Subject Review Report

Department of Agricultural Biology University of Peradeniya

March 2005

1. THE PURPOSE AND AIM OF THE SUBJECT REVIEW

The purpose of the subject review is to evaluate the quality of education in both the undergraduate and postgraduate programmes offered by the Department of Agricultural Biology of the Faculty of Agriculture of the University of Peradeniya and focus on the quality of students' learning experience and on students' achievements in both undergraduate and postgraduate programmes. It is aimed at examining and reviewing the appropriateness of academic standards set for the programs and the effectiveness of curriculum in delivering the intended learning outcomes described in the self evaluation report. It is also aimed at examining the suitability and effectiveness of the assessment methods used to measure the achievement by learning outcomes relevant to the programme.

The review team consisted of Prof. K.D.N. Weerasinghe (Professor of Agricultural Engineering, University of Ruhuna), Prof. S. Widanapathirana (Senior Professor of Microbiology, Faculty of Science, University of Kelaniya) and Prof. M.J.S. Wijeyaratne (Senior Professor of Zoology, University of Kelaniya). Prof. K.D.N. Weerasinghe served as the review chair.

During the subject review of the Department of Agricultural Biology, the following eight aspects were separately studied.

- Curriculum design, content and review
- Teaching, learning and assessment methods
- Quality of students including student progress and achievements
- The extent and use of students feed back, qualitative and quantitative
- Postgraduate studies
- Peer observation
- Skills development
- Academic guidance and counseling

The review team perused the subject review report prepared by the Department before the review visit. During the review visit, which took place from 2nd March, 2005to 4th March 2005, the review team had discussions with the Dean of the Faculty of Agriculture, Head of the Department of Agricultural Biology, members of the academic staff and non-academic staff and selected groups of undergraduate and postgraduate students.

The review team also examined several documents, which included the curriculum descriptions of all course modules offered by the department, practical handouts distributed to the students, samples of students' practical records, mini-project reports, project reports of the final year students, postgraduate dissertations, laboratory manuals and student guides prepared by the academic staff, teacher evaluation reports, Audio visual teaching and learning aids prepared by the academic staff, answer scripts, marking schemes and question papers of several course modules, minutes of departmental meetings and recent publications of the academic staff.

The review team also visited the teaching and research laboratories to examine the facilities available. The lecture theatres, seminar room, plant house, entomology museum and Faculty computer center were also examined by the review team.

Peer observation of the teaching process in a lecture theatre and a practical class was also carried out during the review process.

2. BRIEF HISTORY OF THE UNIVERSITY, FACULTY AND THE DEPARTMENT

The establishment of the University of Peradeniya, originally named as the University of Ceylon was legally sanctioned by the Ordinance No. 20 of 1942. However, due to various reasons including the second world war, the opening of the University at Peradeniya was delayed. The date of transfer of Faculties from Colombo was postponed from 1948 to 1950, and then to 1952. On the 6th of October 1952, the University of Ceylon was officially declared open at Peradeniya. With this event, the Faculties of Arts and Oriental Studies, and the Departments of Law, Agriculture and Veterinary Science started functioning at Peradeniya, while the Faculties of Science, Medicine and Engineering continued to be in Colombo pending the completion of the 2nd and 3rd phases of the building programme at Peradeniya. With those phases of development completed, the rest of the faculties were established at Peradeniya and the University of Peradeniya started functioning as a unitary University.

With the enactment of the University Act No.1 of 1972, all Universities in existence in Sri Lanka at that time became the campuses of one single University, namely the University of Sri Lanka. Thus the University of Peradeniya became the Peradeniya campus of the University of Sri Lanka with effect from 15th February 1972. In 1978, when the University Act No. 16 of 1978 was enacted, the Peradeniya campus became the University of Peradeniya, Sri Lanka and again started functioning as an autonomous University.

Today, the University of Peradeniya is the largest residential University of Sri Lanka, located in an area of 700 ha of land with a picturesque landscape and consists of seven Faculties, namely the Faculties of Agriculture, Arts, Dental Science, Engineering, Medicine, Science and Veterinary Medicine & Animal Science. Present student strength of the University of Peradeniya is around 10000.

Faculty of Agriculture of the University of Peradeniya is the first Agriculture faculty established in the University system in Sri Lanka. It was commenced with the admission of 16 students after completing their General Science Qualifying examination in 1947. In 1948, the Department of Agriculture was formed in the newly established Faculty of Agriculture and Veterinary Sciences together with the Department of Veterinary Sciences and Animal Husbandry. In 1973, an independent Faculty of Agriculture was established with six departments. Faculty of Agriculture is now developed into a fully pledged faculty with eight departments. From 2004, the Faculty of Agriculture has expanded its horizons to offer B. Sc degrree in Food Science and Technology. From the academic year 2004/2005, the B. Sc degree in Agriculture was renamed as B Sc degree in Agricultural Technology and Management. The annual intake of undergraduate students to the Faculty of Agriculture at present is 220. At present, the Faculty of Agriculture has a student population of around 1000 students.

3. AIMS AND LEARNING OUTCOMES

Aims

The Department of Agricultural Biology offers courses and conduct research on basic biological sciences such as Botany of Crops, Genetics, Microbiology, Plant Physiology and Entomology, and on applied sciences such as Plant Pathology, Pest Management and Plant Breeding. Courses on Molecular Biology and Biotechnology are included in the academic programme as an essential tool to be used in better understanding and application of all other disciplines in a modern scientific context. This department now offers seven courses in the core program and fifteen courses together with the project in the advanced program of the B.Sc. (Agric.) degree program.

Thus the aims of the Department of Agricultural Biology are,

1. to provide essential basic knowledge and practical skills related to biological sciences, and to prepare the students entering the university to follow and practice advanced and applied courses offered by the Faculty of Agriculture, University of Peradeniya,
2. to equip fresh undergraduate students with basic laboratory skills in Biology; A very high degree of emphasis is placed on the laboratory practical component as the students entering university after 1973 lack basic laboratory skills due to the abolition of the practical component in the G.C.E. Advanced Level examination,
3. to expose students to modern scientific laboratory techniques such as molecular biological techniques, making them comparable with graduates of universities in developed countries,
4. to prepare students to face the challenge of increasing agricultural production by breeding improved crop varieties and identifying biological as well as physical or environmental factors affecting agricultural production and minimizing these effects with minimal ecological disturbance and human hazards,
5. to provide students with the experience of initiating, carrying out and reporting of fundamental as well as applied research,
6. to cultivate the value of team work and improving interpersonal relationships by making students to conduct group projects and writing project reports collectively,
7. to improve the communication skills through regular oral presentations,
8. to develop in students, a sense of responsibility towards well being of fellow students, society in general and the country as a whole,
9. to provide a friendly, harmonious and supportive atmosphere in the department, faculty and the university, conducive to successful learning and completion of degree programs and
10. to impart a feeling of parental or guardian type of care to students.

Learning outcomes

1 On successful completion of the taught courses offered by the Department of Agricultural Biology in the core program, the students gain theoretical knowledge and laboratory skills pertaining to basic biological sciences necessary for the progressive academic development (Prior to 1968, students registering in the Faculty of Agriculture followed the GSQ program in the Faculty of Science).

2 On completion of the courses in the Advanced Modules (3200 Series onwards), students gain an in-depth knowledge in respective subject matter and are in a position to apply that knowledge in field situations and research.

3 On successful completion of the final year research projects, students develop personal skills in problem or situation recognition, carrying out research,

collecting and analyzing information, and critical and independent interpretation of results and develop transferable skills such as written and oral communication.

In addition to these, on successful completion of programs offered by the Department of Agricultural Biology, students would be able to

(i) work in English language and be computer literate and,

(ii) gain theoretical knowledge and practical and intellectual skills necessary to pursue further studies in a global framework of education,

To achieve the listed learning outcomes, the students are given the opportunities and are therefore able to

i. learn basic courses of biological sciences to improve their knowledge at the point of entry into the university,
ii. gain basic laboratory skills by regular laboratory classes,
iii. gain hands on experience and develop skills by working in the research laboratories of the department (3200 Series onwards),
iv. improve communication skills by oral presentations and attending scientific seminars in the faculty,
v. interact with scientists outside the university by field visits and by encouraging students to conduct their final year research projects in other public and private sector institutes and
vi. have close staff-student interaction by informal social gatherings

4. THE JUDGMENT ON THE EIGHT ASPECTS REVIEWED

Curriculum design, content and review

The curriculum content of the degree program reflects adequate academic standards and enables the students to achieve the intended learning outcomes in the form of knowledge and understanding of the subject matter and development of interpersonal and transferable skills. The core program offered by the department provides all students admitted to the Faculty of Agriculture with basic Biology knowledge and relevant practical skills. The advanced modules offered by the department are intended to produce specialists such as plant pathologists and plant breeders, who would be able to address the key issues related to agriculture. Practical courses, modules on proposal formulation and the project are aimed at promoting the development of practical skills, interpersonal skills and communication skills. The curriculum content of core courses and advanced modules are both in sufficient breadth and depth in terms of subject coverage. It was also noted that the curriculum contained modules such as molecular genetics and gene manipulation, which give students an opportunity to obtain the most modern knowledge in science and technology. However, the reviewers felt that inclusion of a course in Cell Biology in the core program would provide students a sound basis for understanding advanced modules.

The reviewers were satisfied that the learning outcomes of the modules are reflected in the curriculum, which would facilitate obtaining employment in the agricultural sector in Sri Lanka and also pursuing relevant higher degree programmes. According to the self evaluation report the curriculum of the Department of Agricultural Biology has been revised four times between 1973 and 1998 and there is evidence that outcome of these reviews have been implemented. The review team is satisfied that the current needs and priorities of the agricultural sector in Sri Lanka and in the world have been taken in to account in revising the curriculum. For example, inclusion of advanced courses in Molecular Biology, DNA recombinant technology, Post-harvest Biology and plant breeding are seen as very progressive achievements. It was also noted that modern

methods of teaching, multimedia presentations and audiovisual equipment are frequently used in the classroom to achieve the learning outcomes.

However, there seems to be no evidence to indicate that the feed back of the students, consultation with employers and the views of external examiners are taken in to account in the curriculum design and review at the departmental level. The review team strongly feels that view of all stakeholders, including students, alumni, potential employers and external examiners should be taken into consideration in this important activity, which should be done at regular intervals.

Although the latter aspect of curriculum design, content and review can be considered as a slight weakness, the overall achievement under this aspect could be judged as "satisfactory"

Teaching Learning and assessment methods

The academic staff of the department consists of well trained and committed personnel as seen by their scientific achievements, involvement in research, preparation of teaching material and laboratory manuals. The curriculum of each module is written with aims, intended learning outcomes, brief course content and recommended references. These curricula are very informative. However, the review team noted that these detailed information is not given to students. The reviewers are of the opinion that arrangements should be made to give a copy of each of this detailed information on the curriculum to each and every student.

The review team noted that the teaching process, delivery of lectures and conduct of practicals are being done in a satisfactory manner. In all observed instances, the lecturer had prepared the lecture or organized the practical and presented it very well. Lecturers were able to obtain sufficient student response and feedback during the lecture. In the practical classes, all students were given practical handouts. The objectives and the background information were explained to them at the beginning by the teacher concerned. Due to shortage of material, the students worked in groups under the supervision of a Demonstrator who made sure that every student in the group received hands-on experience of the practical.

Examination of samples of student work, mainly marked answer scripts of both theory and practical examinations, revealed that the student achievement in relation to learning outcomes is satisfactory. The questions were well balanced and carefully formulated to achieve intended learning outcomes. The students' answers reflected adequate preparation, understanding of the subject and the development of analytical and transferable skills. Practical classes conducted in groups allowed students to interact with each other and the teacher, and develop interpersonal skills.

There is a diversity of assessment methods used in the department. The department follows faculty guidelines for the assessment of the theory component of courses by conducting end term summative assessments using MCQs, structured questions and essay questions. In the opinion of the reviewers, the mode of assessment is comprehensive and can be considered as a strong feature. On the other hand, practical assessments use variety of methods such as continuous assessments, end term examinations, mid term tests, mini projects and assignments depending on the intended learning outcomes of the module.

It was noted that there is a good practice in the department i.e., all theory papers are scrutinized by a board of academic members of the department. However, the review

team strongly felt the need of having external moderators of question papers and external examiners for the entire examination process for transparency and quality assurance of the degree programme. It is suggested that external examiners' contribution is obtained at least for the advanced modules of the programme.

The Department adopts standard practices in the university system in appointing examiners for setting of question papers and marking of answer scripts.

The review team evaluated the teaching, learning and assessment methods of the department and decided to pass the judgment of 'satisfactory' for this aspect.

Quality of students including students' progress and achievements

The Z score of the students who enter the faculty varies over a wide range; i.e., from 0.7643 to 1.4217. Their competence in English is also highly variable. There is no evidence that this high diversity inhibits the achievement of a satisfactory student profile. This indicates that the good practice adopted by the department to upgrade the English knowledge in the teaching and learning process is successful.

The student progress is continuously assessed through the mechanisms stated in the preceding section. The students are provided with the marks of the continuous assessments obtained in practical assignments, which helps them to continuously improve their performance.

The modular system implemented by the department, in which the results of the examinations of each module are released after the end semester examination, also helps the students to improve their performances during the degree program. However, the review team was informed that in some cases, the results of the end semester examinations are delayed. The Department may consider taking action to release the results of all end semester examinations without delay preferably within 3 weeks of holding the examination.

The mechanisms employed in the department to improve the performance of the students who get poor grades are satisfactory. The implementation of the requirement of the 80% attendance in theory classes as well as in practical classes is also commendable.

The review team noted that the progression rates of the students majoring in Agricultural Biology are satisfactory. The programme completion rate is also good.

The mechanisms employed by the Department to ensure that the qualifications awarded indicate a satisfactory level of student achievement in relation to intended learning outcomes are also satisfactory.

The samples of students' work examined by the review team indicated that intended learning outcomes of each module are achieved. The discussions with the students who are majoring in Agricultural Biology indicated that they are of the view that they achieve their potential.

The information provided by the department indicated that the students who major in Agricultural Biology are readily employed in diverse fields. This indicates that the subject matter they have learnt and the interpersonal skills they have developed are useful in securing employment without much waiting time.

Several students who have followed Agricultural Biology as their major subject have won scholarships and medals awarded by the University of Peradeniya in the recent past. The review team noted that the number of students who received such awards has declined gradually in the past few years. The department may look into the reasons for such a decline and take remedial action.

The review team also noted that the number of students who are majoring in Agricultural Biology has declined since 1996/1997. The department may identify the reasons for this decline and take necessary action to remedy this situation.

The overall quality of students, their progress and achievement could be judged as 'Good'.

The extent and the use of student feedback; Qualitative and quantitative

It is commendable that a highly satisfactory mechanism is employed to obtain student feedback on theory classes, practical classes and field visits. A questionnaire is provided to each student at the end of each module. When several teachers are involved in teaching one module, student evaluation is carried out after each lecturer completes his/her quota of lectures. The administration of the evaluation procedure by the Dean's office is also commendable. The feedback for different aspects of evaluation is quantitatively analyzed and the results of this analysis together with qualitative comments are sent direct to the relevant teacher after the results of that module are released. The results of the evaluation of practical classes are sent to the Head of the Department.

The review team noted that action has been taken on the comments made by the students. It is recommended to continue this practice addressing all the comments made by the students. If any action cannot be taken on a particular aspect raised by the students, the department may consider informing the students giving reasons why such action could not be taken.

The aspect of the extent and use of student feedback, qualitative and quantitative could be judged as 'good'.

Postgraduate programmes

The Department of Agricultural Biology is engaged with two Boards of Studies in the PGIA, namely the Board of Study in Agricultural Biology and the Board of Study in Plant Protection, to offer postgraduate programmes leading to M. Sc., M. Phil. and Ph.D. Degrees. M.Sc in Plant Protection Technology and M.Sc. in Molecular and Applied Microbiology are the two M.Sc programmes conducted by the Department of Agricultural Biology.

The Department of Agricultural Biology has a fairly strong dedicated academic staff and technical staff to conduct and support the said postgraduate programmes. Facilities available in the department to conduct research are good. A committee comprising a major supervisor and a second supervisor provides continuous and close guidance to postgraduate students. Student completion rate is around 60 % for M. Sc. programmes during 2001-2004. M. Sc. programmes are self funded by the students. M. Phil. and Ph. D programs usually have funding through research grants. The research facilities available in the Department are adequate to maintain the postgraduate programs at a high academic level.

However, the review team was informed that there are deficiencies associated with the supply of chemicals and consumables to meet the students' needs. However, this is beyond the control of the department. Practical exposure of the M. Sc. students to gain necessary skills for seems to be limited due to the financial constraints. Availability of course material and internet facilities need to be further improved to enhance the quality of the postgraduate programmes.

Despite of the above facts, the postgraduate programmes offered by the Department are in a high academic level and could be judged as "satisfactory".

Peer observation

A formal peer observation system is not in operation in the department. However, the practicals conducted by the Demonstrators and junior staff members are peer observed by the senior staff members. The Department may consider the introduction of a formal peer evaluation system to include all members of the academic staff.

Since there is some peer observation, especially in practical classes, the review team decided to pass the judgment of "satisfactory" for this aspect. .

Skills development

Skills development in academic programmes is considered as an essential feature of university education by students, employers and the general public. Skills development is more likely to succeed if teaching, learning and assessment methods in the subject they study are designed to facilitate the development of personal skills simultaneously with the acquisition of subject knowledge and understanding. The review team noted that all core modules and advanced modules offered by the department have a considerable amount of practicals enabling the students to develop both professional and technical skills. In addition to regular practical classes, students are given an opportunity to participate in study tours and field visits where they acquire multitude of skills including communication skills, skills needed for working in groups and farm practices. Mini-projects assignments and research projects, which are components of the Agricultural Biology curriculum are also expected to develop report writing skills and interpersonal skills in students. In addition, several residential training programmes conducted at the Plant Quarantine Center and Post Harvest Institute would expose students to the real world situations and help them to develop social and communication skills.

Assessment methods described in the prospectus published by the Faculty of Agriculture clearly indicate the availability of mechanisms to evaluate personal skills. The practical examinations are designed to test the hands-on experience and analytical skills of the students. The project work is designed to test variety of skills such as subject specific skills, communication skills and report writing skills. However, there was no evidence to show that employers of graduates have been consulted regarding their opinion about the skills of the students.

The reviewers are satisfied that the curriculum of the Department of Agricultural Biology is designed to facilitate skills development of students and the assessment methods evaluate students' personal skills as well as their subject knowledge.

The aspect of skills development could be judged as "good".

Academic guidance and counseling

Academic guidance and counseling mechanism is available in the department to all undergraduate and postgraduate students. Since the number of students enrolled in the department to follow the advanced modules during the final three semesters is low, teacher student interaction is direct and students always find time to discuss the matters pertaining to different aspects of their academic life with their teachers. Interactive activities associated with field trips and activities of the Biology Guild provide a good stage for interaction and counseling. Therefore, the review team is of the view that the academic guidance given to the students is commendable.

During the first two years, all students are assigned to each member of the academic staff for counseling and guidance. Senior students and student counselors are also engaged in counseling activities. Some members of the department are trained in counseling. However, the decreasing trend in student enrolment in the department may be rectified if academic counseling may be conducted more intensively during first two years of the study programme.

This aspect can be assigned a judgment of 'good'.

5. CONCLUSION

The good practices, weaknesses and the judgments for each aspect considered in the subject review could be summarized as follows.

1. Curriculum design, content and review

Good practices:	The curriculum is revised at regular intervals. Intended learning outcomes are identified. Contents are of adequate breath and depth. Flexibility in choice of course modules is available. There are opportunities to develop personal skills.
Weaknesses:	Employers, alumni and students are not consulted at the department level in designing and revising the curriculum.
Judgment:	Satisfactory

2. Teaching, learning and assessment methods

Good practices:	Use of multimedia Preparation of Student Guides Distribution of handouts in the classes Getting good student response during the lectures Giving hands-on experience in practical classes to each and every student in the practical group. Continuous assessment Designing of questions to test knowledge as well as analytical and communication skills Mini-projects and final year Project work Availability of a Scrutiny Board
Weaknesses:	Absence of external moderators and examiners
Judgment:	Satisfactory

3. Quality of students including student progress and achievements

Good Practices:	Availability of a mechanism to improve English language skills Implementation of modular system Requirement of 80% attendance.
Weaknesses:	No successful mechanism to maintain or increase the number of students who major in Agricultural Biology.
Judgment:	Good

4. The extent and the use of student feedback: Qualitative and quantitative

Good practices:	Implementation of teacher evaluation system Taking action on students' comments
Weaknesses:	None
Judgment:	Good

5. Postgraduate programmes

Good practices:	Provision of adequate supervisors Provision of adequate technical support Provision of adequate facilities
Weaknesses:	Delay in purchasing consumables, which is beyond the control of the Department Insufficient internet facilities
Judgment:	Satisfactory

6. Peer observation

Good practices:	Peer observation of junior staff in practical classes by the senior teacher who is in charge of the class
Weaknesses:	No peer observation in theory classes
Judgment:	Satisfactory

7. Skills development

Good practices:	Identification of development of various skills as learning outcomes Employment of satisfactory of mechanisms to develop interpersonal skills
Weaknesses:	None
Judgment:	Good

8. Academic guidance and counseling

Good practices:	Good interaction with students and teachers Implementation of a personal counseling system where few students are assigned to a staff member Carrying out interactive activities through the Biology Guild.
Weaknesses:	None
Judgment:	Good

Overall judgment - Suspended

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