



PROVOST'S REPORT TO COUNCIL ON THE REVIEW OF THE DEPARTMENT OF BOTANY

1. INTRODUCTION

This report presents the outcome of a departmental review exercise undertaken by Trinity College Dublin in relation to its Department of Botany. An external peer reviewer visitation was conducted on the 17th & 18th January 2002 by Professor P Baas, Leiden University, and Professor J Lee, University of Sheffield. During the site visit the reviewers met with all staff of the Department, staff of cognate departments, representatives of undergraduate and postgraduate students and postdoctoral fellows in the Department, and senior officers of the College.

The report is based on (i) a report from the external reviewers received on 12th February 2002, (ii) a submission from the Faculty Pro-Dean received on 7th March 2002, and (iii) a submission from the Department, received on 11th March 2002.

The main purpose of the departmental review exercise is (a) to provide a structured opportunity for the Department to reflect on its activities and plans for development, while benefiting from a constructive commentary by senior colleagues external to College; and (b) to ensure that quality and standards in teaching, research and administration are being maintained and enhanced, and that any areas of concern in this regard are identified and addressed within an eighteen month timescale, having regard to the resources available. This review process ensures that each academic department in College will have its undergraduate and postgraduate provision reviewed systematically once every five years.

2. OVERVIEW OF THE DEPARTMENT

2.1 Aims and Objectives of the Department

1. To serve as a base for research and education in Botany to the highest achievable standards, focussing on the whole living plant and its responses to the environment.
2. To enable the personal and professional development of all people in the Department.
3. To make a substantial contribution, both to the College and in the wider national and international context, through the service of individual members of staff as College officers and tutors, as officers of major non-governmental organisations such as The Royal Irish Academy and An Taisce - the National Trust for Ireland, and as participants in various international fora.

2.2 Programmes to which the Department provides teaching

Key programmes (undergraduate):

Moderatorship in Botany

Moderatorship in Environmental Sciences

The Department plays a significant role in the teaching of Biology in the Freshman years of the Moderatorship courses in Science, Human Genetics, Medicinal Chemistry, and the Bachelor in Science (Pharmacy). At the Sophister level, certain of the Department's courses are taken by students reading for moderatorship in Geography and in Zoology.

Postgraduate

M.Sc. in Environmental Sciences

The Department also has a programme of regular research seminars and workshops for postgraduate research students.

In addition, each year the Department offers an evening course for the general public

2.3 Research

The Department conducts much basic research across a wide range of sub-disciplines, with applied angles addressing current ecological concerns such as the study of biodiversity and its conservation, the consequences of global change and water pollution. Members of staff are actively engaged in collaborative research with colleagues in Ireland and the UK, in Europe, and further afield, notably in Africa, South East Asia, the USA and South America. Through their individual publications and editorship of botanical journals, serials and books the Department maintains a high profile nationally and internationally. The Department also organises research conferences on a regular basis.

2.4 Summary Statistical Profile of the Department for the Academic Year 2000-2001¹

Full-time staff FTE	Part-time staff FTE	Undergraduate FTE	Postgraduate FTE	Department Staff: Student Ratio	Faculty Staff:Student Ratio
8	2.11	92.82	31.34	12	16

¹ Figures approved by Council at its meeting on 9th January 2002

The full-time staff of eight includes one Professor, two Associate Professors, three Senior Lecturers, and two Lecturers.

2.5 Accommodation and Facilities (Physical Resources)

The Department is largely based on the College campus in an early twentieth-century building comprising individual staff offices, the departmental administrative office, some research space (including the national pollen counting and prediction service), the departmental library and lecture theatre, and the Herbarium. The latter, which is the only one of its type in Ireland and one of the largest and most significant of all university herbaria, contains an extensive collection of type specimens representing all regions of the world, and is an important resource for teaching and research. Other facilities adjacent to the main building include undergraduate teaching laboratories, post-doctoral and postgraduate offices, greenhouses and a Controlled Environment Laboratory. The College's Botanic Gardens are sited approximately four miles from the main campus. The Gardens house the national seed bank of endangered species, and facilities include greenhouses, controlled environment chambers, specialised growing facilities. The diverse plant collection reflects the Department's teaching and research needs.

3. EXTERNAL PEER REVIEW REPORT

SUMMARY OF REPORT

TEACHING

The reviewers gave detailed consideration to Freshman and Sophister teaching in the Moderatorship in Botany, and also considered the contribution of the Department to both the Moderatorship and the taught postgraduate programme in Environmental Sciences. In relation to the Moderatorship in Botany, the curriculum was noted to '*compare very favourably in its breadth and content with those elsewhere*' and provided '*a good coverage of the discipline*'. The reviewers note that '*the Department's commitment to Sophister teaching is admirable in every way and is much appreciated by current and past undergraduates. Students in Botany probably get a better training in practical work, particularly in the more traditional areas of taxonomy, morphology and ecology, than in any other university in the British Isles. It remains one of the very few Departments to test practical skills and knowledge through practical examinations*'. In relation to Freshman teaching, the reviewers comment that the timing of Botany teaching is '*a matter of concern, coming as it does after many of the students have made their decisions about their Sophister courses*'.

The reviewers commend the Department for its commitment to both practical classes and to field courses and note that *'the latter are particularly important in widening the ecological and taxonomic knowledge of students, but also play an important social role in increasing the cohesion of the classes and maximising the rapport between staff and students. Practical and field course teaching have been much reduced at many other universities in the British Isles and the Department is to be congratulated on the quality and level of provision.'* They also acknowledge that there is a cost in terms of staff time which needs careful evaluation against other priorities.

The need to incorporate more molecular teaching into the curriculum was noted by the reviewers to have been addressed to a considerable degree with a fairly recent appointment. This had been very well received by students and the high demand for molecular work in student projects was evidence of its success. The reviewers noted that *'the importance of molecular techniques in a whole range of botanical and ecological disciplines is likely to increase in the foreseeable future, and the need to incorporate more molecular training into the curriculum is becoming apparent. The Department has taken an admirable approach to the necessity of incorporating molecular training by building on existing strengths. This should be encouraged in future appointments to underpin both teaching and research.'*

Staff in the Department also make a major contribution to the Moderatorship in Environmental Sciences. The reviewers note that *'as well as providing more than a half of the mandatory modules and about a third of the optional ones, the Botany Department has supervised 24 out of a total 65 projects since 1996'*. While recognising that inter-disciplinary teaching in this area is likely to become more important, the reviewers also comment at a general level on the difficulties faced by inter-departmental structures set up to run such courses. Nevertheless, they were of the view that *'the Botany Department has a strong commitment to the Moderatorship in Environmental Sciences and makes a disproportionately large contribution to the teaching compared to other departments'*. They state that due to staffing issues in the department *'a fairly urgent review of both the Department's contribution to the course and the commitment of other departments may be necessary'* and they suggest that it may prove productive to explore other models of inter-disciplinary degrees in the environmental sciences *'including for example in ecology, which would have the benefit of being able to utilise a wide range of existing Botany Department courses'*.

The reviewers noted the heavy teaching loads of staff and the fact that the Department has undertaken a review of the teaching loads. They comment that *'staff nearing retirement currently carry a high load, in part to protect young, more research active colleagues. ... A further review is becoming urgent if future new appointments and remaining staff are not to be swamped with teaching'*.

The reviewers state that *'important teaching challenges facing the Department are*

1. *Improving the number of first choice Sophister students through an examination of the content, delivery and timing of Freshman teaching in Botany*
2. *Examining, and possibly reducing, the contact hours associated with courses as a mechanism for increasing the efficiency of teaching*
3. *Using web-based teaching creatively, in part as a mechanism for 2 above*
4. *Reviewing the Department's contribution to the Moderatorship in Environmental Sciences in the light of impending retirements*
5. *Exploring the potential for other interdisciplinary degrees in the environmental field (which implies challenges for both the Faculty and the College to encourage greater inter-departmental co-operation in teaching)'*.

RESEARCH

In terms of research output, the reviewers state that the *'output of the staff of the Department of Botany is at the top end of range internationally'* and that the *'publications in refereed journals of the staff are impressive, both in terms of quality (excellent) and quantity'*. They comment that the departmental research plan *'clearly builds on the strengths in five major aspects of Plant Ecology and the various aspects of Plant Taxonomy and Systematics. This powerful and internationally possibly unique combination of specialisations allows for a successful policy in attracting grants from a broad field of scientifically challenging and societally relevant themes (environmental biology, global change, conservation biology, biodiversity, etc.)'*. The reviewers also note that the *'Herbarium and Botanical Gardens play a significant and positive role in realising the research programme, and the Department should be commended for integrating these botanical collection resources so well in their research and teaching programmes'*.

While noting that most of the staff have important publications submitted to or in press with international journals, in addition to having a commendable output in books and monographs, the reviewers expressed concern that *'some staff members and ex-postgraduate students have abundant publishable material ... but find it difficult*

to prioritise its publication due to other commitments'. They express concern that *'due to heavy teaching loads and lack of technical assistance the publication potential of some staff members and the postgraduates and postdoctoral fellows under their supervision is not fully realised.'* The reviewers encourage *'the highest possible prioritisation of publication'* and comment that here should be no shortage of high-impact publications in the next two years. The reviewers suggest that *'the publication output of the department could further be increased if postgraduate students were actively encouraged to publish their results prior to submission of their PhD theses and incorporate these publications as chapters in their theses'*.

The Department was *'commended for its sustained success rate in raising external funds for research and research-related postgraduate teaching'* which compared *'very favourably with most departments with a focus on ecology and/or systematic biology worldwide.'* The reviewers note that in these fields *'it is much more difficult to obtain substantial funding than in fields such as physics, chemistry and genomics'*.

The reviewers were impressed by the extracurricular activities of many staff members in national and international fora and noted the Department's outreach teaching activities and the interaction of some staff with the Irish public and governmental agencies on a range of conservation and environmental issues.

In relation to research students, the reviewers note the large expansion of graduate students and post-doctoral research assistants in recent years which *'should be very beneficial in advancing the research standing of the Department to further heights.'* Concern was expressed by both students and staff that the research output from post-graduates had fallen short of expectations, such as where *'students did not proceed to a research career'* or where *'the teaching demands on supervisors had precluded their writing up the work for publication on behalf of the student'*. The reviewers note the Departmental manual for postgraduate research students and that *'the research students commented that in most cases their supervision was very good and that inter-personal relationships in the Department were excellent.'* Completion times for PhD students averaged c.4.8 years which was somewhat longer than that in UK universities. It was also noted that while *'all students are encouraged to take the Diploma in Statistics, the College might consider whether more formal training courses should form a larger and compulsory component of the PhD than at present. This is now universal in the UK, and has been a necessary part of PhD training in other European countries for many years.'*

In the light of the increase in the research community, the reviewers recommend there are a number of questions that the Department needs to explore:

- 1) *'How can the new research group structure facilitate postgraduate research and reduce PhD completion times?'*
- 2) *'How can the Department incentivise publications in the refereed literature of postgraduate student research?'*
- 3) *'Is there a greater role for post-doctoral research assistants in the supervision of research students?'*

In addition, the reviewers suggest that the College might like to consider whether the encouragement of the production of theses as a series of draft or published papers would ensure more published papers and also whether more formal training of postgraduate research students is desirable.

The reviewers also note the significant contribution that the Department makes to the taught masters in Environmental Science which currently accounts for 28% of the taught modules, and in addition the Department has supervised 21% of the projects since 1996.

RESOURCES

The resources of the Department *'in terms of infrastructure (quantity and quality of working space, basic equipment, core funding) and human capacity (technical assistants, number of scientific staff relative to teaching loads and research profile)'* were considered by the reviewers to be *'well below those of other departments of comparable size and international standing'*.

The reviewers consider however, that *'the Department has access to two resources absent from many other departments: a Herbarium of national and international significance and a Botanic Garden'* which were described as *'two special jewels in the crown'*. The reviewers considered the Herbarium to be *'a unique resource put to excellent use in the botanical teaching and research programme. With about 200,000 specimens it is a small to medium-sized herbarium, but through its high proportion of type specimens and historical collections from various parts of the world it is internationally much more important than its modest size suggests'*. The reviewers commend the plans *'to prepare a database and digital images of all the Dublin type specimens for international access on the worldwide web'*, and recommend that College and the Faculty provide new accommodation (at least twice the present space) to improve the storing conditions of the Herbarium and the working space for research and teaching.

The Botanic Gardens were considered to provide *'a major teaching and research resource for the Department'*. However, the reviewers also note that *'the excellent condition of the collections belies the fact that the Botanic Gardens have had little investment since they were established on the present site in 1967'*. The gardens were used by staff, research students and undergraduates, and the collections were considered to be *'nationally important'*. The reviewers were strongly supportive of the plan developed by the Department to provide additional facilities and to replace the glasshouses with state-of-the-art facilities. They comment that *'Botanic Gardens of the present high value are a considerable rarity in the British Isles. Outside Cambridge and Oxford, no other University can boast such a nationally important resource, and its value can only increase given more and sustained investment.'* In relation to both the Herbarium and the Botanic Gardens, the reviewers considered them to be under-resourced and expressed concern about *'the vulnerable nature of the curatorial staff resource'*.

The level of technical support in the Department was considered to be too low *'by all international standards'* and the reviewers recommend that the need for additional technical staff should be addressed as a matter of great urgency. They note with great concern the absence of any structured technical support for research. The level of administrative support available to the Department was considered to be satisfactory. It was considered that while there are adequate lecture/seminar rooms and practical classroom facilities, these are not good by modern standards. Basic resources for field excursions such as field equipment and transportation were also seen to be *'inadequate or substandard and should be better resourced'*. In relation to accommodation, the reviewers indicate that *'the shortage of space and the low quality of most working spaces constitutes a major bottleneck for efficient research'*. They comment that the offices of some staff are very cramped and the working spaces for some of the postgraduate students were very unsatisfactory. The poor quality of facilities and levels of maintenance in some laboratories were noted. They also considered that *'computer facilities are too limited'* for the growing population of postgraduates and postdoctoral fellows.

ORGANISATION AND MANAGEMENT

The reviewers considered the organisation and management in the department to be *'entirely appropriate'*. The Departmental Committee was the main consultative forum, and the reviewers commend the recent establishment of a new teaching committee that will review the teaching programme. They note that the democratic nature of the appointment of Heads of Department *'clearly works well'* and the *'devolution of tasks to other staff also seems highly appropriate'*. Most staff have informal links with staff in other departments, and the major formal contact between departments is through the Faculty of Science Executive Committee. The reviewers also note the many contributions made by staff in the Department to the overall governance of College.

In terms of staff-student liaison, the reviewers state that *'there is an excellent and most friendly rapport between staff and students'* and that *'the large commitment of the staff to field teaching has helped considerably to cement relationships with both Sophisters and postgraduates'*. It was noted that postgraduate representatives have attended Departmental meetings for some years and that undergraduate representation will also occur from this session. The postgraduates expressed the view that more communication about various issues in the Department would be appreciated, and the reviewers suggest that the Department might wish *'to consider whether any measures ... might be taken to improve information flow'*.

RECOMMENDATIONS

The reviewers *'commended the Head of the Department and all members of staff for their balanced and comprehensive self-assessment and very frank SWOT analysis. On the basis of the available documentation and interviews with all staff members and numerous students we wish to endorse the major conclusions of the self-assessment. Our overall view can be summarised as follows:*

1. *The teaching and research programme of the Department of Botany are of a very high quality standard. Compared with departments of similar size and (limited) financial and infrastructural resources the department is at the top in terms of quality and quantity of research and teaching outputs and in its success in attracting outside funding.*
2. *The Department of Botany holds a unique position in Ireland and Western Europe as a whole in its combined strengths in Plant taxonomy and systematics and in a broad spectrum of Ecological themes. It produces more honors graduates in these fields than many comparable departments elsewhere.*
3. *Shortage and substandard quality of space is increasingly becoming a bottleneck for realising the full potential of the department. The Faculty and College should address the space problems as a matter of great urgency.*
4. *Shortage of technical assistance is a limiting factor in research outputs. The allocation of technical staff to support research should be urgently reviewed by the Science Faculty.*
5. *All staff members of the department have a very heavy teaching load. This could/should be reduced by:*
 - a) *reviewing the curriculum and cutting a number of non-compulsory courses;*
 - b) *teaching joint courses*

with other departments with partly overlapping fields (Zoology, Genetics, Geology, Geography, Centre for the Environment) – this requires a top-down organisation of standard course durations and course time tables across the Faculty of Science; c) exploring the possibilities to involve postdoctoral fellows in the teaching programmes.

6. The botany courses taught to Freshmen should be reviewed. The profile of Botany as an exciting field of Science with good career prospects should be confidently advertised.
7. We urge the College and Faculty to provide new accommodation (at least twice the present space) to improve the storing conditions of the Herbarium and the working space for research and teaching.

Future direction

In addition to endorsing the present combination of a broad range of topics in ecology together with plant taxonomy and plant systematics, the reviewers note that the Department has recently '*made a significant step of successfully introducing molecular tools in its research*' which is currently dependent on the expertise and commitment of one member of the academic staff. They suggest that expertise in this area be broadened by the recruitment at the next available opportunity of a molecular ecologist.

The reviewers also recommend that the College should review its policy of recruiting fixed-term contract lecturers, and they suggest that College consider other approaches to maintaining financial contingencies, such as a tenure track system.

4. RESPONSES FROM THE DEPARTMENT AND DEAN OF FACULTY

The Pro-Dean of Science welcomed this report as being '*very complimentary on the performances and achievements of the Department*' and noted that given the background and experience of the two reviewers '*it can be taken that the Department was subject to scrutiny of the very highest and most exacting level, and that the report of the reviewers commands a commensurate degree of authority.*' The Department welcomed '*the positive tone of the review which endorses our recent collective endeavours and our future direction*'.

The pro-Dean states that the report of the reviewers '*is very positive in its assessment of the teaching performance of the Department ... The reviewers pick out two elements as worthy of special mention. The first is the emphasis put on practical work in taxonomy, morphology and ecology ... and the second is the very strong commendation for molecular teaching.*' With regard to the challenges identified by the reviewers, the Department recognises that improving the number of first choice sophister students is '*a key objective, and some progress had been made*'. Some measures have already been implemented with a view to reducing teaching contact hours, and '*experimental web-based Freshman teaching has recently been implemented*'. The Department acknowledges its very strong commitment to the Moderatorship in Environmental Science, and indicates that its contribution to the 2003-04 programme will require preliminary discussion at this time. The Department also recognises the possibilities for more interdisciplinarity in teaching, but considers that '*the key question is whether these possibilities should be offered at undergraduate or postgraduate level*'. The Department welcomes the recognition by the reviewers that they have heavy teaching loads, and suggests that '*proper teaching and administrative loads should be discussed at Faculty and College levels*'. The pro-Dean notes that a major recurring theme in the report is the '*very heavy teaching load*' incurred by all members of the Department and supports the recommendations that these be reviewed with a view to rationalisation.

In relation to research, the pro-Dean notes that the reviewers are '*very positive on the research achievement of the Department and rightly so. In spite of its heavy commitment to teaching, research activity has remained at the very core of the Department's ethos*'. The Department comments on the issues identified by the reviewers under the heading of research. It notes that '*the issue of PhD completion times has several components, which include stipends, the nature of contract funding, availability of equipment and vehicles for fieldwork*' and that while '*research group activity is certainly of intellectual benefit and it contributes to the positive group dynamic of the Department, it may not actually reduce completion times. More realistic research agendas may be an important issue*'. Efforts had already been made within the Department to incentivise publications. The Department noted that the role of postdoctoral research fellows was an issue for further discussion at College level. In noting the comment of the reviewers that the department now has '*a critical mass of research students and staff*', the pro-Dean indicates that '*we have a prime example of a relatively small department performing very effectively but clearly capable of realising greater potential*'.

The quantity and quality of accommodation available was a matter of great concern to the Department which noted that '*research programmes are buoyant and the need for more dedicated research space is now so acute that its absence is a direct hindrance to the Department's optimum development*'. The Department notes that its space needs had been quantified in the Faculty Space Review. The pro-Dean supports the accommodation needs of the Department noting that it '*is suffering not just a chronic shortage of working space but also from excessive*

low-quality space' and that 'the reviewers rightly issue a forthright recommendation that the space problems be addressed as a matter of urgency'.

The Department welcomes the recommendation of the reviewers that new and additional accommodation be provided for the Herbarium. Furthermore, the Botanic Garden also lacks sufficient space for current teaching and research needs, and the Department indicates its intention to submit a development plan for the Garden.

While acknowledging the comments of the reviewers that the *'shortage of technical assistance is a limiting factor in research output'*, the pro-Dean states that many departments *'have only just about adequate technical support to cover teaching activities and only a few have enough technical support to underpin research'*. The Department indicates that *'technical support for field-based research would be welcomed'* and states that *'all technicians should be facilitated by opportunities to improve their knowledge and expertise through closer association with research'*.

5. RECOMMENDATIONS TO COUNCIL

In addition to the Department addressing the detailed recommendations outlined in the review report, the following recommendations are made to Council in light of the review report and the Dean and Department's responses:

(a) that the Department should

1. Consolidate its excellent record in teaching by responding to the reviewers' recommendations and giving particular attention to the possibility of reducing the teaching load of staff
2. Examine ways of attracting more students to specialise in Botany
3. Consider introducing mechanisms to increase publications by staff and postgraduates. (The high quality of research in the Department is noted.)

(b) that the Faculty should:

1. Consider ways of acting upon the reviewers' opinion that the department should strengthen its commitment in the area of molecular ecology, with reference to possible inter-departmental collaboration
2. Request the Dean to liaise with the Bursar on the space needs of the Department (including the Herbarium) that have been identified in the Faculty Space Review and also in relation to the plans for the development of the Botanic Gardens
3. Review the technical staff support level in the Department and the Faculty with a view to optimising such support
4. In relation to the Moderatorship in Environmental Sciences, the Faculty should consider the reviewers' suggestion that a review be conducted of both the Department's contribution to the course and the commitment of other Departments.

(c) that the College should:

1. Note the comments of the reviewers concerning the under-resourcing of the Department by international standards
2. Assist the Department and the Faculty to improve the situation in Botany in relation to their working space and help them to realise the full potential of the Herbarium and the Botanic Garden
3. Take note of the reviewers' suggestions that it should
 - explore the introduction of more formal training for postgraduate research students
 - examine the status of postdoctoral staff in College
 - establish norms for teaching loads
 - review policy on contract staff and consider the possibility of introducing tenure-track appointments.

John Hegarty
Provost
