

## **ACHIEVEMENTS AT THE DEPARTMENT OF CROP PRODUCTION AND PROTECTION (FORMERLY PLANT SCIENCE), OBAFEMI AWOLowo UNIVERSITY**

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### **ABSTRACT**

The Department of Crop Production and Protection is one of the five Departments in the Faculty of Agriculture that have been in existence since the faculty became departmentalized in the 1966/67 session. The academic staff members constituted themselves into groups and developed long-term research programs that attracted funds from the University Research Committee (URC) or outside the University. The research programs are: Cowpea Research Program, Maize Research Program and Vegetable Research Program. The Department has played prominent roles and made immense contributions to the improvement of tomato, cowpea and maize production in Nigeria. Breeders, in collaboration with Pathologists, Entomologists, Virologists and Nematologists in the department as well as at the Institute of Agricultural Research and Training (IAR&T), Moor Plantation, Ibadan, have successfully developed several varieties of tomato, cowpea and maize. The popular Ife No. 1 and Ife Plum tomato, Ife Brown cowpea and Ife Yellow Composite maize are a few examples of crop varieties developed and released from the

department. The Maize Program in the department developed several inbred lines and hybrid varieties that performed well in the Nationally Coordinated Maize Variety Trials.

Entomological works in the department include the development of a reference insect collection and the systematic studies of some insect groups, notably the plant bug family, Miridae, which belongs to the Suborder Heteroptera in the order Hemiptera. Many viruses have been isolated from the cowpea plants that showed varied symptoms of virus infection. These viruses isolated were identified and research work on the control methods, including host-plant resistance, were carried out. Some specific areas of researches pertinent to Agronomy, Agroclimatology and Crop Physiology conducted in the department are: date of planting studies: maize, cowpea, systems agronomy and crop management studies; including spacing, plant density, fertilizer studies, physiology; including phenology: root and tuber crops, maize, cowpea, climatology of specific crops: maize, cowpea, oil palm.

The department has played a significant role in training a critical mass of skilled and responsible individuals among who are two former DVCs of this university and a serving Federal Permanent Secretary.

### **Introduction**

The Department of Crop Production and Protection (formerly Plant Science) is one of the five departments in the Faculty of Agriculture that have been in existence since the faculty became departmentalized in 1966/67 Session. Apparently, the vision of the founding fathers of the department is that production and improvement of crops (arable, permanent and horticultural) and forestry species, along with the cognate sciences; i.e., Entomology, Pathology, Nematology and Weed Science would be taught and researched in the department. With the exception of forestry, all of these subject-matter areas have been well taught and researched by scientists in the department throughout the 40 years of existence of the university. Forestry has been taught and researched only as it applies to agriculture; that is, Agro-forestry.

Of the 244 first set of undergraduate students admitted into the university at the take-off site in Ibadan in 1962, 23 were admitted to read Agriculture. Because the students at that time were being prepared for a comprehensive general B.Sc. (Agric.) Degree, the department, like all other departments in the faculty, did not really have its own students. Thus, the department contributed to the growth and development of the faculty in those initial years by teaching plant science courses, conducting research, providing administrative services and supervising final year students that opted for projects in plant science.

This arrangement was in place till the 1977/78 session, when the faculty started running programs that led to the award of five undergraduate degrees, including B.Agric. (Plant Science), awarded by the department.

The first set of students on the new program graduated in the 1981/82 Session. With the introduction of a Plant Science Degree, it became necessary for the department to admit undergraduate students of its own. Admission of students into the department, which is primarily through the University Matriculation Examination (UME) conducted by the Joint Admission and Matriculation Board (JAMB), has been on an increasing trend over the years. For example, students intake has increased from about 20 in the 1987/88 Session to about 60 in the 2001/2002 Sessions, an increase of about three additional students per session. The department thereafter changed her name from Plant Science to Crop Production and Protection after considering many factors.

Admission of post-graduate students into the department started in the 1968/69 Session with only one student, Mr. (now Professor) B.A. Matanmi who opted for the M.Phil. Degree in Entomology, under the supervision of Professor J.T. Medler. He completed his program in the 1970/71 session. Since then, graduate students have been admitted into and graduated in all disciplines covered in the department. The department awards three University Senate approved Post-graduate degrees; that is, M.Sc., M.Phil., and Ph.D. The first Ph.D. Degree of the Department was conferred in 1981 on Mr. (now Professor) I.O. Obisesan, who specialized in Plant Breeding and Genetics, under the supervision of Professor T. Fatunla (now Olutunla).

### **Objectives**

The department of Plant Science aims at providing academic, research and practical training opportunities to undergraduate and graduate students in all specialized areas of crop production so that the students feel confident and are competent to enter into the job market post-training. Often after graduation, most of the undergraduate students seek employment in government service, teaching and industry in varied

capacities. The undergraduate program has been designed to:

- I. provide opportunity for acquaintance with commonly grown food, industrial, vegetable, and horticultural crops in the South West zone of Nigeria as well as to impart the basic expertise in the management of these crops for maximum productivity;
- ii. impart the technical know-how regarding the control of insect pests, weeds and diseases of economic crops and at the same time alert undergraduates of necessary precautions to be taken in crop protection activities to avoid environmental pollution;
- iii. expose undergraduates to how these economic crops may be improved genetically for better and higher yields, resist or tolerate biotic and abiotic stresses, and be better adapted to unpredictable environmental conditions;
- iv. provide opportunity for students to specialize in any of the core areas of Plant Science; that is, Breeding, Seed Production, Agronomy, Weed Science, Farming Systems, Crop Physiology, Horticulture, Insect Taxonomy, Insect Ecology, Insecticide Toxicology, Biological Control of Insects, Nematology, Virology, Bacteriology and Mycology.

In addition to the main objectives of postgraduate studies in the university, the

department of Plant Science aims at providing specialized in-depth academic, research and practical training opportunities for graduate students, which will prepare them to fill teaching, research, and administrative positions with government, universities, research institutes and agro-allied industries.

We present in the rest of this report the resources and curriculum put in place to meet the objectives of the department, the research breakthroughs emanating from the department, and the impact of the research and teaching of the department on national and international development activities.

#### **Administration**

Most decisions affecting staff and students originate from the department. For example, courses, examinations and students' results are based on the departments. Recommendations for PG student admissions, staff promotion, entitlements and welfare in general emanate from the departments. Administration of the departments, therefore, is a vital component of the growth and development of the faculty and university.

The administrative staff of the Department of Plant Science is made up of the Head of Department (HOD), who is the Chief Executive Officer, one Secretary, one Senior Typist, one Senior Clerical Officer and a Messenger. Over the years, the many individuals have served as HODs (Table 1).

**Table 1: Pertinent information about Heads of Department (HOD) and Acting HODs of Plant Science, Obafemi Awolowo University, 1967-2012.**

S/N	Name	Qualification	Status on Appointment	Designation	Tenure
1	D.C. Army	Ph.D.	Professor	HOD	1967-1968
2	J.D. Moore	Ph.D.	Professor	HOD	1968-1970
3	J.E. Kuntz	Ph.D.	Professor	HOD	1970-1972
4	E.R. Duncan	Ph.D.	Professor	HOD	1972-1974
5	B.E. Onochie	Ph.D.	Senior Lecturer	Acting HOD	1974-1976
6	A.O. Adenuga	Ph.D.	Professor	HOD	1976-1977
7	I.C. Onwueme	Ph.D.	Senior Lecturer	Acting HOD	1977-1981
8	J.L. Ladipo	Ph.D.	Reader	Acting HOD	1981-1983
9	A.E. Akingbohunbe	Ph. D	Professor	HOD	1983-1986
10	T. Fatunla (now Olutunla)	Ph.D.	Professor	HOD	1986-1989
11	J.O. Amosu	Ph.D.	Reader	Acting HOD	1989-1991
12	B.A. Matanmi	Ph.D.	Reader	Acting HOD	1991-1994
13	C.O. Alofe	Ph.D.	Reader	Acting HOD	1994-1996
14	I.O. Obisesan	Ph.D.	Reader	Acting HOD	1996-1999
15	O.A. Akinyemiju	Ph.D.	Reader	Acting HOD	1999-2000
16	I.O. Obisesan	Ph.D.	Professor	HOD	2000-2003
17	M.A.B. Fakorede	Ph.D	Professor	HOD	2003-2006
18	S.A. Ajayi	Ph.D	Reader	Acting HOD	2006-2008
19	O.K. Adekunle	Ph.D	Reader	Acting HOD	2008-2010
20	A.O. Salami	Ph.D	Reader	Acting HOD	2010-Date

Normally, the Vice-Chancellor appoints Professors as substantive HODs, but in situations where there are no Professors or where all Professors have served as HODs in the department, Readers or Senior Lecturers may be appointed as acting HODs. Substantive HODs are appointed to serve for a 3-year term while acting HODs serve for one year at a time, although their tenure is renewable for one or more terms of one year each. As from 1981, former students of the university had progressed enough to qualify as substantive or acting HODs. The first former student of the university to serve in that capacity was Professor J.L. Ladipo while Professor A.E. Akingbohunbe was the first former student of the faculty to serve in that capacity. Other former students that have served thus far are Professors B.A. Matanmi, C.O. Alofe, I.O. Obisesan, M.A.B. Fakorede, and S. A. Ajayi. The incumbent acting HOD, Dr. (Mrs.) Abiodun O. Salami, was a former student of the university. She is the 20th HOD since the inception of the department.

All members of the academic staff participate in the administration of the department. Administrative responsibilities are shared out among all academic staff members by appointing them to serve on departmental committees. That way, the staff members are involved in the decision-making process of the department. Examples of such committees and their terms of reference are summarized in Table 2.

**Table 2: Committees in the Department of Plant Science and their terms of reference.**

<b>S/NCommittee</b>	<b>Terms of Reference</b>
1.Postgraduate	Screens all applications for PG studies; monitors progress of all PG students.
2.Examination Coordination	Computes students' grade points, prepares reports on academic standing of students for the Departmental Board of Examiners.
3.Research Coordination and Review	Reviews all research proposals and reports before onward transmission to the faculty.
4.Farm Planning, Management and Production	Takes oversight of all Plant Science activities at the Teaching & Research Farm and makes recommendations for the consideration of the department.
5.Academic and Curriculum Planning	Reviews the curriculum of the department as the need arises. Receives from academic staff members and deliberates on suggested modifications in the academic programs of the department and makes recommendations to the department. Handles lecture and examination time-tables, including fixing invigilators for examinations.
6.Equipment and Infrastructure	Takes stock of research and teaching equipment, as well as items of furniture in the department from time to time. Ensures the proper functioning of the equipment. Makes recommendations to the department on servicing, repairs or purchase of equipment and furniture. Proposes space allocation to members of staff and departmental activities.
7.Departmental Review	This Committee reviews the performance of every staff member once a year and makes recommendations to the Faculty Review Panel on each staff. The Committee considers all applications for appointment and, in cases where there are many applicants for one position, shortlists the candidates for onward transmission to the faculty Selection Panel. The Committee initiates all cases of appointment (including permanent positions, part-time positions, associate positions, visiting positions, contract appointments), promotion to all cadres, and determination of appointments and makes appropriate recommendations to the Faculty Review Panel for further processing in the university system.
8.Internship	Takes charge of the administration of the internship program at the departmental level and reports to the department. At least one member of this Committee represents the department in the Faculty Internship Committee.
9.Junior Staff	Matters related to the conditions of service and welfare of the Junior Staff in the department are handled by this committee.

10. Social	This Committee handles all social activities of the department as well as those involving staff members of the department and atimes, the faculty. Such activities include Annual end-of year Get Together of the department, Send-off for staff members leaving the services of the University (e.g. by retirement), naming, marriage and burial ceremonies, chieftaincy title and other awards, inaugural lectures, etc. The Committee deliberates on the exact role the department would play and communicates same to members of staff of the department.
11. Departmental Car	Takes oversight of the departmental car to ensure that it is roadworthy at all times. Monitors the movement of the car on a day-to-day basis.

Each Committee reports to the department, usually in a departmental meeting chaired by the HOD. This approach has effectively made the department highly democratic. All departmental committees have counterparts at the faculty level. Two of the departmental Committees are statutory; that is, departmental Board of Examiners and Departmental Review Committee. In the department of Plant Science, all members of the academic staff are members of these two committees.

One important tradition in the department is that the academic staff members rather than the departmental secretary record minutes of meetings in rotation, particularly at departmental meetings. The members of staff rotate recording of minutes on semester basis. This approach provides hands-on training for the junior colleagues who are normally inexperienced in recording minutes of meetings. Another advantage of our approach to membership of committees, especially the two statutory ones, is that the junior colleagues are opportuned to learn the statutes, rules, regulations, procedures and traditions of the department, faculty, and university from the experienced senior colleagues.

**Facilities for research and teaching**

Availability of human and material resources has played a vital role in the resounding success achieved so far by the department of Crop

Production and Protection. Although highly cost intensive, the university has made every possible effort to put in place the necessary facilities that would enhance the attainment of the objectives of the department. Some of the facilities will be discussed here under the following subheadings:

- Human Resources
- Laboratories – Central teaching Lab., research Labs
- Tissue Culture Lab.
- Media Resources Unit

***Human Resources***

**Academic Staff Members:** The founding fathers of Obafemi Awolowo University procured the best available teaching and research equipment for the initial take-off of the faculty. Also, during the initial years, the faculty had a USDA-sponsored affiliate relationship with the University of Wisconsin, Madison, Wisconsin, USA tagged USAID-University of Wisconsin Joint Project. This arrangement had many aspects that benefitted our department. First, many standard items of teaching and research equipment were imported for the use of the faculty, some of which were specific to Plant Science. Second, experienced academic staff members were recruited from the United States and seconded to the faculty for about two years at a time after which others replaced them. Thirdly, staff members still in training positions

were sent to the USA to complete their Ph.D programs after which they returned to the department. Fourthly, outstanding students were identified from each graduating class, employed as Assistant Lecturers and sent to the USA for graduate studies under a bond to serve the university one year for each year of training. Many of the staff and students were sent to the University of Wisconsin while others were sent to some other US universities identified as centers of excellence in fields relevant to the programs of the different departments in the Faculty of Agriculture. In the specific case of the department of Plant Science, one such other university was Iowa State University, Ames, Iowa where the two Plant Breeders trained on this program, Professors T. Olutunla and M.A.B. Fakorede, obtained their Ph.D degrees in 1973 and 1977, respectively. After the termination of the USAID-University of Wisconsin Joint Project in 1976, the University continued to send a few more staff members of the department of Plant Science for training in the USA and Canada. Staff members, such as Professor T.I. Olaifa and Dr. A.S. Adegoroye received their training at Michigan State University, East Lansing, USA and the University of British Columbia, Canada, respectively in Pesticide Toxicology and Horticulture.

The department does not restrict the recruitment of academic staff to only individuals who graduated from the university or those who were USAID-University of Wisconsin Joint Project Participants. Rather, staff members have been employed on their individual merit; regardless of the place of training. For example, Professor L.K. Opeke, a Plant Breeder and one of the foundation staff members of the faculty and Late Professor A.O. Adenuga, an Entomologist, received their Postgraduate Degrees from Britain. Others in this category were Professor I.C. Onwueme, Agronomist/Crop Physiologist

trained at the University of California, Davis, California, USA; Late Professor J.O. Amosu, Nematologist, trained at the University of Illinois, Urbana-Champaign, Illinois, USA; Dr. J.A. Adedokun, Entomologist, who was trained at Ohio State University, USA; Professor O.A. Akinyemiju, Weed Scientist, who was trained at Michigan State University, East Lansing, Michigan, USA; and more recently, Prof. S. A. Ajayi got his Ph.D. from Christian-Albrechts University, Kiel, Germany, Drs O.C. Adebooye, Horticulturist, O.K. Adekunle, Nematologist, Dr (Mrs) O.A. Salami, Mycologist and Dr B.O. Odu, Virologist, who obtained their Ph.D. Degrees from the University of Ibadan. Drs. J. T. Opabode, A. Oluwaranti and R. O. Akinwale had their Ph.D. Degrees from the department of Crop Production and Protection, while Dr. O. J. Soyelu had his Ph.D. Degree University of Fort Hare, Alice, South Africa.

With this critical mass of well-trained staff in place, it has been possible for the department to train its staff as the need arose. In particular, this has been the situation in the last two decades or so when funds for sending staff members in training positions for higher degrees outside the country became impossible because of dwindling financial resources in the university. Rather, our Postgraduate program was strengthened to enable us train the younger colleagues in the department. Individuals in this category are usually employed as Graduate Assistants and are expected to pursue higher degrees until they attain the Ph.D Degree within a reasonable timeframe, after which they are regraded to the Lecturer I position. Individuals in this category include Professor I.O. Obisesan who obtained all his degrees from the department and was employed as a Lecturer after completing his Ph.D. The academic staff members are as listed in Table 3.

**Table 3.: List of Academic staff members of the Department of Crop Production and Protection, their qualifications and rank.**

S/N	Name	Qualification	Rank
1	Prof. A.E. Akingbohungbe	B.Sc, MS, PhD	Professor
2	Prof. M.A.B. Fakorede	B.Sc, MS, PhD	Professor
3	Prof. I.O. Obisesan	B.Sc, MPhil, PhD	Professor
4	Prof. O.A. Akinyemiju	B.Sc, MS, PhD	Professor
5	Prof. B.A. Matanmi	B.Sc, MPhil, PhD	Professor
6	Prof. S.A. Ajayi	B.Agric, MPhil, PhD	Professor
7	Dr. O.K. Adekunle	B.Sc, MSc, PhD	Reader
8	Dr. (Mrs.) A.O. Salami	B.Sc, MSc, PhD	Reader
9	Dr. G.O. Agbaje	B.Sc, MSc, PhD	Reader
10	Dr. G.O. Adesina	B.Agric, MSc, PhD	Senior Lecturer
11	Dr. B.J. Amujoyegbe	B.Agric, MSc, MPhil, PhD	Senior Lecturer
12	Dr. M.B. Sosan	B.Agric, MPhil, PhD	Senior Lecturer
13	Dr. B.O. Odu	B.Agric, MSc, PhD	Senior Lecturer
14	Mr. S.A.A. Abasi	B.Agric, MPhil	Lecturer I
15	Dr. O.J. Soyelu	B.Agric, MPhil, PhD	Lecturer I
16	Dr. J.T. Opabode	B.Agric, MPhil, PhD	Lecturer I
17	Dr. Abimbola Oluwaranti	B.Agric, MSc, PhD	Lecturer I
18	Mr. R.O. Akinwale	B.Agric, MSc	Assistant Lecturer
19	Mr. F.E. Awosanmi	B.Agric, Mphil	Assistant Lecturer
20	Mr. O. Udah	B.Agric	Graduate Assistant
21	Mr. O.I. Olawole	B.Agric	Graduate Assistant

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**Non-academic Staff Members:** There are three categories of non-academic staff members: Administrative Staff, Technological Staff and Farm Staff (Table 4).

Table 4.: List of Non-Academic staff members of the department of Crop Production and Protection, their qualifications and rank.

S/N	Name	Qualification	Rank
1	Mr. T.I. Oyetade	B.Sc, MSc	Principal Farm Manager
2	Mr. O.O. Tanimajo	OND, HND	Asst. Chief Agric. Superintendent
3	Mr. R.O. Ajibade	HND Entomology	Senior Technical Officer
4	Mr. Wole Osude	OND, HND, AIST	Technologist II
5	Mr. Oguntoye	HND	Agric. Superintendent
6	Mrs. V.M. Popoola	WASC (OL)	Senior Laboratory Superintendent
7	Mrs. E. A. Babalola	WASC (OL)	Senior Laboratory Supervisor
8	Mrs. T. V. Osulale	HND, ANIST	Assistant Technologist
9	Mrs. O. A. Adeyemi	WASC (OL)	Laboratory Supervisor
10	Mr. O. Olanisebe	WASC (OL)	Farm Assistant
11	Mr. M.A. Ibrahim	WASC (OL)	Farm Assistant
12	Mr. A. Akinbinu	WASC (OL)	Farm Assistant
13	Mr. K. Fadairo	WASC (OL)	Farm Assistant
14	Mrs. B.O. Akande	Pitman Stages I, II and III; Cert. EDP	Chief Typist
15	Mrs. O.B. Oke	WASC (OL)	Chief Clerical Officer
16	Mr. G. Oyerinde	Pry Six Cert	Chief Office Assistant

### **Laboratories**

Agriculture is an applied science; therefore, it is strongly practical-oriented. Many of the undergraduate and graduate courses are more or less laboratory-based. Some of these courses apply to all agriculture students at the relevant level and are, therefore, considered as faculty courses. For this reason, there are some central teaching and research laboratories in the faculty, one of which is the Crop Science Laboratory. The lab is well laid out with the plumbing, electrical and gas-supply fittings and prep room in place. Provision is made for about 75 places in the lab, which was more than adequate in the initial years of the department. In recent years, however, the number of students registered for crop production and protection courses has escalated, making it imperative for the lab classes to be run in groups. In the last 3-5 years,

students registered for the 200 and 300-level crop production and protection courses had to be divided into three groups and lab classes had to be done three times per week for each course. Similarly, the laboratory staff, equipment, chemicals and supplies are over stretched, especially at the face of dwindling financial resources. Despite these problems, the department has tried very hard to keep up the standard of the teaching-learning continuum. Recently, the department took delivery of new leica stereo- and compound microscopes courtesy of a 10 million naira grant from Nigeria Breweries Ltd. This is an important milestone in the history of the department considering the fact that the last time students' microscopes purchased was 40 years ago.

There are several other laboratories in the

department but these are primarily for research, although they are used for teaching postgraduate and, occasionally, final year undergraduate students. The specialist laboratories include crop physiology lab, cropping systems lab, post-harvest lab, virology lab, plant pathology lab, nematology lab, insect taxonomy lab, integrated pest management (IPM)/insect pathology lab, seed lab, weed science lab and herbarium, and a dirt lab. Space has been earmarked for a tissue culture and genetic engineering lab but the lab is yet to be equipped.

**Tissue culture Laboratory:** This is a relatively new laboratory in the Department of Crop Production and Protection conceived by Prof. O.A Akinyemiju, which has received attention of the National Biotechnology Development Agency (NABDA), Abuja and University Research Committee, OAU, for a total grant of Seven million naira. Already, Postgraduate students are being admitted for research studies in the area. When fully operational, the tissue culture lab will serve all the disciplines in the department.

**Media Resources Unit:** The Media Resource Centre equipped with cameras, photographic equipment and supplies, overhead projectors, slide projectors, reprographic equipment and cartographic facilities was initially housed in the faculty. Presently, each department purchase these items of equipment. The department has a LCD (Multimedia) Projector/screen, and this has been useful in the presentation of seminar by the undergraduate, postgraduate students and staff members. It has also been used in the delivery of lectures, thus improving the quality of our teaching methods.

### **Current Status of the Undergraduate Curriculum**

Given the increasing trend towards specialization and professionalism in agricultural circles, the name Plant Science has lost its meaning and outlived its usefulness. The

department of Plant Science as formerly constituted does not teach or research all plants. Rather what is covered by our mandate is the study of crops and, to a limited extent, forestry species. Therefore, the present name of our department (Crop Production and Protection) reflects our mandate and is far from catchy.

Over time, candidates that end up as students in the department, in most cases, did not make the department their choice and this has often been of concern to the academic staff of the department. The students were all raked from cognate faculties and departments in this and other Universities whereas JAMB candidates, they could not meet the cut-off points in their choice departments. The students often ask, “What is the difference between Botany and Plant Science?” “What are the prospects of a bright future of a B. Agriculture (Plant Science) graduate?” “Can’t the department effect a change of name?”

In an effort to impress these questions on the powers in the faculty, the students through the National Association of Agricultural Students (NAAS) wrote a letter to the Dean of Agriculture, copying all Heads of Departments that they would be happy if our faculty could effect a change of name of departments in the faculty to reflect the realities of what we teach and research. In the letter, the students argued that Botany deals with generalized study of plants forms and functions while Plant Science deals with study of crop production and protection. They argued that our department deals with the crops in particular and not plants in general.

Another argument put forward by our former students who are now in the labor market is that employers at different interviews ask them to distinguish between Plant Science

and Botany. Except to an agriculturist, particularly Ife graduates, Plant Science is taken to be synonymous with Botany.

These facts justify the need to effect a change in the name of the department to reflect what the layman will appreciate and understand. This is also in consonance with the current trends in the country in particular and the world in general. The department therefore changed the name from Plant Science to Crop Production and Protection after considering several proposals.

The department considered the numerous fields of specialization in crop science and thought that the present trend of developments in research in the different disciplines should be considered while designing courses for undergraduate programs. The department further considered the fact that introduction of new courses should be done with restriction because the undergraduate program is covered by all the departments in the faculty and courses are distributed equitably among the departments. Notwithstanding this limitation, the department carefully considered new developments in science vis-à-vis the available opportunity for introduction of new courses into the undergraduate programs. In arriving at the decision for a new name and new courses, the need for graduates to be self-reliant after graduation in the face of limited employment opportunities in Nigeria has prompted the department to think of a course that can generate employment for graduates of our B. Agric. program. In the light of the above, the department felt strongly that bee-keeping is a lucrative business that is now being promoted internationally because it can be started with a low initial capital outlay.

### **Post-graduate Programs**

As noted by Badu-Apraku et al. (2004), sustained and well-focused research normally leads to the discovery of new technologies, improved research methodology and accumulation of information. Researchers are always improving existing methodologies for efficacious results. New and more effective and efficient methodologies and technologies, such as Information Technology and Biotechnology are continuously being developed, that can render Bachelor's Degree holders out of date within a few years after graduation. Additionally, a Bachelor's Degree, in most instances, is often inadequate to cope effectively with the responsibilities involved in research and teaching at the tertiary education level. Therefore, Bachelor's Degree holders, particularly those who desire research and teaching jobs, need to be exposed to additional in-depth training and education in areas of interest to them. Indeed, post-graduate students occupy a vital position in the growth and development of a strong academic department in any university.

With these and perhaps other reasons in view, the Department of Plant Science started Post-Graduate (PG) Programs during the 1968/69 session with only one student who opted for Entomology. Since then, the Programs have continued to increase in number, expand in scope and improve in quality. Over the years, a large number of students have successfully completed M.Sc., M.Phil, and Ph.D. Plant Science programs in the different areas of specialization offered in the department (see Table 4).

**Table 5: Disciplines, areas of specialization and number of available courses for M.Sc., M.Phil, or Ph.D. degrees in Plant Science or Seed Science offered in the department of Crop Production and Protection, Obafemi Awolowo University, Ile-Ife.**

Discipline	Areas of Specialization	No. of courses available	
		Harmattan	Rain
(a) Crop Production	Farming Systems, Agronomy, Agroclimatology, Crop Physiology, Plant Nutrition, Horticulture, and Weed Science.	9	11
(b) Entomology	Insect Taxonomy, Insect Ecology, Insect Pathology, Toxicology, and Control of Insect Pests.	8	9
(c) Plant Breeding	Conservation of Plant Genetic Resources, Crop Improvement through Genetics and Breeding.	6	5
(d) Plant Pathology	Applied Mycology, Virology, Nematology, and Phytobacteriology	8	6
(e) Seed Science	Seed Production, Seed Technology, Seed Health, Seed Analysis and Certification	8	6

**Admission Requirements.** To be eligible for the M.Sc. Plant Science or Seed Science, the candidate must possess a Bachelor degree not lower than Second Class (Lower Division) in Agriculture or related discipline from an approved university. The department requires Second Class (Upper Division) from candidates desirous of admission into the M.Phil. An applicant for the Ph.D. Program must possess M.Phil. or M.Sc., with a minimum average of 60% (B+) in the course work.

### Research

The department has conducted intensive and extensive research in all areas of plant agriculture. Tomato (*Lycopersicon lycopersicon* L.), Cowpea [*Vigna unguiculata* (L.) Walp] and Maize (*Zea mays* L.) have received the greatest research attention. Other crops that have been researched include Yam (*Dioscorea* sp), Cassava (*Manihot esculenta* Cranz), winged Beans (*Phosocarpus tetragonolobus* L.), Bambara nut, (*Arachis subterranean* L.), Soybean (*Glycine max*

*Merill.*), and horticultural crops such as *Amaranthus* sp and *Celosia* sp. Research has also been conducted to a limited extent on permanent crops such as Cacao (*Theobroma cacao*), Bananas (*Musa spp*), Oil Palm (*Elaeis guinensis*) and the Citrus sp. In some cases, research has been conducted in areas that cut across crop species, such as farming systems, agroforestry and production research. A special case of farming systems research was a crop rotation experiment conducted for many years, first by Dr. B.E. Onochie, an Agronomist, and later by the Late Professor J.O. Amosu, a Nematologist. Also in the case of production research, the department was particularly interested in the profitability of crop production practices recommended to farmers on the basis of research findings.

The academic staff members constituted themselves into groups and developed long-term research programs that attracted funds from the University Research Committee (URC) or outside the University. The research

programs are:

- (i) Cowpea Research Program
- (ii) Maize Research Program
- (iii) Vegetable Research Program

There were also some other smaller research projects lasting for a few years, depending on the nature of the project and the source of funding. For example, funds from the Western Nigeria Cocoa Marketing Board Endowment Funds and the International Funds for Science (IFS) supported the Winged Bean Research Project, both of which normally support research projects for a few years, at best. Team members on each of the research programs consisted of Breeders, Pathologists, Entomologist, and Agronomist. This approach has made it possible for the department to have a focus and minimize duplication of efforts.

In the following sections are summaries of some of the research breakthroughs of the department. In order to put the findings in a generalized perspective, the presentation is made on subject-matter rather individual crop basis.

#### ***Weather at the Teaching & Research Farm***

Rainfall and, to a lesser extent, temperature are the most important climatic factors determining the crop to grow and the timing of agronomic practices in the ecologies of Nigeria. The department of Crop Production and Protection has kept historical records of climatic factors at the Meteorological Station of the Teaching and Research Farm (TRF) of the university for about 35 years. Fakorede et al. (2004) analyzed the rainfall data for the 1975-2000 period to determine drought probability during the cropping season at the TRF. The data failed to support the popular belief that delayed onset of the rainy season would be compensated for by delayed recession of rains towards the end of the calendar year. Regardless of time of onset of the rainy season at the TRF, the probability of rain after the last week in October is very low.

#### ***Genetics and Breeding***

Most of the researches conducted in the department in the area of Genetics and Breeding, cover inheritance studies and breeding for disease and insect pest resistance, quantitative genetics, breeding and varietal evaluation methodologies, and development of improved varieties. The department has played prominent roles and made immense contributions to the improvement of tomato, cowpea and maize production in Nigeria. For example, the Ife 1 and Ife Plum tomato varieties are very much popular in the South West of the country. Ife Brown cowpea is very well known, not only in Nigeria but also throughout West Africa. The Maize Improvement Program in the department played a leading role in hybrid maize development in Nigeria and has been a major contributor to the West and Central Africa Maize Network (WECAMAN).

#### ***Entomology***

Extensive studies have been conducted in the department to gain insights into the biology of the major pests of cowpea as well as to provide information that would be useful in formulating long-term control programs for the pests. An example is the cowpea flea beetle (*Oothea mutabilis* Sahlberg), whose life cycle has been studied exhaustively. Also its threshold of damage on cowpea has been evaluated, and its efficiency of utilization of different growth stages of the cowpea plant as food has been determined.

**Insect Taxonomic Studies** – Taxonomist in general and Insect Taxonomists in particular are very few in the world and especially in Africa. Our department is fortunate enough to have one of the very few Insect Taxonomists in the world, Professor A.E. Akingbohunge, who is a world authority and the only African expert on the insect suborder Heteroptera (the true bugs) and a leading authority on the family Miridae. In one of his recent studies, Professor Akingbohunge presented, in a monograph, an historical review and a discussion of the diagnostic characters of

the Isometopinae (Heteroptera: Miridae) of Africa, Europe and the Middle East (Akingbohunge, 1996).

**Insect Pathology** - crop production and protection was the first academic department in Black Africa to teach Insect Pathology at the Postgraduate level. This was made possible by the singular efforts of Prof. B.A. Matanmi after the successful isolation, characterization and culture of the etiologic agents in the laboratory as well as pilot field trials of promising entomopathogens such as *Beauveria bassiana*, *Entomophagi grylli*, *Batkoa apiculata* et cetera, and the commercial formulation of the crystalliferous bacterium, *Bacillus thuringensis*, formulated as Dipel® and Thuricide®, and the Baculovirus, *Baculovirus heliothis*, formulated as Elcar®. These resulted in research collaboration/partnership between the Insect Pathology unit of the department and the following: USDA-ARS, Plant Protection Research unit, United States Plant, Soil & Nutrition Laboratory, Cornell University, Ithaca, New York, U.S.A.; Division of Biological Control, Department of Entomology, University of California, Riverside, California, U.S.A.; Department of Entomology and Nematology, University of Stellenbosch, Stellenbosch, Republic of South Africa.

**Insect Ecology and Integrated Pest Management (IPM)** – Elucidation of the life history and biology of crop pests and research information on their ecology provide the necessary options for devising control strategies. The department had an Insect Ecologist, Late Professor A.O. Adenuga, who researched this area for many years. Through the study of insect ecology, he was able to develop a control protocol for stem borers of maize. The ant mosaic pattern usually present on cocoa farms can be manipulated to control the black pod disease of cacao, which is actively spread by some ants. This is a concrete contribution from the Department of Crop Production and Protection to our knowledge of

biological control of crop pests and diseases.

### **Plant Pathology**

For much of the mid-1970s to early 1980s, most of the effort on fungal and bacterial diseases of cowpea was directed at observation, evaluation of predisposing factors and screening for resistance. These were on Stem anthracnose of cowpea caused by *C. lindemuthianum*, Web blight caused by *Rhizoctonia solani* Kuehn, yam anthracnose disease caused by *Colletotrichum gloeosporioides f.sp. alatae*. Studies were also conducted on yam anthracnose and fruit rot diseases of tomato. Presently, the Mycologist, Dr. Abiodun O. Salami, has put in place a sustainable means of cultivating edible mushroom, the sustainability of bio-control of pathogens with the use of mycorrhiza especially Vesicular Arbuscular Mycorrhiza (VAM) and food security, and on both the cultivation and propagation of some fungal organisms as well as their bio-remediating abilities.

### **Virology**

Many viruses have been isolated from the cowpea plants that showed varied symptoms of virus infection. These virus isolated were identified and research works on the control methods, including host-plant resistance, were carried out. Examples of viruses isolated and on which studies were conducted on are Southern bean mosaic virus (SBMV) and Cowpea aphid-borne mosaic virus (CAMV). The Virologist, Prof. J.L. Ladipo, got grants from donor agencies with which he equipped the lab.

### **Nematology**

Research into the control of plant parasitic nematodes started in 1970 when the Nematologist, Professor J.O. Amosu returned from study leave at the University of Illinois, Urbana-Champaign, USA. He conducted research primarily in the area of nematode population dynamics in cultivated soils, host-parasite relations and nematode interactions with other soil-borne pathogens. The research

concentrated on integrated control of three plant parasitic nematodes; *Meloidogyne incognita*, *Pratylenchus brachyurus* and *Helicotylenchus pseudorobustus* on cowpea, maize, sugarcane, cotton and tomato.

Based on the active nematode research program in the department, the Nematologist was elected as one of the nearly 90 Cooperators from 8 regions of the world in a global research tagged International Meloidogyne Project (IMP), with headquarters at the North Carolina University, Raleigh, North Carolina, USA.

Following the demise of Professor Amosu, the Department employed another Nematologist, in person of Dr. O.K. Adekunle. Dr. Adekunle has been conducting research into the use of plant materials and wastes as plant extracts or organic amendments for the control of plant-parasitic nematodes against the backdrop of growing global demand for a safe environment. Also, he has characterized active nematicidal ingredients in neem leaves, and siam weed leaves and roots. Some of the ingredients are tannins, amines including methylamine; alkaloids, flavonoids, amides including benzamide, and ketones including benzylethanone and o-hydroxybenzanone (Fatoki and Oyedunmade, 1996; Fatoki and Fawole, 1999; 2000; Adekunle, 2002; Adekunle and Fawole, 2003a; b).

In continuation with the study of nematode interaction with other soil-borne pathogens initiated by Professor Amosu, Dr. Adekunle found that filterates from two fungi, *Fusarium oxysporum f. sp. glycines* and *Sclerotium rolfsii* could be used as sources of biological nematicides for the control of root-knot nematodes and that the pathogenicity of root-knot nematodes on legumes could be extensively reduced when these fungi interact with the nematodes. This was the first report of these fungi having this kind of influence on nematodes (Adekunle and Akinsanmi, 2005; Akinsanmi and Adekunle, 2003).

### ***Agronomy, Agroclimatology and Crop Physiology***

The department of Crop Production and Protection consists of many interrelated disciplines. One of the disciplines, itself a complex of several sub-disciplines is Crop Management (Production), which is usually partitioned into Agronomy, Agroclimatology and Crop Physiology. Over the years, members of staff in these areas have included Dr. B.E. Onochie (Agronomist), Professor I.C. Onwueme (Physiologist), Professor C.O. Alofe (Agronomist/Physiologist), Professor O.A. Akinyemiju (Weed Scientist/Physiologist), Dr. (now Professor) R.O. Fadayomi (Weed Scientist), Dr. (now Professor) P.O. Adetiloye (Systems Agronomist), Dr. A.S. Adegoroye (Post-harvest Physiologist), Dr. O.C. Adebooye (Horticulturalist/Physiologist), Dr. G.O. Agbaje (Physiologist/Agronomist), Dr. B.J. Amujoyegbe (Agronomist) and Mr. S.A.A. Abasi (Agroclimatologist). Plant breeders, entomologists, nematologists and plant pathologists in the Department have collaborated with these specialists to conduct research into different aspects of crop management in general.

### ***Seed Science and Technology***

The establishment of the Seed Science laboratory in the Department of Crop Production and Protection is an achievement worth mentioning. The German Government donated equipment worth five million naira to the department, and these have given the lab an international recognition as a result of the major contribution to the world literature on seed production and technology. The Seed Scientist, Prof. S.A. Ajayi has been consulted by the Food and Agriculture Organization (FAO) as a result of the output from the lab.

### ***Weed Science***

Weed Scientists in the department have worked in several areas including determination of critical stages of weed interference in yield of crops; development of weed control

prescriptions; herbicide persistence and downward movement in tropical soils; herbicide calculations, equipment calibration and maintenance; and on the control of water hyacinth.

### **Distinctions and awards**

The following Distinctions and Awards have been given to members of staff of the department.

**Dr. O.K. Adekunle**

- Third world academy of sciences (TWAS) Post-Doctoral Research and advanced training fellowship, institute of Himalayan Bio-resource Technology, Palampur, India, 2003-2004.
- 10,000 British Pounds Sterling International Foundation for Science (IFS), Sweden, Research Grant (C/4290). 2007-2009

**Professor A.O. Adenuga**

- Harvard visiting research fellowship in Entomology, 1970-71
- Listed in "Who is Who" in Nigeria, 1980.
- Listed in "Who is Who" IBC, Cambridge, England, 1981.
- Listed in "Who is Who" in the Commonwealth, 1982.
- Listed in "Men in the World of achievement" 1982.
- International "Who is Who" of intellectuals, vol. VI, IBC, Cambridge, 1985.

**Professor S.A. Ajayi**

- Professor Werner Schulze Fellowship for Young Agricultural Scientists, Institute of Crop and Grassland Science, FAL, Braunschweig, Germany, 2000.
- Vavilov-Frankel Fellowship,

International Plant Genetic Resources Institute (IPGRI), Rome, Italy, 2002.

- International Society for Seed Science Award, Salamanca, Spain, 2002.
- South Africa National Research Foundation Post-doctoral fellowship, 2003.
- 3,000 British Pounds Sterling Darwin Initiative Research Exercise on community Tree Seed (DIRECT) project in collaboration with Royal Botanical Gardens, Kew, U.K. 2003
- 42,000 Euros Seed Research Equipment Grant from German Academic Exchange Services (DAAD). 2003
- 330,000 Naira Obafemi Awolowo University, University Research Council Grant. 2006
- 2,221,500 Naira Obafemi Awolowo University, University Research Council Grant. 2010

**Professor A.E. Akingbohunbe**

- German Academic Exchange Postdoctoral Fellowship-1976.
- Commonwealth Academic Staff Fellowship-1982-83
- IAEA/FAO Fellowship for a study tour of Radiation Disinfection Centres in the Netherlands, Hungary and USSR – August/September 1986.
- Royal Society/Nuffield Foundation Developing Country Fellowship – 1986-87.
- Rockefeller Foundation Scholar-in-Residence at Villa Serbelloni, Bellagio, Italy- October/November, 1988.
- Fellow, Entomological Society of Nigeria.

In addition, professor, Akingbohunbe has the following nine biographical listing to his credit:

- Agricultural and Veterinary Sciences International Who's Who-Longman.
- International directory of distinguished leadership- American biographical institute (ABI)
- Five Thousand Personalities of the World- ABI
- International Leaders in Achievement - Cambridge International Biographical Centre (IBC)
- Men of Achievement –IBC
- Marquis Who's Who in the World.
- 2000 Fellowship In Plant Pathology Outstanding Scholars of the 21st century- 1st Edition (IBC)
- 2000 Outstanding Intellectuals of the 21st century – 2nd Edition (IBC)
- World List of Honours – IBC
- Visiting Collaborating Scientist, Maize Programme, International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria, 1988-89.
- Consultant, West and Central Africa Collaborative Maize Research Network (WECAMAN), Bouake, Cote d'Ivoire, 1996. Editorial Adviser, Training Materials Unit, IITA, Ibadan. Jan-Dec 1996.
- West and Central Africa Collaborative Maize Research Network (WECAMAN) Bouake, Cote d'Ivoire, 1997, 1999, 2001.
- Consultant, West Africa Rice Development Association (WARDA), Bouake, Cote d'Ivoire, 1998-1999.
- Visiting Scientist, Maize Program, CIMMYT, Mexico City, Mexico, 1997.
- Consultant, Maize Programme, CIMMYT-Kenya, Nairobi Kenya, 2000.
- Member, Ad Hoc Expert Group On Africa Green Revolution, United Nations Economic Commission for Africa (UNECA), Addis Ababa, Ethiopia, 2003 to date.
- Fellow, British Society of Commerce, 2000 to date.

Professor O.A. Akinyemiju

- Post –Doctoral Fellowship, US Forestry Service, 1981
- Visiting scientist, CIMMYT, Mexico, 1987.

Professor C.O. Alofe

- Visiting Scientist, Department of Agronomy, University of Wisconsin, Madison, Wisconsin, USA, 1985.
- African Crop Science society (ACSS) Meritorious Award, 2001.

Professor J.O. Amosu

- Wright, 1969.
- Fellowship, Science Association Of Nigeria (FSAN), 1985

Professor M.A.B. Fakorede

- Editorial Board Member, Euphytica- the Netherland Journal of Plant Breeding, 1983-1986.
- Editor for the Africa Region, Journal of Genetics & Breeding (Rome, Italy), 1983 to date.

Professor B.A. Matanmi

- Fellow, Entomological Society of Nigeria.
- Listing in World Directory for Current Research on the Entomopathogenic Fungi, genus Entomophthora. (Life Sciences and Agric. Expt. Station, University of Maine Misc. Report 182, Ed. R.S. Soper, 1976, Second Edition by R.S. Soper and A.A. Evlakhova, 1978)
- Listing in directory of invertebrate pathology Ed. J.D. Briggs, The Ohio, U.S.A. and Ohio Agric. Research and

Development Center, Wooster, Ohio.

- Listing in World Directory of Vector Research and Control Specialists. Compiled by Eugene J. Gerberg for American Mosquito Control Association, 1982.
- Travel Fellowship Awards by: PFIZER, 1980 and BIODE, 1981.
- Member, Society for Invertebrate Pathology Working Group on the Safety of Microbial Control Agents.
- Listing in: sixth Edition, Marquis' Who's Who in the Commonwealth, 2nd Edition.
- Men Of Achievement, 10th Edition
- International Book of Honours, 1st Edition
- Profiles of African Scientists, 1st Edition.
- Who's Who in the 21st century, 2002.
- Who's Who in Science And Engineering, 2205-2006.
- United States Agency for International Development/African American Institute Fellowship Award, For Research in Insect Pathology at The University of California, Riverside, U.S.A., 1987.
- Co-Grantee, South African Foundation for Research Development Award at The University of Stellenbosch, Stellenbosch, South Africa. 1995-1996.
- Between January 1984 and August 1985, he was appointed as Commissioner for Agriculture and Natural Resources, Kwara State of Nigeria. His professional training and learning experiences over the years in the University enabled him to contribute meaningfully, as a Member at that time, towards the formulation of Memoranda and Policies of the National Council of Agriculture and Water Resources.

Professor I.O. Obisesan

- Member, National Steering Committee on AFRA 5.029 (African Region Cooperative Agreement) for Research Development and Training Related to Nuclear Science Technology with regard food crops; 1998 to date.
- Fellow, International Atomic Energy Agency (IAEA), Nov. 1993 to Oct. 1994; University of Naples, Portici, Italy. Course of study: Tissue culture and transformation in cowpea.
- Visiting associate, Instituto Agronomico, Campinas (IAS), Brazil, September 4th to December 3rd, 2003; under the aegies of TWAS/UNESCO.
- Associate scheme at Centers of Excellence in the South. Research Focus: Conservation of avocado pear germplasm.

Dr. O.C. Adeboye

- Fellow, college of Research Associates, United Nations University/ Institute for Natural Resources in Africa (UNUINRA), 2001 to date.
- Award for the Best presentation at the 3rd international conference on sustainable use of indigenous food and medicinal plants, university of Karachi, Pakistan, September, 2000.

Dr. M.B. Sosan

- TETFUND Fellowship Award for Post-Doctoral Research at the University of Cape Town, South Africa. 2010-2011.

## References

- Adekunle, O.K., 2002. Penetration and infection of *Meloidogyne incognita* in some selected cowpea cultivars. *Moor J. of Agric. Research* 3(2):276-280.

- Adekunle, O.K and O.A. Akinsanmi, 2005. Bioactivity of *Fusarium oxysporum* f.sp. *glycines* and *Sclerotium rolfsii* filterates on egg-hatching, survival and infectivity of juveniles of *Meloidogyne incognita* race 2. *Australian J. Experimental Agriculture* 45:99-102.
- Adekunle, O.K. and B. Fawole, 2003a. Comparison of effects of extracts of Siam weed, neem and carbofuran on generation time and reproduction of *Meloidogyne incognita* race 2 on tomato. *Environment and Ecology*. 21(3):720-726.
- Adekunle, O.K and B. Fawole, 2003b. Chemical and non-chemical control of *Meloidogyne incognita* infecting cowpea under field conditions. *Moor J. Agric. Research* 4(1): 94-99.
- Akingbohunge, A.E., 1996. *The Isometopinae (Heteroptera: Miridae) of Africa, Europe and the Middle East*. Delar Tertiary Publishers, Ibadan, Nigeria. (ISBN 978-32616-5-7). 172pp.
- Akinsanmi, O.A. and O.K. Adekunle, 2003. Effect of *Fusarium oxysporium* f.sp *glycines* and *Sclerotium rolfsii* on the pathogenicity of *Meloidogyne incognita* race 2 on soybean. *Plant and Soil* 253:429-435.
- Badu-Apraku, B., M.A.B. Fakorede and S.O. Ajala, 2004. Enhancing human resources for maize research and development in West and Central Africa: A networking approach. *J. Nat. Resour. Life Sci. Educ.* 33:77-84.
- Fakorede, M.A.B., A. Saka and S.A. Ajayi, 2004. Drought probability during the cropping season in a rainforest location: Implications for maize production. Paper presented at the Annual Conference of the Nigeria Society for Environmental Management, Obafemi Awolowo University, Ile-Ife.
- Fatoki, O.K. and B. Fawole, 1999. *In vitro* toxicity of some selected plant extracts on eggs and second-stage juveniles of *Meloidogyne incognita*. *African. J. Plant Prot.* 9:83-92.
- Fatoki, O.K. and B. Fawole, 2000. Identification of nematicidal ingredients from neem leaves, siam weed leaves and roots. *African. J. Plant Prot.* 10:33-38.
- Fatoki, O.K. and E.E.A. Oyedunmade, 1996. Controlling effects of some plant leaves on the root-knot nematode, *Meloidogyne incognita* attacking tomato, *Lycopersicon esculentum* Mill. *Nigerian J. Plt. Prot.* 16:59-65.