauna, to manage natural and semi-natural systems, and to work towards more sustainable managed systems, including post-disturbance rehabilitation. The first year intake has been this year, 2005.

**Marine and Estuarine Science**: Following recommendations from the 2003 review of the 4-year degrees, Environmental Science and Marine Science programmes in FNAS, there has been extensive revision of marine science through Professor Di Walker and Dr Gary Kendrick (School of Plant Biology) and staff of the Schools of Animal Biology, Earth and Geographical Sciences, Biomedical & Chemical Sciences, and the Centre for Water Research. Commencing in 2005, marine science can be studied as majors in Marine Biology or Marine and Coastal Planning and Management, or combined in a Specialised Programme, the BSc (Marine Science). The courses also benefit from collaborative research links with the Australian Institute of Marine Sciences (AIMS), CSIRO Marine Research, Fisheries WA, RMIT Faculty of Engineering, Curtin University Centre for Marine Science and Technology, University of Tasmania, Geosciences Australia and Defence Science and Technology Organisation.

**New 4-year programmes**: The School has proposed courses of study in Biology, Genetics and Breeding, and Plant Genomics for implementation in 2006 (Appendix 5). These programmes would offer more diversity in options. For example, a student wanting a double major in botany and zoology over four years will be able to do so, and also obtain better grounding in complementary areas such as Geographical Information Systems as well as some research experience. Alternatively, a student might elect to complete a major in either botany or zoology in their third year, and then transfer to an end-on honours year. Either graduate could be expected to enter a career with organisations such as CALM and BGPA, but with different levels of qualification.

**UNIT INITIATIVES**

Four specific units are indicative of the steps the School has taken since its formation to optimise the possibilities presented by the University restructuring.

**Whole Plant Physiology 201**: This Level 2 unit (see Appendix 3a) was the first unit (2003) to be developed from the amalgamation of the Plant Sciences and Botany groups and is taught by members from those groups together with two new members of staff. It is now the pivotal unit for almost all study programmes in which the School is involved, and all students, excepting marine science students, must take it.
**Introduction to Ecology 250**: This Level 2 unit (see Appendix 3b), largely conceived and developed by Dr Pauline Grierson is a superb example of what can be done to consolidate disciplines that cross School boundaries while increasing course flexibility for students in what is an already crowded timetable. The unit, which commenced this year (2005) draws on the ecological expertise within the Schools of Plant Biology, Animal Biology and Earth and Geographic Sciences complemented by expertise from other organisations such as Curtin University, University of New South Wales, CALM, FESA and the Bushfire CRC. Students who take this unit can elect to continue ecologically related studies in any of the three Schools. This means students are not forced into the situation where they must take three or even four Level 2 units within one School to have sufficient prerequisites for one of the majors in the 3-year programmes. It also allows students in the 4-year programmes to obtain the ecological background that should underpin units such as Plant Physiological Ecology 301 and Rangeland Ecology and Management 308 but was formerly not available to them.

A framework has already been discussed whereby this unit could be made available for the Albany Campus if a proposed BSc in Restoration Ecology is established there from 2006. This framework will use the iLecture system with the expertise at Albany (on-campus and off-campus) to deliver the practical and discussion sessions.

**Plant Conservation and Restoration Biology 303**: This Level 3 unit (see Appendix 3c), introduced in 2004, is an outcome of the synergies developed over several years through associations of staff of the former Plant Sciences and Botany groups with the research staff of the BGPA (see also §2.5 below). The research staff at BGPA has a world-wide reputation for outstanding research on the conservation of rare plant species and habitat restoration. Besides its place in the Botany major and several of the established 4-year programmes, the unit will have an important role in new Conservation Biology degrees.

**Rangeland Ecology and Management 308**: This Level 3 unit (see Appendix 3e) has been in existence for several years but underwent a major revision in 2003 and was further revised in 2004. The highlight of the course is now the 7-day field camp on the Cashmere Downs pastoral station hosted by owner, Mr David McQuie. For most students this is their first experience of the rangelands, seeing at first hand the problems of maintaining a sustainable industry within an unpredictable climate, subject to large-scale land degradation through over-grazing and feral animals. The students participate in a variety of projects tutored by the owner and several field officers from CALM and DAWA.

**End-on Honours**: The units Research Orientation 471, Research Preparation 472, Special Topic 473 and Research Thesis 474-477 have been introduced in 2005 to replace the former full-year Honours course for those students who have completed a 3-year BSc degree with a Botany major. The units are also the basis for students wanting a Graduate Diploma in Botany or a MSc (Prelim). The course can be taken part-time with either a Semester 1 or 2 starting date. The course is co-ordinated by A/Prof Bill Loneragan and Dr Penny Smith. Two of the units, in particular, break new ground:

Research Orientation 471 has a number of components: a statistics component delivered by School staff (Dr Pieter Poot, Dr Guijun Yan and A/Prof Bill Loneragan) and a library component to cover use of research abstracting and bibliographic facilities (Biological Science Library staff: Ms Belinda Tiffen and Mr Kael Driscoll). These two components are examinable. The statistical component has been introduced to address what is perceived as a deficiency amongst many 3-year degree students compared with their 4-year counterparts. Towards the end of the lecture/laboratory series students were asked to submit preliminary experimental designs for their intended projects. Presentations were then made to show how the designs might be statistically analysed and potential problems with designs addressed early on. Additionally, all students take a School Health and Safety course (Mr Greg Cawthray) and, depending upon need, will take courses for 4WD driving, radioisotope handling, minesite inductions, scuba diving, boat handling etc.

While aspects of plant conservation are embedded in course material of a number of the School units, apart from Plant Conservation and Restoration Biology 303 and Evolution of the Australian Flora 304, students
have had little opportunity to study specialised units in conservation biology. As many of this year’s honours students have research projects with a conservation bent, the opportunity has been taken for Professor Stephen Hopper to trial a series of lectures and assignments that will form the basis of later units for the new Conservation Biology degrees.

2.5 CO-ORDINATION AND COLLABORATION IN TEACHING

Co-ordination and collaboration has been extensive at all levels within Plant Biology and between Schools. Most staff are involved. Joint involvement eases the load on individuals, provides back-up support in the event of illness, and can facilitate taking study leave and/or long service leave. The FNAS has a number of ‘faculty’ units for which the School has a primary co-ordinating role: Ecosystem Processes 101 (A/Prof Bill Loneragan with Ms Elizabeth Halladin); Biometrics 210 (Dr Guijun Yan); Introduction to Genetics 240 (Dr Susan Barker with Dr Phil Vercoe (SAB)); Introduction to Ecology 250 (Dr Pauline Grierson with A/Prof Dale Roberts); Molecular Genetics in Managed and Natural Systems 304 (Dr Susan Barker with Dr Phil Vercoe (SAB)); Plants in Managed Landscapes 331 (A/Prof Julie Plummer with Ms Catharina Sack (Architecture); and Genetics and Plant Breeding (A/Prof Wallace Cowling with Dr Phil Vercoe (SAB).

Of units that are wholly the responsibility of the School, Whole Plant Physiology 201 is co-ordinated by A/Prof David Turner and Dr Tim Colmer with further involvement of five academics including two new appointments (in 2004). However, ‘team’ teaching is increasingly becoming adopted throughout the School. The 29 adjunct appointments referred to above (§1.3) have a significant role in many units, especially at Levels 2 and 3. Perhaps the unit most unique in terms of its institutional and individual collaboration is Rangeland Ecology and Management 308. In its present form the unit has been developed in collaboration with Mr Angas Hopkins (CALM) and Dr Ben Norton (Curtin University). The lecture course involves some five UWA staff (three from the School), plus a further 11 from outside institutions including BGPA, CALM, Curtin, DAWA, Forest Products Commission, and the Indigenous Land Corporation. Introduction to Ecology 250 also has a high level of ‘external’ participants (see §2.4 above).

A collaborative development of special significance was the signing on the 8th October, 2004 of a Memorandum of Understanding between the School of Plant Biology and the Botanic Gardens and Parks Authority. The MOU has formalised a longstanding relationship between the former Botany Department and Plant Sciences Group with King’s Park research personnel. As pointed out in a UWA News article (Appendix 6), the association has, since 1984, led to the joint publication of over 120 scientific papers and books, trained more than 25 PhD students plus many honours students, and led to the introduction in 2004 of the new undergraduate unit Plant Conservation and Restoration Biology 303.

2.6 INTERACTION BETWEEN TEACHING AND RESEARCH

UNDERGRADUATE

The relationships between the disciplines taught during the early undergraduate years and opportunities for research within the School are highlighted for students through two specific means.

Conversazione: In 2004 a ‘Conversazione’ evening was held for second- and third-year students (Appendix 7). Staff and their research students presented displays and talked about their research and career possibilities to encourage students to continue their studies into higher-level plant biology disciplines. The evening concluded with an informal supper when students could talk further with the staff and postgraduate students. Following its initial success, the evening is to become a regular event in the School.

4th Year and Honours level research: To encourage third-year students to consider undertaking their research projects in an area of plant biology a comprehensive booklet (Appendix 8) is prepared and made
available to students in September. In addition to projects proposed by the staff, there are also potential projects from BGPA, CLIMA and several mining companies with whom staff have close interaction.

Following the 4-year Horticulture and Viticulture degree review in 2003, Professor John Considine is progressively incorporating viticultural and oenological research outcomes into the teaching material and protocols, with industry partners providing additional teaching support.

**Field Camps:** Ranging from a day- to week-long trips, these camps provide an opportunity for students to work in the field using techniques they have been introduced to in lectures and the laboratory (an example from Plant Physiological Ecology 301 is shown in Appendix 9). Camps are held for most areas taught within the School. They involve the research students and, frequently, professional practitioners, and are highly regarded by the students (see Student comments in Appendix 4b,c).

**Summer scholarships:** Staff in the marine and terrestrial ecology areas (e.g., Dr Gary Kendrick, Professor Walker, A/Prof Bill Loneragan) have been particularly successful over many years in obtaining funding from government and the mining industry to employ senior students to tackle a small research project over the summer vacation. The student is given a scholarship for about 10 weeks with additional funding for supplementary materials. The staff member supervises the project and ensures the final report is written to a high standard. These Scholarships have been highly successful in motivating students to continue in their studies, they provide experience of ‘real-world’ problems, use of the library, working to a deadline, developing writing and analytical skills, and interacting with professionals in the workplace—in all, an excellent preparation for the honours year.

**Volunteer supervision:** Dr Patrick Finnegan hosted two second-year student volunteers in his laboratory in 2004 – Matthew Rowe (Aug – Dec 04) and Anton Smit (Feb 04) – providing them with the opportunity of learning molecular biology techniques.

Since 1995 A/Prof Bill Loneragan has hosted six second-year students from the Institut National Agronomique Paris-Grignon, France, for between 8-10 weeks work experience. This is a formal requirement of their course and requires submission of a project report that is assessed. He also hosted a student from the University of Coventry for a 12 month period as part of that student’s course.

**POST-GRADUATE**

Post-graduate students are encouraged to participate in teaching as laboratory demonstrators or by presenting lectures in the area of their speciality. Whole Plant Physiology 201 has a complicated laboratory schedule that involves students carrying out different exercises in different locations. Previously, demonstrators were assigned to a particular exercise and location. For 2005 the demonstrators have been assigned to a particular group of students and move with them. While the new arrangement requires additional preparation by the demonstrators it is also allowing them to develop better rapport with the students and has been favourably received.

**Post-Graduate Summer School:** Prior to the restructuring, the former Plant Sciences group introduced a summer school for its post-graduate students. This has now become an important event in the School of Plant Biology’s calendar. The Summer School is organised by a committee of students for the students and their supervisors. It involves up to 100 postgraduate students and supervising staff heading over to Rottnest Island to spend a few days getting to know what research everyone is doing and how they are progressing. The scientific program includes some invited speakers from WA, interstate and overseas as well as all students giving short presentations (see the 2005 programme details in Appendix 10). Students in the first year of their postgraduate candidature are required to give a 5-minute introductory talk with 5 minutes of questions, and all other students a 10-minute presentation of their latest and most interesting results followed by 5 minutes of questions. It allows for everyone to get some feedback on their work. The talks
are organised into sessions chaired by senior students. There is also a strong social aspect to the event and opportunity for students to get to know each other and staff better. The event is an excellent preparation for professional meetings and is well summed up in the following words from the Head of School:

“I have just returned from our Annual Postgraduate Summer School. It was a tremendous success, again, as everyone who attended agreed, including our first guest speaker, Alan Robson. That success was due to a large number of issues, but I want to single out a few. Firstly, I should mention the organisational talent of Stuart Pearse and his team members, who all worked hard and effectively towards a successful fifth Summer School. The invited speakers were fantastic, including our own VC, Alan Robson, and three international scientists of a calibre any international symposium organiser would be proud of: Andre Lauchli, Loren Rieseberg and John Boyer all presented great talks. I should also mention the very high level of the postgraduate presentations. Two won prizes (Nick George and Catherine Borger), but the panel who chose those winners assured me that there were a number of others who were very close, including Teguh Wijayanto, who was mentioned specially by the panel, and several others. Plant Biology has a bunch of postgraduate researchers we can all be proud of!

I want to thank the many staff members who attended the Fifth Postgraduate Summer School, either for part of the time, or for the entire period. Their input was very important for the success this year, as in previous years.

Plant Biology will have a prize for the best journal article published by one of our postgraduate researchers as first author in 2004. Please submit your paper by the end of February if you want your paper to be considered for the prize. A panel will chose the winner and announce the nature of the prize....".

SECTION 3: OPTIONAL INDICATORS OF TEACHING AND LEARNING FOR THE SCHOOL OF PLANT BIOLOGY

3.1 SCHOOL POLICIES AND BUDGETARY PRACTICES

In line with University practice, applicants for academic positions are required to show evidence of teaching expertise, including presentation of a teaching seminar, which is open to all staff and students. Since its formation, the School has appointed four excellent young academics, Drs Patrick Finnegan, Martha Ludwig (shared with CMM and the School of Biomedical and Chemical Sciences (SBCS)), Thomas Martin (shared with SBCS) (all in the area of Plant Genetics and Molecular Biology) and Megan Ryan (Crop Science), together with two higher-level appointments, Professor Stephen Hopper (Conservation Biology) and Associate Professor Martin Barbetti (Crop Science).

As an outcome of the review of first-year units, Core Concepts in Biology 130 and Plant and Animal Biology 131, a decision has been made for 2005 that the ratio of demonstrating staff to students should be decreased from 24:1 to 16:1. Furthermore, Plant Biology academic staff involved in the unit are acting as roving demonstrators, providing students with the opportunity to interact one-on-one with lecturers in the more informal laboratory setting. This represents a return to practices common in the former Department of Botany, but which had declined with changes in staffing duties and responsibility for co-ordination.

It is School policy that all research students are provided with a basic level of funding, additional funding being the responsibility of the supervisor(s) or student. For Honours and 4th-year project students this is $800 and $600, respectively. Post-graduate students are required to submit a budget and may be allocated up to $2500 each year for the first three years of their research. Additionally, post-graduates are provided with a lap-top computer to the value of $1500. Post-graduate also receive a one-off payment of $500 towards research travel. As part of their training on carrying out research, all research students are required to take responsibility for administering their own budgets, with minimal input from their supervisor.
With the move to allocating the number of post-graduate scholarships on the basis of completions rather than enrolments it is important that students complete their theses as close to the 3-year period as possible. As an incentive to our PhD students, if a student submits their thesis within 3.5 years he/she will be allowed to retain the computer less any University owned software. If he/she takes longer than 3.5 years the student is required to make a financial contribution if he/she wishes to keep the computer, the amount dependent on the time taken to submit the thesis. The School provides funding for three copies of theses.

3.2 ROLE OF THE HEAD OF SCHOOL IN PROMOTING AND ENCOURAGING EXCELLENCE IN TEACHING AND LEARNING

The Head of School, Professor Hans Lambers, has an ‘open-door’ policy in respect of any aspect of the duties of School staff. Academic staff are expected to comment on their teaching as part of their regular three-year reviews, and these comments will be discussed then. In the case of new appointments, the Head discusses aspects of their teaching duties on an annual basis. Similarly, as Head of School, he has taken the initiative that all postdoctoral researchers are reviewed on an annual basis. This review process also involves the supervisor(s). It is an initiative that is highly appreciated by all postdocs in the School.

In 2002, Professor Lambers proposed one of his graduate students, Mr Michael Shane for the Teaching Internship Scheme. His final report (Appendix 11) outlines the success of this experience. Since his internship, Mr Shane has continued to make valuable contributions in the Whole plant Physiology 201 and Plant Physiological Ecology 301 units. He recently completed his PhD (with Distinction) and is currently in South Africa as a post-doc.

Professor Lambers has initiated awards for Summer School presentations and the best student journal article published. These awards reflect the importance placed upon communication of scientific research.

3.3 EVIDENCE OF SYSTEMATIC MENTORING

One of the benefits of joint co-ordination and team teaching (§2.5) is that, properly planned, it allows younger staff to develop their confidence and abilities with the assistance of more experienced staff. Marking of undergraduate student reports and research projects by younger staff appointees and graduate students is frequently complemented with a second marking by the unit co-ordinator and discussion. See also reference to the Teaching Internship Scheme (§3.2) above.

3.4 SYSTEMATIC DEVELOPMENT OF TEACHING SKILLS IN POSTGRADUATE RESEARCH STUDENTS

To develop their teaching and communication skills, post-graduate students are encouraged to participate in laboratory classes as demonstrators. A number of the academic staff have encouraged their post-graduate students to give the occasional student lecture or a School seminar in their area of speciality. Such mentoring will include discussion of the topic, reviewing a draft outline, listening to a presentation and attending the actual lecture following which constructive criticism will be given. The results of this mentoring are particularly evident in the success the School’s post-graduate students have achieved at scientific conferences:

Ida Ayu Astarini (A/Prof Julie Plummer, Dr Guijun Yan, Ms Rachel Lancaster (DAWA))—winner of the Young Scientists Award for the best student presentation at the ISHS 1st-Regional Horticultural Conference, Coolum, QLD. Sept 2004.
Tikik Kustiati (A/Prof Julie Plummer, I McPharlin)—awarded third prize at the ISHS 1st-Regional Horticultural Conference, Coolum, QLD. Sept 2004.
Sandra Tanz (Dr Martha Ludwig)—awarded prize by the Australian Society of Plant Scientists at the ComBio Meeting (Perth 26-30 Sept. 2004).

3.5 INVOLVEMENT IN INNOVATIVE TEACHING INITIATIVES

Both the former Plant Sciences and Botany groups have a long history of introducing innovative teaching approaches.

In the 1980s A/Prof Bill Loneragan introduced commercially produced segments of TV material (e.g., the David Attenborough “Life of the Plant”) into first-year laboratory classes, first-year lectures and third-year ecology units. He was responsible for introducing the Macintosh microcomputer into Botany undergraduate classes in 1989 and, from this experience, made a successful case for funds to establish a microcomputer laboratory within the Department. In 1990, together with Dr David Bell (former Botany staff) and Dr Michael Wheatley (DUIT), a computer-based application (EcoMap) was developed to introduce students to aspects of vegetation sampling. This application was extended (now called VegTech) in collaboration with Professor Mark Adams (Plant Sciences group) and Dr Terry Judd, employed through a UIF grant. In 1991 he developed a series of Excel spreadsheet macros for use in Professor Pate’s Form and Function labs. These enabled the efficient processing of class data within class time and saved some 2 days full-time work formerly carried out by a lab technician.

Dr Tim Colmer, along with Dr David Pannell (SARE), was responsible for the introduction, and coordination in 1997, of the unit Ecosystems Processes 100. This was a major development for the, then, Faculty of Agriculture. The unit aimed to give students an early and realistic experience in the area of their degree with the material presented in a problem-based context. Students were instructed in the essential skills of working in teams and communication via mini-seminar and written reports. The unit has undergone some evolution since, but retains these essential strengths that can be seen, for example, in Introduction to Ecology 250 and will be essential components of units proposed for the new Conservation biology degrees.

A/Prof David Turner used a 2000 CATL grant to develop a Web-based interactive approach for his physiological component in Plant Science 210 to accommodate the diversity of student educational backgrounds (e.g., different levels of mathematics, with or without physics). Students responded well to the approach, and exam results for the students were 15% on average higher than those of students in the previous year. He was subsequently awarded a second CATL grant (2002) to extend this project to Whole Plant Physiology 201, the unit that replaced Plant Science 210. The Centre for Teaching and Learning has used A/Prof Turner’s experience in setting up Whole Plant Physiology 201 on the web as an example of how the switch to outcomes-based learning can be achieved.

3.6 NUMBER OF TEACHING DEVELOPMENT GRANTS

A/Prof David Turner has been awarded two CATL grants (2000—$10000 and 2002—$40000). As indicative of the long history of teaching related grants prior to the restructuring, A/Prof Bill Loneragan has been involved in a variety of grants totalling $216407:

1995 $110000  UIF: rationalisation of teaching, including the development of computer-aided learning, in basic and applied ecology. Co-developer of application with Dr Mark Adams (Faculty of Agriculture).
$ 2400  Deputy Vice-Chancellor: comparison of Honours standards between UWA and the University of Melbourne

1993  $ 7000  Apple University Development Fund: development of an image database of botanical material for teaching plant science. This project is on-going in collaboration with Hon Research Fellow, A/Prof D T Bell.

$ 16750  DEET-CAIL: development of image database of botanical material for teaching plant science

1991/92  $ 35000  UWA: upgrading of protective fencing of the Yule Brook (now the Alison Baird) Reserve teaching/research facility

1990  $ 30257  DEET: establish the Botany computer laboratory. **This facility has been extended in 2004 as an FNAS computer laboratory**

$ 3000  Apple University Development Fund: simulated model for teaching vegetation sampling procedures (joint with Dr D T Bell)

1988  $ 12000  UIF (UWA): video equipment for first year teaching laboratories

Professor John Considine was awarded a CATL grant of $10000 in 2002 to assist in the development of teaching aids for viticultural teaching.

### 3.7 STAFF WITH TEACHING AWARDS

Dr Tim Colmer has an exceptional record in terms of teaching awards. Prior to the School’s formation he was recognised with Excellence in Teaching Awards from the Faculty of Agriculture in 1997 and 2001. He has been the Associate Dean for Teaching Quality (2001/02) and was a founder member of AgTEA, a group formed to promote discussion of teaching issues within the Faculty of Agriculture, and gave lectures and conducted workshops for the group. In 2004 Dr Colmer was nominated for a National Teaching Award; the same year he was given a Teaching Award by the Australian Society of Plant Scientists and he is now the education representative for that Society.

A/Prof David Turner has been nominated for a UWA Teaching Award and, on average one in three years, for a UWA Post-graduate Supervision Award.

As can be seen from the results of SPOT evaluations (Table 3) the School may well expect other nominations for University and National Teaching awards to be made in 2005.

### 3.8 PARTICIPATION IN STAFF DEVELOPMENT RELATED TO TEACHING AND LEARNING

Under the University’s Operational Priorities Plan (2003-2005), it is intended that all units should have teaching material on the web. A/Prof Bill Loneragan has attended Centre for the Advancement of Teaching and Learning courses (2002) on the use of WebCT: Introduction to WebCT; Designer’s Introduction to WebCT; and File Management—WebCT. He has also participated in Workshops on Outcomes Based Education (2003). Staff now incorporate outcomes in all their unit outlines (see examples provided in the Unit Outlines provided in Appendix 3).

New staff members Drs Erik Veneklaas and Patrick Finnegan completed the UWA Foundations in University Teaching and Learning unit in 2004.

### 3.9 OTHER INDICATORS OF EXCELLENCE IN TEACHING AND LEARNING
Staff promotions: Since the formation of the School, two members of staff have been promoted, Dr Susan Barker (Lecturer to Senior Lecturer) and Dr Bill Loneragan (Senior Lecturer to Associate Professor). Both applications included a significant teaching component. Extracts from the reports by the external assessors as related to their respective teaching performance (Appendix 12) indicate strengths in curriculum development, co-ordination, technological development, problem-based learning, the linking of research and teaching, and funding support for teaching activities.

Undergraduate textbooks: Several staff have written or contributed to undergraduate level textbooks.

Knox R.B. et al. (2005). Biology: An Australian Focus. 3rd Ed. McGraw Hill, Australia. This is a highly successful Level 1 textbook written by Australian academics for Australian university students, the only such text available. Contributing authors to the first edition (1994) were Professor Craig Atkins (Ch 2 and 5) and Dr Patrick Finnegans (Ch 11) (prior to his appointment at UWA); and Associate Professor Bill Loneragan was a reviewer (Ch 43). A/Prof Bill Loneragan was a contributing author for the second edition (2001; Ch 17) and the substantially rewritten third edition (Ch 15).

Atwill, B. et al. (1999). Plants in Action: Adaptations in Nature, Performance in Cultivation. MacMillan Education Australia. Several members of the School contributed sections to this advanced level textbook: Professor Craig Atkins (2.3); Dr Tim Colmer (17.1.3, 17.2, 17.3, 17.4); Professor John Pate (Case study 5.1, 16.4, 19.3); Associate Professor Julie Plummer (8.1). Professor Steve Powles also contributed prior to his UWA appointment (20.1, 20.2).

Lambers, H. et al. (1998). Plant Physiological Ecology. Springer-Verlag New York Inc. This is an advanced level textbook, which has had world-wide acceptance. It has now been translated into Chinese for use by students in China.

Equity and Diversity: The University’s vision is to provide an equitable and inclusive environment for all staff, students and the broader community with which it engages. The School has a healthy gender balance amongst staff and students with 41% female staff and 45% female students. Its staff, undergraduate and post-graduate students include many diverse cultures and countries of origin. On her own initiative, one of our Secretaries, Ms Pandy Du Preez, has recently begun compiling a list of the different backgrounds represented but it is not yet sufficiently advanced to give an accurate indication of the real diversity in the School.

While employed as a Research Officer with the School, Dr Janet Wroth, was appointed the FNAS Equity and Diversity Officer. Dr Wroth obtained funds (DVC—$1000, Dean FNAS—$1000) to hold a series of 4 seminars throughout 2004 to promote an awareness and understanding of aboriginal culture amongst staff and students. An example of one of the topics she organised is shown in Appendix 13a.

A programme “Variety is the spice of life” was initiated by the Head of School and School Manager as part of the Rottnest Island postgraduate summer school (see Appendix 10). The programme was totally implemented and driven by the postgraduate students coordinating the Rottnest Island Postgraduate Summer School, especially by Chris Jones and Stuart Pearse. The programme was funded by a $2000 grant from the UWA Equity and Diversity Office. The Workshop was very positively received and a full report, including constructive comments from participants, has been forwarded to the Equity and Diversity Office (Appendix 13b).

An important lecture within the Rangeland Ecology and Management 308 unit addresses native title issues within the pastoral and mining industries of the Western Australian rangelands. The lecture is given by a member of the Indigenous Land Corporation. Some of the student feedback (see Appendix 4b) indicated the lecture did not quite achieve its intended aim and this will be addressed next time.
The School Manager, Dr Renu Sharma, has been appointed as a University Equity and Diversity adviser for the period 2005-2007.

**Post-graduate Student Awards**: The listing of awards won by post-graduate students for the period 2002-2004 shows the range of successes achieved by these students (Appendix 14).

**Outreach**: The School contributes in many ways to broadening the understanding amongst school children and the general public of aspects of plant biology.

Since her arrival in Perth in 1998, Dr Susan Barker has regularly given talks at Perth and regional Schools, public forums, and conducted laboratory sessions as part of the Siemens Science Week Experience, in her areas of specialisation—genetics and gene technology. She has also supervised two 6 month internships for students from the Hohenheim and Karlsruhe Universities, Germany.

Dr Patrick Finnegan hosted two students under the CSIRO Student Research Scheme in 2004. One of these won the award for the Best Scientific Communicator; the second was given an honourable mention for the Best Scientist Award. He also hosted a third high school student, arranged through Colin Hawke in the FNAS office.

A group of secondary science teachers visited Plant Biology (hosted by Dr Megan Ryan, A/Prof Wallace Cowling, Dr Martha Ludwig) on Thursday 2 December, 2004 for professional development training, and to learn about some of our exciting plant research and its applications. The group saw sections of leaf tissue in the transmission electron microscope (demonstrated by Dr Peta Clode), how plant tissue is prepared and sectioned for transmission electron microscopy (demonstrated by Mr John Murphy), and how the anatomy of C3 and C4 grass leaves differ (demonstrated by Dr Martha Ludwig). The teachers left with some materials and ideas for student projects in agricultural and natural systems. This proved to be a very useful exercise coordinated by Colin Hawke from the FNAS Office.

Professor Stan Kailis (Honorary Professorial Fellow) has established himself as an expert on growing olives and processing olive oil. He is frequently sought for advice and organises very popular workshops on olives, olive oil and table olives to the olive industry and the general public. In 2005 he will deliver 3 workshops to regional industry groups in Geraldton, York and Donnybrook; 4 workshops in Gingin to the public through UWA extension; 3 workshops interstate in New South Wales and Victoria; and one in California (USA). In addition he undertakes primary research on the quality of olives, olive oil and table olives. His small UWA teaching commitments include project supervision of PhD students, and undergraduates in topics on olives and oilseeds. He has been involved in the publication of two books:


Professor Hans Lambers holds Honorary Professorships at the China Agricultural University, Beijing (2002+) and the Chinese Academy of Sciences (Research Centre for Eco-Environmental Sciences, Beijing) (2004+). He is also a Fellow of the Royal Netherlands Academy of Arts and Sciences (KNAW) (2003) and a Fellow of the World Innovation Foundation (2004).

A/Prof Bill Loneragan has a long involvement with community and local government groups and is a member of the City of Stirling and its committees for the management of bushland reserves. The City has been the recipient of several national awards for its rehabilitation and its work culminated in 2001 with the opening of the Henderson Resource Centre at Star Swamp ($485000) available to community groups and
educational institutions, including UWA, for teaching and research. He was a member of planning committee for the Centre. The former Faculty of Science and Department of Botany contributed funds and equipment for the Centre’s laboratory. Since 1998 he has regularly conducted a day lecture/field excursion for the River Conservation Group at York on the biology and ecology of selected native species with attendances of up to 40 people. In 2003 he was made the first Honorary member of the Group. Both these associations have led to support for a number of Honours, a PhD and an MSc programme.

In 2004, A/Prof Loneragan was appointed to the Assessment Review Panel/Higher Education Advisory Committee for the State accreditation/registration process.

Dr Penny Smith has been a regular participant in school visits to the University and took part in the Siemens Science Experience each year until 2000. In 2000 the "Isolation of pea DNA" practical she organised was voted one of the three most interesting activities by the students. This practical is still used for many groups that visit the University.

The subject of genetic modification of plants is a highly contentious one in the minds of the general and farming public. Dr Penny Smith has been involved in presenting a number of workshops on Genetically Modified (GM) plants including "Genetic Engineering and the Agricultural Industry" and "Agriculture and Gene Technology-The Bread and Butter Issues". For each of these an exit survey was done and in all cases the results were positive. After one of the workshops, a participant (who in fact was anti GM plants) even wrote a letter to the editor of his local newspaper praising her balanced contribution.

Professor Hans Lambers has produced a CD to promote the FNAS and School of Plant Biology (Appendix 15). Post-graduate students when they leave the School are presented with a copy and asked to use it whenever they can to demonstrate the possibilities and opportunities available for education through the UWA and our School in particular.

3.10 WHERE TO NOW?

Many, if not most, academic staff would say they have always been involved in Outcomes-Based Education (OBE). Despite their apparent involvement, staff invariably find its formal adoption as required by the Academic Council resolution of April 2001 comes at a price. This cost is further added to when the academic wishes to use the considerable facilities and advantages available through WebCT. In the School of Plant Biology, units such as Ecosystem Processes 101, Whole Plant Physiology 210 and Introduction to Ecology 250, which are strongly grounded in the OBE approach, are proving especially demanding of staff resources. Part of the reason for this is that many staff do not in fact have the skills that would allow them to get the best out of their students and so the work load tends to fall on relatively few. One very useful way by which the Distinguished School Teaching and Learning Award might be used would be to provide the necessary training for more staff so they could experience with their students the full benefits of OBE.