ENVIRONMENTAL BIOLOGY: AN ADAPTIVE COURSE IN ZOOLOGY

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UNIVERSITY OF IBADAN

ENVIRONMENTAL BIOLOGY: AN ADAPTIVE COURSE IN ZOOLOGY

An inaugural lecture delivered at the University of Ibadan

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By

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The Vice Chancellor, Deputy Vice Chancellor (Administration), Deputy Vice Chancellor (Academic), Registrar, Librarian, Provost College of Medicine, Dean of the Faculty of Science, Dean of the Postgraduate School, Deans of other Faculties and of Students, Distinguished Ladies and Gentlemen.

Preamble

The Department of Zoology is one of the foundation Departments in the Faculty of Science, University of Ibadan. This inaugural Lecture is the eighth from the Department, since its inception in 1948. The previous inaugural lectures delivered from the Department are as detailed in table 1.

Table 1: Previous Inaugural Lectures from the Department of Zoology, University of Ibadan

No	Year	Lecturer	Title of Inaugural Lecture
1	1960	Prof. J. E. Webb	The erosion of Victoria Beach: Its causes and cure
2	1967	Prof. N. Bolwig	Animals: Their world, our world
3	1975	Prof. F. M. A. Ukoli	Orders amongst parasites
4	1977	Prof. S. Afolabi Toye	Biological success: the arthropods' claim
5	1991	Prof. M. Nwagwu	The third face of the coin
6	1998	Prof. S. O. Fagade	In the belly of our waters
7	2006	Prof. Tonye G. Okorie	Lady mosquito: a tribute to a great General

From the list above and the year spacing, I probably would not have been able to deliver an inaugural lecture before my retirement, without the unusual slot of four inaugural lectures granted to the Faculty of Science this academic year (2009/2010). This happens to be the last in the series of the four. For this, I will like to express my appreciation to the Dean of Science, Professor Olukayode Adebowale and the Vice-Chancellor, Professor Olufemi Bamiro, FAS, FNSE, for this priviledge granted me.

I became a Zoologist by choice. In 1962, I was priviledged to be taught Biology for a period of three months by a young postgraduate student—then Mr Rufus A. Alabi—from the University of Ibadan. Prior to this time, I had believed that I will major in Mathematics and so believed most of my teachers. After discussions with my Biology teacher then, I made up my mind early in life to study Zoology for my first degree and Entomology for my Ph.D. degree. It was not until 1988, when I went to the University of Ilorin, as an external examiner, that I realised that this then teacher of mine, had become a Professor of Microbiology. I held on tightly to my persuasion to read Zoology as a first degree. I remember very vividly, that when I was to register for my first year in Zoology, the then Sub-Dean (Science), Dr. Joyce Lowe of the Department of Botany persuaded me to change my course, either to Geology or Forestry. She believed that my Advanced Level/Higher School Certificate result could give me better degree options. This I resisted and registered for a degree course in Zoology. I used the Western Nigeria Government Scholarships for both my General Certificate of Education (GCE) Advanced level and First degree courses. I recall, each time that I was to complete the documentation of these scholarship papers, my father's friends would ask me 'what is Zoology?', and couldn't I find a better course to read? My father had always supported me to read whatever course that I deemed fit, regardless of pressures. Papa believed in my choice and this made stronger my determination.

This lecture will reflect on three aspects of my research activities on aquatic entomology, pest control and management, and the environment amongst others; Department of Zoology today and some aspects of the University of Ibadan tradition. As expected, it will end with acknowledgements.

Research Work on Aquatic Entomology

I came to the Department of Zoology (exactly 42 years ago today) in September 1968 as an undergraduate student and have remained there till today. I graduated as the best student

in the graduating class of 1971. I was offered a University Bursary to come back to pursue a higher degree. Instead of proceeding to Canada for my higher degree, my late father persuaded me to accept the University of Ibadan offer. I chose to pursue my higher degree in Entomology, under the late Professor Samuel Afolabi Toye. He insisted that the only field of Entomology available was Aquatic Entomology, as no such study had been carried out in Nigeria then. I wasn't impressed and he offered that I could transfer my scholarship to the then Department of Agricultural Biology and study under Professor Youdeowei. I did not want to leave Zoology Department, so he gave two options, either to concentrate my research work on the Order Odonata or Order Ephemeroptera. I chose to work on the Odonata. The Odonata are the dragonflies.

I started with making reference collections, and sending them to the British Museum for Natural History for identification. The British Museum linked me up with Mr. R. M. Gambles (now late), who was a renowned expert on tropical dragonflies. From the wide array of dragonflies collected and identified in Ibadan aquatic environments, I decided to work on the ecology, biology, life history of three libellud dragonflies—*Palpopleura lucia lucia (Drury), Acisoma panarpoides inflatum (Selys) and Urothemis assignata (Selys)*. My reference collection of libellud dragonflies in Ibadan, indicated that there was a total of 33 species, spread under 21 genera, with representatives of all the 11 subfamilies known to exist in Nigeria. Unfortunately, none of these insects was new to science; I had nursed the priviledge of naming one of the insects, just like Professor Toye did to a number of millipedes. After my first year, I had made substantial progress in this new field, was exempted from the M.Sc. degree programme and proceded straight to the Ph.D. programme, which was concluded in exactly 36 months. I was 26 years old then.

The dragonfly adults are terrestrial, but associated with aquatic environments, while their larvae are wholly aquatic. The larva has a unique feeding mouthpart, which functions

like a hydraulic system and is quite efficient in its operation of catching live prey. In figure 1 is a few instars of the larvae of *U. assignata* with drawings of their mouthpart—labium—and antennae structures. Gambles & Gardner (1960) and Gambles (1963) were the only available earlier works on Nigerian dragonflies, from the Plateau area of Nigeria. Hassan (1975, 1976a & 1977b) detailed out the life cycles of the three libellulid dragonflies. These studies were the first to identify a pro-larva in the development of these insects. The studies aimed at providing information and identification through detailed morphometrics of important identification guidelines. *Urothemis assignata* is used as an illustration (tables 2 and 3). The numbers of larval instars in each species vary considerably, so also is the number of days they live as larvae. The instars of larvae in the libellulids vary from 9 to 15, while their duration as larvae may vary from 30 to 258 days, particularly in the field. The larvae are all carnivorous and their diet, very varied. These range from copepods to soft bodied insects, tadpoles and even fish fries and juveniles.

Fig. 1: Some of the larval (2nd, 5th, 8th & 13th (Ultimate) instars of *Urothemis assignata*

Table 2: Life History Record (mean, with standard deviation) of *Urothemis assignata*

Instar	Number* of larvae bred	Length (*mm*)	Width (*mm*)	Duration (*days*)
2	72 (2)	0.95 ± 0.06	0.20 ± 0.02	3.9 ± 0.6
3	50 (6)	1.30 ± 0.07	0.33 ± 0.04	4.9 ± 1.7
4	38 (14)	1.68 ± 0.16	0.45 ± 0.06	4.7 ± 2.5
5	34 (28)	2.27 ± 0.30	0.59 ± 0.11	5.2 ± 2.5
6	34 (32)	3.05 ± 0.25	0.78 ± 0.10	7.0 ± 2.8
7	41 (39)	4.11 ± 0.47	0.95 ± 0.09	6.8 ± 2.0
8	37 (36)	5.33 ± 0.77	1.15 ± 0.12	5.9 ± 2.9
9	32 (31)	7.05 ± 0.73	1.39 ± 0.18	6.4 ± 2.9
10	26 (25)	9.47 ± 0.70	1.95 ± 0.15	7.5 ± 2.0
11	25 (24)	12.16 ± 0.70	2.38 ± 0.21	10.2 ± 1.4
12	24 (23)	15.63 ± 0.48	3.39 ± 0.23	20.9 ± 6.9
13	23 (22)	20.08 ± 0.85	4.37 ± 0.22	41.0 ± 10.7
Exuvia	13 (13)	21.37 ± 0.84	4.55 ± 0.22	
Duration of larval development				*124.4 days*

* Figures in bracket indicate the number of larvae supplemented from the field.

Table 3: Summary of the development of larval characters in *Urothemis assignata*

Character	Instar 2	3	4	5	6	7	8	9	10	11	12	13
Antennary segments	3	3	4	4	5	6	7	7	7	7	7	7
Abdominal segments covered by wing sheath	–	–	–	–	–	R	R	½	1¼	2	4	6
Tarsal segments	1	1	1	2	2	3	3	3	3	3	3	3
Anal cerci		–	–	–	R	R	+	+	+	+	+	+
Mid-dorsal abdominal spines	–	–	–	–	+	+	+	+	+	+	+	+

(–) absent; (R) rudimentary; (+) present

A detailed study on the feeding pattern of these insects revealed an interesting phenomenon, which may be useful for explaining corruption levels among humans. In nature, the average larva never has a full gut, filled with food. They have more food in the gut in the afternoon and evening, with little food in the gut overnight. However, when studied in the laboratory in crystallizing dishes, they not only filled their gut, but kept on killing the available prey offered, without

eating them (Hassan 1974, 1975 & 1976b). Benke (1972) also observed that the actual consumption of prey by larvae in the field is small when compared with their potential consumption. The instinct to kill by these larvae (figure 2), even when not necessary, but because of abundance of prey, which they are not used to in the field, can be related to the greed and corrupt ability of our leaders to acquire wealth unnecessarily, because they never saw money like that before.

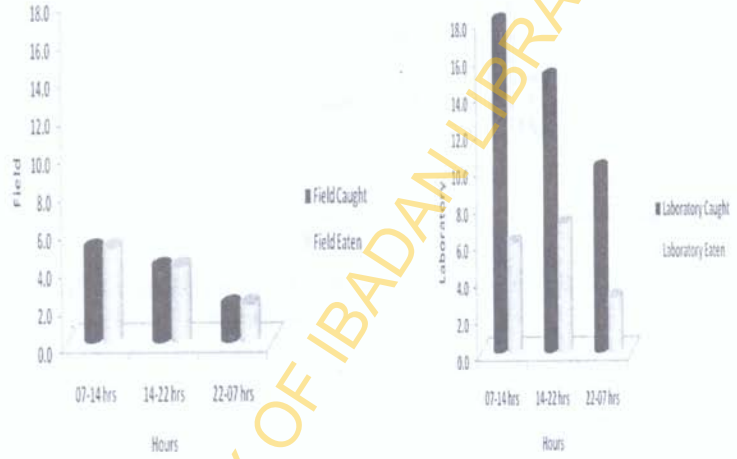

Fig. 2: A comparison of prey killed by *Urothemis assignata* ultimate larvae in the field and in the laboratory

Adult dragonflies show a very good example of animals with diurnal rhythms—biological clock. They leave water at specific periods to roost in defined places. These defined places, Gambles (1971) termed 'odonate dormitories'. The orientation of these insects during roosting is shown in table 4; the detailed activities of this rhythm are as captured in table 5; while a comparison between night hours and total hours of roosting in two dragonfly species is in table 6.

Table 4: Orientation of *Palpopleura lucia lucia* and *Acisoma panorpoides inflatum* during roosting

Species	Number of specimens in the direction								Total
	NNW/NNE	NNE/ENE	ENE/ESE	ESE/SSE	SSE/SSW	SSW/WSW	WSW/WNW	WNW/NNW	
lucia	14	15	10	16	16	11	12	16	*110*
inflatum	18	15	17	14	15	12	16	18	*125*

Table 5: The time & duration of roosting activities in *Palpopleura lucia lucia* &*Acisoma parnorpoides inflatum* and the temperature and light intensities at which they occurred

Activities	*lucia*	*inflatum*
Pre-roosting		
Time of leaving water	16.20 - 16.46	16.21 - 16.44
Light intensity (lux)	5274 - 6243	5274 - 6168
Temperature (°C)	29.3 - 32.4	28.6 - 32.4
Roosting		
Time roosting began	18.05 - 18.44	18.14 - 18.48
Duration (hours)	11.51 - 13.45	11.42 - 13.27
Light intensity (lux)	388 - 538	237 - 527
Temperature (°C)	24.0 - 28.6	23.8 - 29.0
Distance from water (m)	1.2 - 109.0	0.4 - 64.8
Height (cm)	20.7 - 237	14.8 - 119.9
Pre-flight activities		
Time	06.27 - 07.12	06.23 - 07.06
Duration (min)	11 - 70	11 - 65
Light intensity (lux)	11 - 258	0 - 183
Temperature (°C)	15.0 - 21.7	14.8 - 21.9
First flight of day		
Time	06.32 - 08.00	06.27 - 07.44
Light intensity when no pre-flight activity occurred (lux)	0 - 32	0 - 21
Light intensity when pre-flight activity occurred (lux)	- 1690	- 1152
Temperature (°C)	17.3 - 25.6	17.1 - 25.2

This circadian or diurnal rhythm is primarily influenced by light regimes. There is a high degree of correlation between night hours in Ibadan as calculated by Oguntoyinbo (1972) and the total hours of roosting in the two species of dragonflies (Hassan 1976c) (table 6). Cloudsley-Thompson (1960) stated that light acts as a 'master factor' in arthropods and only when it rises above, or falls below certain threshold values do other factors such as temperature and humidity exert an effect. From our field observations, temperature and humidity may exert an effect, particularly when the rhythm is interrupted in the morning.

Table 6: Night hours at Ibadan and total hours of roosting in *Palpopleura lucia lucia* and *Acisoma parnorpoides inflatum*

Month	Night hours[2] at Ibadan	Total hours of roosting in	
		lucia	*inflatum*
January	12.4	12.38, 13.70	12.22, 13.38
February	12.2	12.17, -	12.07, -
March	12.0	12.07, 12.08	11.98, 11.95
April	11.8	11.88	11.90
May	11.5	11.95	11.90
June	11.3	11.85	11.77
July	11.4	11.88	11.70
August	11.6	11.93	11.81
September	11.9	11.97	11.93
October	12.1	11.98, 12.23	12.05, 11.93
November	12.4	12.35, 12.40	12.32, 12.27
December	12.5	13.52, 13.75	13.27, 13.45

[1]Minutes calculated as percentage of an hour.
[2]Night hours were calculated from day-length data, cf. OGUNTOYINBO, 1972.

A high degree of parasitism between *U. assignata* and the mite of the genus *Hydrachna* was observed extensively in the field. Infestation was initiated usually on the ultimate instar in water. Parasitization of the adult host was evidenced by the presence of hydrachnid mites or their scars on the wings (figure 3). Adult and larvae of *U. assignata* were parasitized all year round, although more heavily during the dry season. Parasitism in the sampled population ranged from 55 to 90% (Hassan 1983). This was the first report in literature of the *Hydrachnids* parasitizing the odonates. The odonates are usually parasitized by the *Arrenuridae* (Mitchell 1959, 1961), while Cromwell (1963) also reported parasitization of other odonates by the family *Limnocharidae*. In their review, Smith & Oliver (1976) indicated that the hydrachnids are mainly associated with the hemipterans (bugs) and coleopterans (beetles).

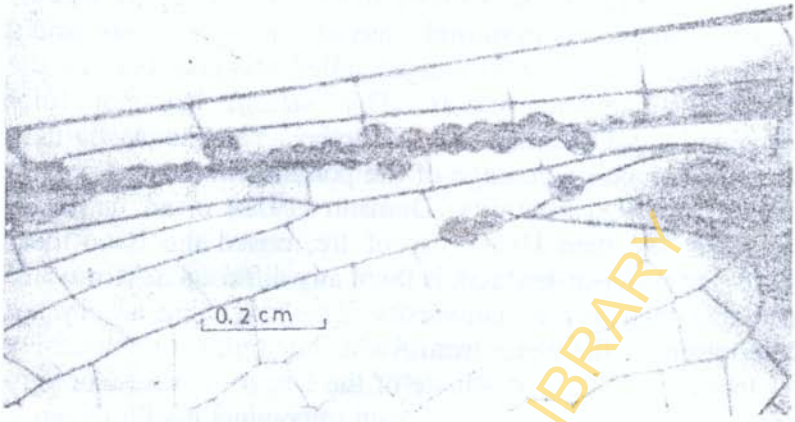

Fig. 3: Distribution of mite larvae *(Hydrachna sp.)* on the ventral wing of *Urothemis assignata*

The purpose of this association seems to be that the mite larvae developed to become adults on the wings of the odonates. The odonates also serve as a means of transport and dispersal for the mites. Mitchell (1961, 1969) elucidated the processes whereby the mite larvae locate and attach to their host larvae, migrate from the host larvae to the emerging imagines and also indicated the processes which stimulate such migration in mite larvae during ecdysis. Corbet (1963) indicated that the hydrachnids were commonly found on mosquitoes. Of the ten species of libellulids sampled in the field, only three other species were parasitized by water mites. *Palpopleura lucia lucia*, and *Aethriamanta rezia (Kirby)* were parasitized by the hygrobatid mite—*Hygrobates sp.*, while *U. edwardsi (Selys)* was parasitized by *Hydrachna sp.* It would seem that the hydrachnid mites might be specific to the *Urothemis spp.*

During my sampling and survey of odonates larvae, I naturally came to know a wide array of other aquatic insects. In 1978, there was a burst in the University sewage system, mainly from the Nnamdi Azikwe Hall axis. Most of the sewage found their way into the Awba stream, which feeds the Awba dam in conjuction with Sango stream. This

completely altered the ecology of the stream as well as its aquatic fauna; chironomid larvae, in their swarming populations (Toye 1977) and rat tailed maggots became the commonest aquatic insects. This stream has not fully recovered from this invasion till today. Yet, the Awba dam supplies a good percentage of the portable water available to the University community. Damann (1973) in an inaugural lecture at the then University of Ife, raised the issue thus: 'Drinking water or sewage, is there any difference?' for water available then at that University. This might be a very apt description for the water from Awba dam today.

In 1986, a young graduate of the Department of Zoology approached me that he would want to conduct his Ph.D. work on the ephemeropterans—mayflies, another order of the aquatic insects. I was glad to take him on. He did quite some good work and obtained his Ph.D. in 1991 (Ogbogu 1991). The ephemeropterans live more as larvae, since the adults live only for a few days, without feeding, only to mate and die. If humans were to have this fate, the world population will not be billions, but a few millions, since most will rather choose celibacy. Ogbogu and Hassan (1996a) appraised the oxygen and temperature requirements of *Cloeon perkinsi* and the significance of these on their microdistribution in their ecosystem; whilst Ogbogu and Hassan (1996b) looked critically at the ecological impact of sewage discharged from the University sewer system into the Awba dam. The impacts of these discharges on the physico-chemical variables on the stream-reservoir system were assessed and stress factors on two species of ephemeroptera were considered. The discharges had significant impacts on the population dynamics of these insects. Ogbogu has made substantial contribution to knowledge in this insect order and has also established a phoretic association between a bryozoan and the *Caenis* larvae, novel to the group (Ogbogu 1991), amongst others. He has also included another aquatic insect order—Trichoptera—to his research interest area.

Water hyacinth—*Eichhornia crassipes (Marts) Solms: Pontedariaceae*—became a problem to Nigerian waterways in the late 1970s. Based on expertise, I, with other entomologists in biological control—Professors Odebiyi and Akinlosotu, amongst others, were invited to serve on a National Panel for the biological control of this weed pest by the then National Agency for Science and Engineering Infrastructure (NASENI)—an Agency under the Federal Ministry of Science and Technology. 2000 individuals of the insect bio-control agent, *Neochetina eichhorniae (Coleoptera: Curculionidae)*, were donated to the Nigerian Government by the Australian Government. These insects were quarantined in the United Kingdom, collected and were successfully reared in Nigeria. I am proud that I designed the laboratory (figure 4) which was used to propagate these insects. Funds were provided by the Federal Agency to build the essential components of the laboratory at the National Horticulture Research Institute (NIHORT). The insects multiplied, but as usual with government, there was no fund to release the insects to the affected fields, where they would have become established and control the spread of the water hyacinth. The reasons were quite obvious. If the water hyacinth was controlled, the annual budget for mechanical clearing would cease. While the entomologists on this project had lost hope about the seriousness of the Ministry to continue this work, we were suddenly called upon to release some of these insects on a newly located water hyacinth spread on River Niger at Dole-kinna, a border settlement between Niger Republic and Nigeria. This was all because, a Minister in the Federal cabinet, who came from that locality did not want the fishing industry of his people adversely affected. In the interim, the weed was spreading in the Kianji Dam and on the Epe, Lekki and Lagos lagoons.

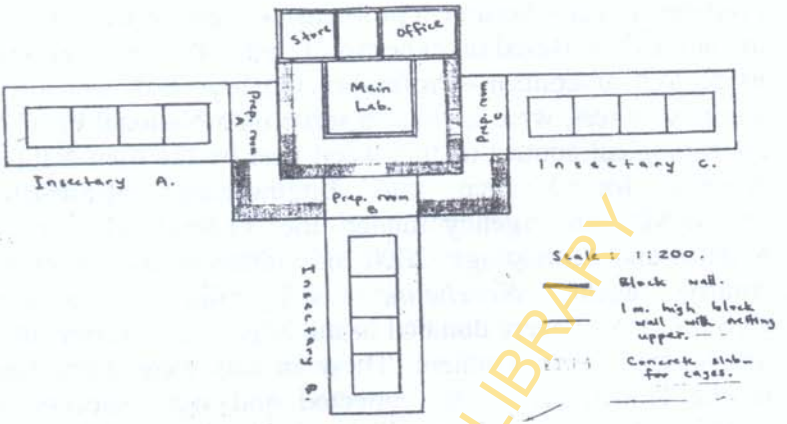

Fig. 4: Aquatic insect laboratory for the rearing of *Neochitina species* at NIHORT

In 1996, I put a Ph.D. student to study the impact of water hyacinth in Ogun River. The result (Oke 2000) did elucidate useful information on the ability of *N. eichhorniae* to control the spread of the weed. At a time, we lost all the biological agents. IITA, Cotonou came to our rescue, by providing another 200 *N. eichhorniae*. Today, we have all the knowledge on how to combat the problem of water hyacinth through biological control, but the ability to develop the infrastructure for this has become problematic. I applied for the University Special Multi-disciplinary Research Grant, managed then by the Centre for Environmental Protection and Natural Resources (CEPNAR). The application was approved in principle, but nothing came out of it. The idea was to develop a location in Ibadan, and we could develop consultancy projects with the riverine areas of Nigeria, where the water hyacinth was a problem. Today, the African Development Bank, through the Federal Ministry of Environment, has made this thought a reality at NIHORT.

Mr. Vice-Chancellor Sir, for the first part of my research activities, detailed above, with my graduate students, I concentrated efforts on the insect orders of Odonata, Ephemeroptera and Coleoptera; working on their ecology,

behaviour and life history. This, we linked up with the identification of a wide array of aquatic insects in various insect orders and other invertebrates and vertebrates. We studied most of their interrelationships for the first time in Nigeria. The adult odonates may not be of much economic value, but their larvae constitute a major component of the food web of any aquatic system. The odonates with the ephemeropterans, constitute the bulk of insect biomass in the aquatic ecosystem. They also compete with the fishes for food, and the large species predate on fish fry and juveniles. In the monoculture of cichlids, they are used to prevent a runt down of the fish populations. Our studies also indicated the possible utilization of specific aquatic fauna as indices of pollution. It is possible for a trained Zoologist to assess a polluted water body faster than any other discipline, by an assessment of the fauna composition. While I have veered away from aquatic entomology, Ogbogu has entrenched himself in this field. Indeed, he recently acquired expertise in the usage of molecular biology for taxonomic identification of these insects.

Research Work on Pest Control and Management

With the decline of funding research (both local and external) in the early 1980s, my research activity switched to mainly supervising graduate students in stored product entomology. These research activities concentrated on the determination of the pest status of three problematic stored products pests - *Tribolium castaneum (Herst) (Coleoptera: Tenebrionidae), Trogoderma granarium (Everts) (Coleoptera: Dermestidae)* and *Rhyzopetha dominica (Fabricius) (Coleoptera: Bostrychidae),* and developing control strategies for them. These are pests of maize, cowpea and groundnut. A pest status was established for the three pests in various locations of Nigeria. The mode of infestation of the commodities by these pests was determined; cultural practises tend to encourage infestations. Multiplication of infestation occurs greatly during the transportation of the commodities from the

north to the south. The recycling of jute bags during transportation allowed large-scale cross infestations. The unprofessional usage of insecticides by the local market women to kill these insects also resulted in insecticide resistance problems. Under-dosage sprays of insecticides in many market areas resulted in the development of resistance to the tested insecticides by the 3rd to the 4th generations of these insects. Simple storage methods—hermetically sealed containers, usage of vegetable oil and pepper, amongst others—were proved useful for the domestic control of these pests. Three Ph.D. theses were produced from these research activities on stored products entomology (Williams 1984; Odeyemi 1989; and Ikpehai 1993).

From 1986 to 1988, I supervised a research project on whiteflies on maize and wild grasses in the Republic of Cameroon, sponsored by USAID, Yaoundé. This involved extensive travelling within the East, South and Central Cameroon. This was followed up with a travel grant to spend one week at the International Centre for Insect Physiology and Ecology (ICIPE), Nairobi, Kenya. These two research exposures broadened my perception on pest control. Consequently, there was a shift from mainly laboratory work to an integrated and multi-discipline format of pest control.

During this period, three exotic pests of cassava—Cassava Green mites (CGM) - *Mononychellus tanajoa, Bondar (Acarina: Tetranychidae)*, spiralling white files (SWF) - *Aleurodicus dispersus,Russel (Aleyrodidae: Homoptera)* in 1992, and the large grain borer, *Prostephanus truncatus* Horn *(Coleoptera: Bostrychidae)* were still problematic. In 1990, multidisciplinary research activities with the International Institute of Tropical Agriculture (IITA), both at Ibadan and Cotonou, Republic of Benin were initiated, involving collaborative research work with Drs. Yaninek, Dixon, Ekaneyaki and Jackai. This afforded me the opportunity to have access to research facilities and sponsor-spent funds and the ESCaPP grant fund. Our research activities were primarily working out possible control

strategies for the exotic pest of cassava—CGM, *M. tanajoa*, through the breeding of resistant cassava varieties. Research activity was also expanded to SWF, *A. dispersus*, when it attained a pest status to study the life cycle, ecology and control strategies including possible field biological agents. This collaboration later included the evaluation of the large grain borer – *P. truncatus* on cassava dried chips. This later study was sponsored on ESCaPP grant from IITA, Cotonou.

Mononychellus tanajoa is dependent on the cassava plant in the course of evolution. It is native to the neotropics (Yaseen 1975; Flechtmann 1978, and Bellotti and Byrne 1979). Akinlosotu and Leuschner (1981) reported the outbreak of this exotic pest in south-western Nigeria. *Mononychellus tanajoa* was estimated to cause between 13 to 80% reduction in cassava crop yield in the cassava belt of Africa (Yaninek and Heren 1988), even though Nukenine, Dixon, Hassan and Mbofung (1998) did not totally support this claim. The initial approach of the importation of CGM known predators—phytoseiids *(Acarina: Phytoseiidae)* from its native place of origin (South America) did not offer much success. While these exotic phytoseiids were effective in the control of *M. tonajoa* in the areas of release, there was no successful broadcast of the predators in the field. The only recorded success can be that of Yaninek *et al.* (1992) in the Republic of Benin.

Ojo, Hassan and Yaninek (unpublished) studied the local phytoseiids that were available in the cassava agro-ecosystem in Ibadan. Seven species of local phytoseiids were encountered (figure 5) and the population was more abundant in the wet seasons. A study on the diet of these phytoseiids revealed that their diet varied from acarines, and whiteflies to plant tissues. Since these phytoseiids were non-specific in their diet, they could not be successful in controlling the population of CGM.

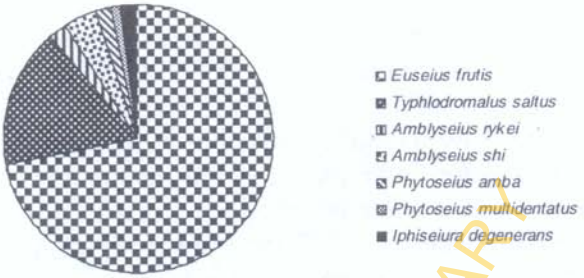

Fig. 5. Average pattern and types of local phytoseiids found in cassava agro-ecosystem in Ibadan per unit time of sampling

The study above was followed up with a later study (Nukenine, Hassan and Dixon 1998). The possible roles of local phytoseiids as control agents for *M. tanajoa* were evaluated in the field. Annual population fluctuation studies of local phytoseiids and the CGM indicated that the population of the local phytoseiids were higher during the wet seasons as against the population of the CGM, with higher populations during the dry seasons (figure 6). For any predator to be effective on its prey population and its control, the two populations must be density dependent. Another study (Nukenine, Hassan and Dixon 2000) revealed that although a large array of local phytoseiids exist in the field, they do occupy a different ecological location on the cassava plant as compared to those occupied by CGM. Consequently, they cannot be effective as a control agent for *M. tanajoa*.

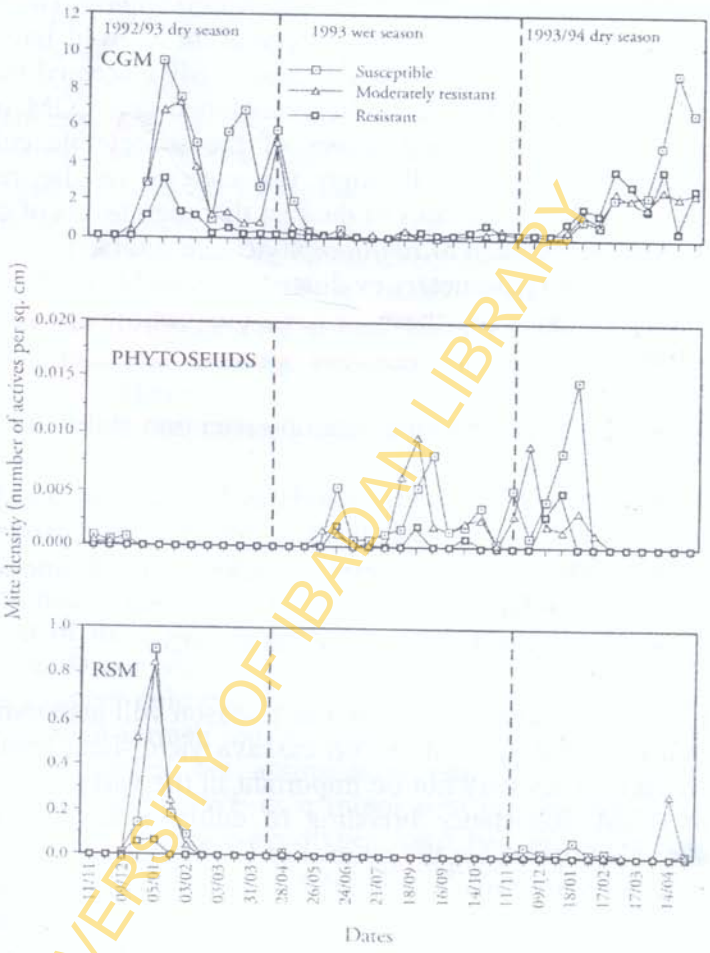

Fig. 6: Population dynamics of the local phytoseiid and cassava green mite in the cassava plots at IITA

The failure of a search for a possible local predator to control the CGM, changed the focus of our research efforts to the need to understand the basis of field resistance to *M. tanajoa* by various cultivars of cassava. Van de Vrie, McMurtry and Huffaker (1972) suggested that the plant itself may have resistance factors which might protect it against pests. One hundred and five cultivars of cassava were

evaluated for resistance to the CGM. Only twenty-two cassava cultivars out of the screened lot showed indications of resistance to the CGM. Of these, TME1 seemed the most resistant to CGM. Our studies concluded that CGM is more common on the young leaves of the susceptible cultivars, while they disperse through the canopy in the resistant cultivars. This translates to the fact that high levels of cassava resistance inhibited *M.tanajoa*/phytoseiid interactions.

Of all the parameters evaluated for possible conferment of resistance against these mites, the following could be inferred:

- Cultivars with high canopy retention ability during the dry season;
- Cultivars with high levels of leaf calcium and fat and low levels of leaf nitrogen, potassium and phosphorus;
- Cultivars with higher levels of amino-acids—isoleucine and tyrosine - in their leaves
- Cultivars with high leaf pubescence.

Planting cassava early in the rainy season will also reduce the impact of the green mites on cassava yield. Leaf anatomical characteristics may not be important in the varietal resistance to CGM. Resistance breeding of cultivars is a viable and attractive option for the control of CGM either in isolation or as a component of an integrated pest management strategy.

While efforts were being concluded on the CGM, another exotic pest (SWF – *A. dispersus)* emerged in Nigeria by 1992. Akinlosotu, Jackai, Ntonifor, Hassan, Agyckwa, Odebiyi and Akingbohungbe (1993), reported the presence of this pest in Nigeria to the Food and Agriculture Organization (FAO). Extensive research was carried out on the biology, spread of this exotic pest in all the southern states of Nigeria, and the impact of native natural enemies and pathogens as possible control agents.

Odebiyi, Hassan, Jackai and Asiwe (unpublished) established the presence of SWF in south-western Nigeria.

This pest is polyphagous and has a host plants range of over 100 plant species (Banjo, 1997, Hassan 1997). These host plants include food crops, nitrogen-fixing leguminous plants and ornamentals. It remained uncertain how SWF got into Nigeria. SWF feeds and oviposits on the lower leaves of its host plant and may therefore elude contact insecticides, most indiscriminate or general predators, and natural enemies (Banjo, Hassan, Dixon, Ekanayake and Jackai 2000, 2004). The nymphs and adults suck the cell sap of their host, devitalize the plant and thus cause direct damage. SWF also excretes honeydew, on which sooty moulds develop (Akinlosotu et al. 1993). SWF is essentially a dry season pest, with its population peaking between February and April (Hassan 1997). There was a strong correlation between SWF infestation levels on cassava and temperature and evapo-transpiration.

Banjo, Hassan, Jackai, Dixon and Ekanayake (2001, 2003) studied the life cycle of SWF. The full cycle takes between 23 and 41 days. It was observed that cassava cultivars had no impact on the developmental cycle and dispersion of the SWF. A detailed study by Banjo, Hassan, Ekanayake, Dixon and Jackai (2004) on the impact of SWF on three cassava cultivars in a screen house for six months, using five plant growth indices (leaf area index, crop growth rate, harvest index, net assimilation rate and total plant biomass) classified SWF as a minor pest on cassava. This was because the cassava genotypes used had the ability to undergo compensatory growth even at high infestation levels. However, this result may differ under water-stressed conditions and the impact of SWF might be worse than observed in this study.

In another study in a screen house, Popoola and Hassan (2002) had earlier determined the factors that may affect the development of the various stages of infestation of the cassava plant before the life cycle is established. Three cycles of infestation generally leads to a successful infestation. Hassan and Udofia (1997), and Popoola and Hassan (2002) studied the possibilities of moulds as possible biological

control agents of this pest. This was based on the premise that SWF excretes honeydew on which moulds could grow. *Trichoderma lignorium* was obtained on larva stages on cassava, while *Fusarium sp., Rhizopus stonolifer, Aspergellus flavus* and *A. niger* with *T. lignorium* were observed on various stages of the larvae on *Acalypha wilkesiana*. Only *Aspergillus spp.* were found on the pupae. No moulds were obtained on the eggs. Three of the isolated fungal genera are deuteromycetes, which are known to be entomopathogenic (Kamat and Rao 1975). Entomopathogens are known to overcome their hosts before extensive invasion of the organs take place and therefore toxins are presumed to be responsible for host mortality (Roberts 1981). These pathogenic moulds might be responsible for the sudden reduction in the population and severity of SWF. SWF remains a tamed pest now, though there are still periodic population sprouts on some plants at the peak of the dry seasons.

Prostephanus truncatus is a stored product pest of cassava and dried maize. The pest originated from Central America, Tropical South America and the extreme south of the United States of America as a localized pest of farm stored maize (Popoola 2004 & 2009). Popoola and Hassan (unpulished) studied the possible route of *P. truncatus* into Nigeria as a pest of cassava dry chips. The possible route from our investigation might be the goods smuggling route from Benin Republic through Oyo North to Ibadan. The pest was first noticed in the Republic of Togo in 1984, then in the Republic of Benin in 1986 and in Ghana in 1989. The timing of the arrival of this pest in Nigeria coincides with the time Nigerians were being encouraged to go into cassava chips production for export trade. It is a virulent pest and has the ability to reduce cassava chips into powder.

Research Work on the Environment

My research interest on the environment was kindled after a work visit to Professor Bjork's laboratory at the University of Lund, Sweden and part of my sabbatical leave spent at the

Academy of Natural Sciences, Philadelphia in 1979. Unfortunately, most of the understanding gained at these laboratories remained unutilized till today, primarily due to lack of laboratory space and funding.

An Environmental Impact Assessment Study on one of Shell Petroleum Development Company development programmes at Ovhor, Okokporo and Ubaleme oilfields opened another dimension to my research interest. The domestic water available to one of the surveyed communities to drink was rain water collected from their roofs. This water supply had been blackened by soot from gas flaring. The question that came to my mind then was: What is the quality of water available for drinking in the cities? I decided to take Ibadan as a case study.

A number of wells in two local government areas of Ibadan were sampled; chemical and biological analyses were carried out to determine their water quality. Specific interest was taken on Total Solids, Nitrate, Ammonia, Sulphate, Lead and Chromium. The comparisons between the values obtained and the World Health Organisation (WHO) or Nigerian Environmental Standard and Regulatory Enforcement Agency (NESREA) standards, are shown in figures 7 and 8. Based on the ammonia, lead and chromium levels in the water samples, all the water supplies from the wells are not safe for human consumption. The most critical of these was iron. Nitrate level was only critical for samples obtained around Inalende/Ogunpa axis of Ibadan. The lead levels in all the water samples were all within acceptable limits for human consumption.

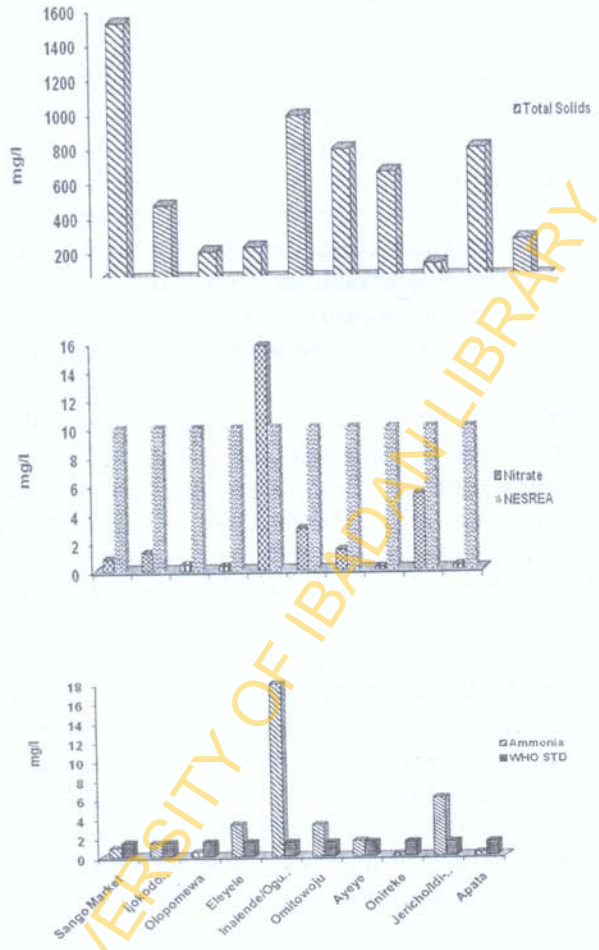

Fig. 7: Total solids, nitrate and ammonia levels in well water in different areas of Ibadan.

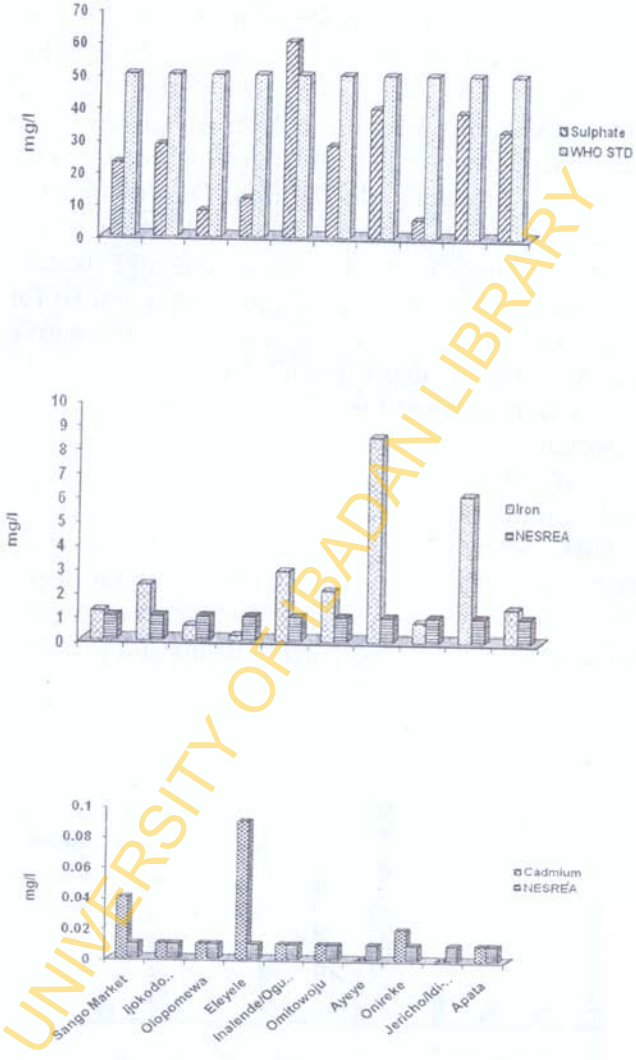

Fig. 8: Sulphate, iron and cadmium levels in well water in different areas of Ibadan.

The biological analysis indicated that most of the water samples had organisms growing in them. The groups of organisms ranged from phytoplanktons to zooplanktons. The phytoplanktons observed were from the Chlorophyceae, Cyanophyceae and Baccilariophyceae groups, while the zooplanktons were mainly protozoans and rotifers (see fig. 9). The samples from Inalende/Ogunpa, Omitowoju and Ayeye were worst. Only at Onireke were the water samples free from biological organisms. In simple language, water samples from majority of all the wells sampled were not fit for human consumption. The question is: Is there any alternative for the average Nigerian to drink from? Yet, water is an essential fluid every human must take on a daily basis; no wonder the life expectancy of an average Nigerian is put at 45.7 years. This will make me and most of the people listening to me 'expired' products of Nigerian citizenry. Water you must drink daily. Since government cannot provide her citizens with portable water, why not take an extra pain of processing your well water, by any cost effective means. It may be cheaper in the long run than buying drugs and you may live to see your grandchildren, at least.

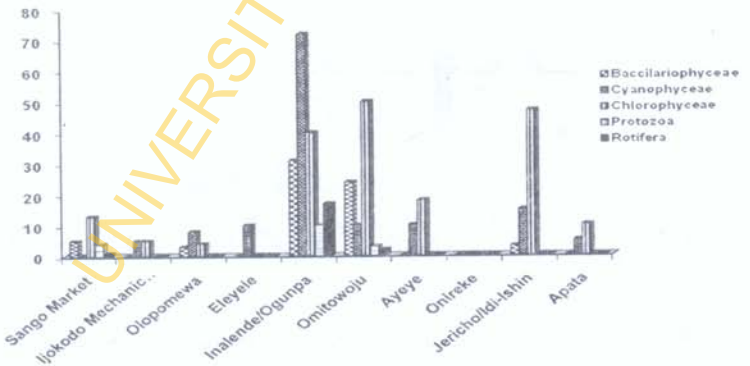

Fig. 9: Mean numbers of groups of phytoplankton and zooplankton identified in well water samples at various locations in Ibadan

When you buy a car – *tokunbo* or new – the petrol tank has a label – 'unleaded fuel only'. What do you do when all fuel imported into Nigeria contains lead tetrachloride? Hassan and Onomrerhinor (2008) examined soils and plant tissues along the major highways and a few side roads in Ibadan to observe the correlation between traffic density, its composition and the lead contents of the surrounding soil and vegetation. The majority of all soil and plant tissues analysed had high lead loads as a result of the traffic density (fig. 10). Our data also showed that the proportions of types of vehicles have different impacts on the lead loads observed in the soil and plants along different highways (table 7). Motorcycles have the worse impacts on the lead loads than other types of vehicles.

Hassan and Ikhiomaya (unpublished), broadened the scope of the study above. We examined a number of roads in Ibadan, with the University of Ibadan Botanical garden as control, to study the load of Lead, Zinc and Cadmium in the soil and earthworms. Earthworms are commonly used in bioassay studies. Earthworms encountered during the study were *Eudrilus eugeniae, Alma millisoni, Libyodrilus violaceus* and *Hyperiodrilus africanus*. Soils and earthworms were collected at 2, 6 and 15m. away from the edge of the roads. The 2m. distance from the edge of the road had significantly more values for all the tested heavy metals (table 8). The values for the 6m and 15m distances were not significantly different for all the metals both in the soil and the earthworms tested. The culprit for these heavy metals under discussion is the fumes from automobiles and trucks plying these roads, most with engines under varying degrees of efficiency (engine wear). The critical situation is that most Nigerians end up with food materials with these loads of heavy metals, for their daily food intake—the vegetables grown along the road side, the roasted plantain and maize we buy as snacks, and the tomatoes and foodstuff bought at Sango road market all have their fair share of this contamination. Do we need to wonder why health bills are high, and the life expectancy of the average Nigerian is low?

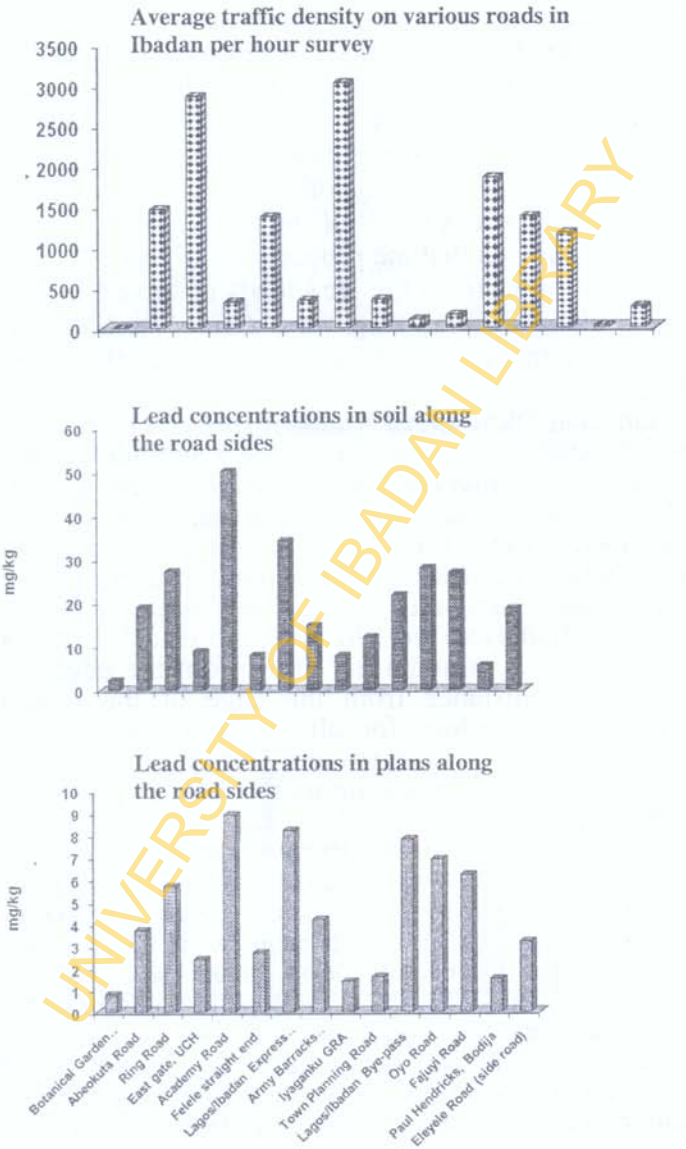

Fig. 10: Traffic density on Ibadan roads in relation to lead concentrations in the soil and in plants along the roadsides.

Table 7: Composition of traffic recorded on various roads per hour in Ibadan metropolis

	Motor-cycles	%	Cars	%	Buses	%	Vans	%	Heavy Duty Vehicles	%
Total	2962	19.69	8166	54.30	2894	19.24	633	4.21	385	2.56
Iyaganku GRA	27	25.23	66	61.68	7	6.54	5	4.67	2	1.87
Academy Road	477	34.69	297	21.60	579	42.11	14	1.02	8	0.58
Lagos/Ibadan Bye-pass	793	42.70	982	52.88	46	2.48	30	1.62	6	0.32
Paul Hendricks Road	2	7.69	16	61.54	2	7.69	6	23.08	0	0.00
Abeokuta Road	215	14.65	631	42.98	549	37.40	36	2.45	37	2.52
Oyo Road	256	18.60	530	38.52	522	37.94	56	4.07	12	0.87
East Gate, UCH	47	14.42	256	78.53	14	4.29	6	1.84	3	0.92

Table 8: Heavy metal composition (mg/kg) in soil and earthworm at 2m, 6m and 15 m away from various roads in Ibadan metropolis

Road	Metal	Soil			Earthworm *		
		2m	6m	15m	2m	6m	15m
Bodija-Ashi	Zn	23.6	21.6	14.4	48.6	43.0	40.8
	Pb	42.6	17.1	13.1	8.5	1.1	2.8
	Cd	8.6	4.3	2.0	0.9	0.5	0.7
Bodija-Secretariat	Zn	32.5	31.6	25.6	59.5	48.2	44.3
	Pb	121.4	62.6	28.7	8.1	5.3	0.8
	Cd	24.6	16.4	8.9	1.1	0.5	0.8
Eleyele	Zn	24.1	22.8	19.5	53.8	49.7	50.3
	Pb	37.4	27.8	19.7	12.8	5.5	2.2
	Cd	13.8	4.1	3.4	3.6	3.5	1.3
Orogun-Oyo	Zn	44.9	38.2	23.2	84.7	69.1	54.8
	Pb	125.8	57.2	24.7	13.7	7.0	3.8
	Cd	15.2	9.5	6.1	3.2	2.2	0.9
Botanical Garden, UI	Zn	10.9	-	-	37.6	-	-
	Pb	10.4	-	-	3.2	-	-
	Cd	1.9	-	-	0.7	-	-

Mr. Vice-Chancellor Sir, permit me to make a little inference on how much the insensitivity of a failing state affects the health of its citizenry. Most homes in Nigeria have no regular energy supply from the Power Holding Company of Nigeria. Most families will want to have electricity supply, at least between 7 and 10pm.They buy either a medium-sized petrol powered generator or a small one popularly called 'I better pass my neighbour'. Whether small or medium sized, all the generators produce fumes to the corridors, through front doors or to the general environment depending on the type of building. My concern Sir, is that this trend in town is also now gaining ground not only in the residences on campus, but even in the departments (both academic and administrative). Should the University not take note and examine its staff for the level of lead in our blood stream? As a result of the lead volumes on the highways and the fumes we inhale in our various residences, extensive damage is gradually been done to our brains, particularly the children of the lower middle-class people in Nigeria.

The Aba-eku landfill site, the major repository of municipal solid wastes in Ibadan was the focus of another research study (Oni, Hassan and Li unpublished). The results of the solid waste composition revealed seven waste fractions as major contributors with the highest proportion comprised of metal wastes (approx. 25% of the disposed wastes) in the landfill (fig. 11). Other waste fractions according to their order of contribution were paper, plastics, glass, food wastes, humus (which represented the degraded portion of the wastes), and the miscellaneous fraction (i.e. wastes which were difficult to assign to a specific category). Heavy metals (nickel, chromium, lead, cadmium, copper and zinc) in the top soils of the landfill site were increased by 154%, 204%, 326%, 1829%, 2030% and 5584% respectively compared to the control. Other metals such as iron and manganese showed an increase of 82% and 100% respectively in landfill top soils compared to control.

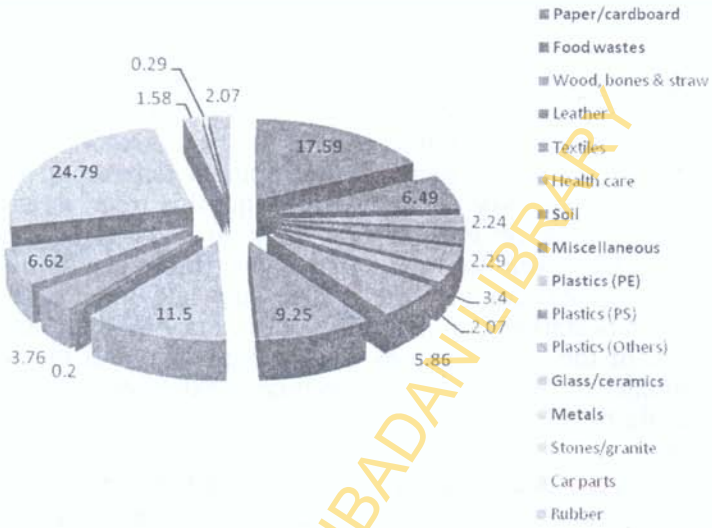

Fig. 11: Mean percentage composition of solid wastes at Aba-eku landfill site, Ibadan.

Of the eight metals considered, cadmium and lead showed a reduction with depth in the soil profile and were identified as the major pollutants in the groundwater. They exceeded local (NESREA) and/or international (WHO) regulatory limits (fig. 12). Iron was also identified as a pollutant in the groundwater. Other metals were relatively well controlled in the groundwater, possibly due to reduced mobility in soil. They however have the potential to rise to pollutant levels in future, if current trends continue. Principal component analysis linked the metal contaminants (cadmium and lead) in soil and leachate to the disposal of metal wastes in the landfill.

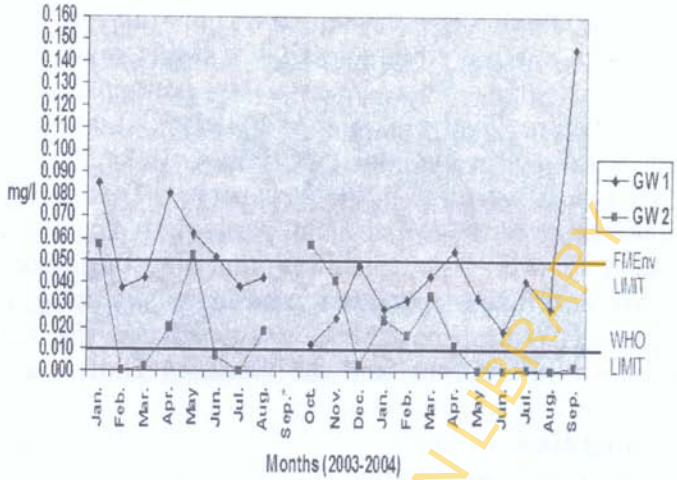

Fig. 12: Metal (lead) levels in the groundwater exceeding both WHO and NESREA limits

Leachate showed an overall reduced toxicity due to attenuation in soil as it passed through the landfill. This was supported by the results of the bioassays. No mortality due to leachate was observed in *Bufo regularis* (toad) and in fourteen-week-old fingerlings of *Clarias gariepinus*. *Culex pipiens* showed some tolerance to the leachate with an LC_{50} value of 20%. Toxicity assessments using landfill soils showed a significant reduction in growth of earthworms (*Eisenia fetida*) in the landfill soil compared to the control.

While more research work is currently going on about our solid waste impact on the surrounding environment with particular reference to the organisms, the thrust of our research activity is gradually changing to eco-toxicology.

Department of Zoology Today

The Department of Zoology, University of Ibadan basically remains as founded in 1948, but internal changes, in both orientation and curricular, have occurred resulting in what the Department stands for today. Most of the changes,

particularly the division into units came into being with the introduction of the course system in the University in 1970. The introduction of course units into the postgraduate programmes came into being in 1972 and this gave rise to the following six units of the Department—Animal Physiology, Ecology, Entomology, Fisheries and Hydrobiology, Genetics, and Parasitology. In the course of time, Cellular Parasitology evolved as a programme in the Department. This boosted the graduate intake of the Department, particularly so since it was externally funded. Through this programme, Professor Mark Nwagwu developed a modern research laboratory in the Department. With time, the merger between the Cellular Parasitology programme and the Genetics Unit, eventually became the Cell Biology and Genetics Unit. In 1994, when I was Acting Head of Department, the moribund Ecology Unit was redesigned to become Ecology and Environmental Biology Unit. This unit had the opportunity to redesign most of its courses and was further strengthened in 2004, when I was Head of Department. The Postgraduate School requested for an upgrade of all courses in the University, and we seized the opportunity to fine-tune the unit courses to produce an endearing curriculum.

Zoology is primarily the study of animals, which includes man, as functional organisms as influenced by their environment. The cellular parasitologist studies malaria parasites as influenced by its environment and the evolving adaptations just like the hydrobiologist looks at planktons as influenced by the water bodies and potential pollutants of the environment. Even in taxonomic studies today, the impact of the environment has a part to play. This indeed is what all Zoologists do with the organisms (animals) they work with. Why this elaboration? There had been peculiar issues with the perception of the outside world about what Zoology is. Like my father's friends retorted, what are you going to do with a degree in Zoology? Today, the Department of Zoology is being 'marginalised' by a number of factors. Almost all the courses taught in Zoology Department are being duplicated,

in parts, in many departments. There are Department of Fisheries and Wildlife, Department of Animal Science, Department of Crop Protection and Environmental Biology, all in the Faculty of Agriculture; Department of Medical Parasitology in the College of Medicine, and Department of Veterinary Microbiology and Parasitology in the Faculty of Veterinary Medicine. They are professional departments, while Zoology remains in the basic sciences. Nonetheless, all these departments need the Department of Zoology at one time or the other for information, collaboration or inputs to their curricular.

As an undergraduate student in the Department of Zoology, I was taught all the phyla in the animal kingdom, with particular attachment to morphology, structure and adaptations. I had to dissect an earthworm, a crayfish, three insects—cockroach, grasshopper, and cotton stainer, two fishes—dogfish and tilapia, two amphibians, two reptiles—lizard and green snake, a bird—pigeon, and two mammals—rat and rabbit. Taxonomic characteristics were taught as a component part of classification, while ecology with field work was associated with amphibian, reptile and mammalian studies. We did mathematical genetics relating to trait inheritance, histology and embryology. Animal Physiology, Entomology, Hydrobiology and Fisheries and Parasitology were final year degree options, all of which were compulsory indirectly. This training guided my research undertaking as a graduate student—morphology, behaviour and ecology of libellulid dragonflies.

In 1977, I obtained an equipment grant of N325,000.00 and was able to import major equipment that transformed my research orientation away from traditional Zoology. There were new appointments of staff into the Department, which also reorientated our teaching curriculum and research. Professor Nwagwu transformed the Embryology course into Cellular Parasitology and Molecular Biology. This was augmented by the Genetics group also diversifying into eco-toxicology, drug evaluations and mutation studies. Professor

Fagade, with his younger colleagues, reorientated Hydrobiology and Fisheries from speciation studies into a wider dimension to include production, fish biology and ecology of the fisheries of Nigeria. Our Parasitology Unit also transformed from parasite identification and classification to studying morbidity, diseases control and evaluations of infections. The Entomology Unit now carry out research work on pest control and management, repellant effectiveness assessment, pollution studies using aquatic organisms, forensic entomology, etc. The Ecology Unit has shifted from habitat studies to pollution studies, waste management, environmental biology, conservation, wetlands etc. All the above have been possible by interactions with other laboratories and research organizations outside the country by the academic staff of the Department.

Why this story? Mr. Vice-Chancellor Sir, individual academics in the Department have gained recognition in their various fields of endeavour, but this has not rubbed much on the perception by the community at large of the Department itself. I was requested to serve on an interview panel by an organization that wanted to recruit environmental officers. Zoology was rated lowest on the line amongst other courses. I asked why they had requested a Zoologist on their panel, if the subject is so poorly rated. I was recommended to the organization as an Environmental Biologist, and was recognized on my own merit. We ended up with two Zoologists out of the three employed environmental officers.

Today, the environment has become a big issue. Most human endeavours now revolve round it. The need for environmentalists from all disciplines is increasing daily, and the right nomenclature of degree classification is becoming an issue. The reality of our Department of Zoology today is that Environmental Biology has become a centre-place in many of our courses, for all levels. It is the current rallying point for most of our areas of influence, study and research (see fig. 13).

Fig. 13: Environmental Biology as a rallying point for diverse interest areas in Zoology

The Department of Zoology has been affected by the restrictive opinion of the course. This definitely has an impact on our performances at many levels. Take a look at our undergraduate admission pattern. The Department usually has a quota of about 50 candidates, but do rarely admit up to 8 candidates from the first and second choice admission exercises. The Department has always recruited change-of-courses candidates; who will want to change their course later, if allowed. Thus, most of the students are not interested in Zoology from the beginning, but they begin to create interest from their 3rd year. This may be a major cause of their lacklustre performance at the first class and second class upper degrees classifications of graduands. At the higher degree programme, since the areas of specialization are advertised, intake statistics have become better, although it is usually lopsided towards Environmental Biology.

How have our sister departments in other universities been coping? The Department of Zoology, University of Benin, had the same admission problems that Ibadan has faced all these years. In 2005, the name of the Department was changed to Department of Animal and Environmental Biology. The following admission exercise brought more students than the Department needed from the first choice admission listing. Since then, the Department had been

requested by some NGOs and donour organizations, to start specific sponsored M.Sc. programmes. The experience at Obafemi Awolowo University differed; the Department of Zoology had affiliated to it, the Institute of Ecology. This Institute was quite 'cold' until it changed its scope and name to Institute of Ecology and Environmental Studies. Today, it has mounted vibrant sponsored programmes at the Master degree level. Recently, it was mandated by a regional body to start a sponsored M.Sc. programme in Climate Change. A number of other universities have adopted many other names – Applied Zoology, Fisheries and Environmental Biology, amongst others.

Mr. Vice-Chancellor Sir, it is my considered opinion with 35 years of experience in teaching and research in the Department of Zoology, University of Ibadan, that a change of name of the Department to Department of Animal & Environmental Biology, will benefit both the department and the University at large. The quality of the undergraduate admission intake will improve and so also will be the output. Employers of labour will have a better perception of the degree content of the Department. The Department may also be able to draw funds related to the environment from various donour agencies and foundations.

What has happened to some aspects of the University of Ibadan Tradition?

Mr. Vice-Chancellor Sir, this University had a robust tradition that had assisted the growth and stability of the system. Today, we bother about the retirement of Professors and Administrators. It is my opinion Sir, that the University boxed itself to this corner. As at when I graduated from this University in 1971, there was a scholarship/bursary for the best graduating student in each department that made up to specific grades. I was a beneficiary of such a scholarship. The scholarship offer was robust enough for anybody to accept. The allowance attached to the scholarship was very close to the annual salary of a graduate. A graduate then earned

£720.00 per annum. The graduate scheme allowance was £600.00 per annum, with an ability to earn extra £1.1 shilling per hour of demonstration for undergraduate practicals. The concept then was to catch the best brains for the academic system. The system stopped. We need to ask what happened; at least remunerations were, and are still being paid by the government. I wish to advise that the University should adopt the Graduate Assistant salary scale as contained in the new salary structure to pay this group of students. At least academically minded bright students may be interested.

Official information has become scarce in the University. When I joined the University as an academic staff in July 1975, official information was disseminated quarterly, through the University publication called 'University of Ibadan Gazette, Published by Authority' (see Plate 1). This was so comprehensive that it contained all information you may require from the University system. With all due respect Sir, may I use the Vice-Chancellor as an example. In Vol. 21, No.1, October/December 1975 edition of the Gazette, on page 14, you were gazetted as follows:

> 'Design and Production Engineering
> O. A. Bamiro, B.S. (Nottingham), Ph.D. (McGill), Lecturer (1.9.75)
>
> Dr Bamiro is a product of the University of Nottingham. He enrolled at McGill University, Montreal, Canada in September, 1972 and was awarded his Doctoral degree in 1974. From 1971 to 1972, he was an employee of the Shell BP, Lagos as Pipeline Designer. While doing his postgraduate courses in Heat Transfer and Advanced Mathematics at the University of McGill, Montreal, Canada from where he accepted this appointment'

This gazette covers every aspect of university life (see content listing). In the same Volume on Page 18, the

establishment of two new faculties—Faculties of Veterinary Medicine and Faculty of Technology—were listed. In the last few years, there have been complaints that faculty members no longer know themselves, since new appointments are no longer announced and no documentation. Appointments to various committees are necessary information for members of staff and should be so disseminated. The advancement in the level of information dissemination today makes it easier for the Administration to collate information, in the format of the University of Ibadan Gazette, publish it quarterly and paste it on the University website and may send such documentation as soft copies to all interested stakeholders.

I appreciate the Administration for the resuscitation of the Passages Unit of the Bursary. However Sir, I believe that this Unit can be brought back to its old glory. It was not only an office to facilitate passports and visa acquisition for staff, but did well in relating to Customs for the importation of equipment and chemicals from manufacturers. I recall, with appreciation, the role that the unit played under late Mr. Balogun. As stated earlier in this lecture, I had an equipment grant of N325,000.00 in 1977 and decided to order all the equipment from the manufacturers, ranging from Gallenkamp in the UK to Conviron Environments in Canada. The Passages Unit linked up with Crown Agent to order and ship these equipment to Ibadan. The unit obtained Ports and Customs duty free certificates, supervised the collection of the equipment from the Ports and delivered them to the Department. They also linked up with IITA for installation of the Conviron Environments equipment. A lot of money was saved. Today, what happens in the University? The University uses suppliers to deliver equipment, even as trivial as refrigerators and air conditioners, and sometimes at absurd prices, in the name of due process. I believe Sir, this is one area that gown can seriously affect town. Recently, a graduate student needed a field operated hand centrifuge for her research. A supplier brought one for N50,000.00. The student

went to Lagos and bought the same centrifuge for N2,500.00 only.

The University of Ibadan has the tradition of operating a committee system that aimed to regulate the behaviour of the individual and also streamline processes within the University. Today, some of these committees only appear on the pages of the University document, while some have disappeared. Many staff of the University take various adjunct lecturerships, commissioned appointments, and consultancies from various universities or organizations. Most of us go scot-free, while a few cases have surfaced at the Senior Staff Disciplinary Committee. The University used to have a Committee of Senate that regulates such appointments called 'Work and Payments Committee'. Again, let me use the University of Ibadan Gazette of June 1975, Vol. 20, No.3 page 16 to show the membership of this committee as at the 1975/76 Session (see Plate 2). I have applied to this committee to take external appointments twice, and was granted approval on both occasions. In one of them, it was stated what percentage of the remuneration I received must be paid to the University. Indeed, this committee should be able to generate money for the University, if made to function and properly constituted.

Mr. Vice-Chancellor Sir, permit me to indicate a particular situation on the University campus today, that has become worrisome to some of us. As a graduate student, I needed to build an outdoor experimental cage for part of my research study. Even though the University was funding the construction and the work supervised by the Maintenance Department, I was made to apply to the Building, Works and Site Committee of the University for permission and wait for approval to construct a structure at a corner of my Department (Plate 3). Today, we find various 'buildings' – like the one in Plate 4 all over the campus. What has happened to this Building, Works and Sites Committee—a committee of Council?

UNIVERSITY OF IBADAN

GAZETTE

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Plate 1: Gazette of the University of Ibadan

3. *Work and Payments Committee*
   - Professor A. I. I. Ette
   - Professor A. Adeloye
   - Dr F. O. Aboaba
   - Dr Tam S. David-West
   - Dr G. O. Olaofe
   - Dr B. O. Ikede

4. *Business Committee*
   - Dr E. O. I. Banigo
   - Dr J. S. Oguntoyinbo
   - Dr O. Kujore
   - Dr J. A. Sofola

Plate 2: Membership of some University Senate Council Committees

Plate 3: Approval sought to build an outdoor experimental cage

Plate 4: Was any approval sought to build a structure like this?

Acknowledgements

With profound appreciation and gratitude, I owe what I am today in terms of quality of mind and discipline to my teachers, who mentored me as a university student. Most impressive to me was late Professor Samuel Afolabi Toye, my academic mentor, academic father, guardian and friend. Others include late Professor F.M.A Ukoli, late Professor N. Bolwig, Professor W.W.D. Modder, late Professor A.B.M. Egborge, Professor C. Ejike, Dr. Margaret B. Hill, Dr. D.C.D. Happold, Dr. R.S. Oldham, Dr. D. H. J. Sydenham, Dr. J.F. Barker, and late Dr. C. Powell. Late Prof. S. A. Toye, Prof. R. A. Balogun (Obafemi Awolowo University), Prof. O. Awe, Prof. J. A. Ekpere, Mr. R. M. Gambles, Prof. Ruth Patrick and late Otunba Tade Ismail were wonderful motivators and role models to me.

I appreciate a large number of my undergraduate students and over 70 M.Sc. students that I supervised. I deeply appreciate my M.Phil. and Ph.D. students who had been a major part of my academic life, and those who are currently working on their Ph.D programmes. It is noteworthy that they all remain my friends till now. I appreciate you all for been able to cope with me.

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I acknowledge the current academic staff members of the Department of Zoology, who were all my students, either at the undergraduate or postgraduate level for the joy and pains that we have all shared together. I acknowledge my numerous academic sons and daughters, who have inspired me greatly

to realize that you are nothing, except when you can mirror yourself in a number of people whose lives you have touched. To all of you, I say thank you for being my friends, who have all been very dependable. May all your dreams come true! I also want to appreciate the children of my academic mentor, late Professor S. Afolabi Toye for our mutual trust and belief in each other.

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I appreciate the entire family members of the Sanni dynasty – '*awon omo Lapoekun, omo Osigiriki, omo aniwun t'oyinbo oni nle, odara nile, dara lori esin*' — who have made marks in their various life endeavours. I wish to particularly appreciate the Hassan family branch of this dynasty. My late father, Alhaji Hassan Olayinka Sanni, was a disciplinarian, who could scold any of his 14 children until he passed away seven years ago at 96 years old. I remember with very fond memories my late mother, Alhaja Rafatu Amope Hassan who was always there for me and anyone she came in contact with. She touched many lives; she was a mother in a million. I appreciate my parents-in-law, Prince Charles A. Ariyo and Mummy Arinola Ariyo for the everyday love extended to me.

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Bolanle, Olabisi, Oluwanifesimi, and Adeola—my children, have all been sources of joy and inspiration to me. I love you all. I appreciate my two dependable sons-in-laws—

Messr. Jomi Otubu and Kunle Ojetola. My love goes to Feranmi and Iremide, my two grand-daughters. I remain grateful to the woman who makes all the difference to me—Dr. Adesolabomi Adebolade Hassan – my wife, lover, confidant, adviser, sister and friend. 'Mama' as I fondly call her, I love you and thank you for not harassing me and always allowing me to be myself.

To HIS Majesty, LORD GOD ALMIGHTY, be the glory, for what I am today. What can I say? To Him alone, be all the praises, honour and adoration.

Mr. Vice-Chancellor Sir, ladies and gentlemen, I thank you all for listening. God bless you all.

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BIODATA OF
PROFESSOR AMUSAT TITILAYO HASSAN

The eighteenth in the series of the University Inaugural Lectures for 2009/2010 session will be delivered by Professor Amusat Titilayo Hassan of the Department of Zoology, on behalf of the Faculty of Science.

Professor Amusat Titilayo Hassan was born on Monday, 2nd February, 1948 at Ijebu-Imusin, Ogun State, Nigeria, and was taken to Ilesha at the tender age of 2 years. He attended CAC Primary School, Okesha, Ilesha between 1954 and 1959 and moved to CAC Grammar School, Efon-Alaye as a pioneer student between 1960 and 1965. He had the best School Certificate result for his set and this record remained for quite some time. He attended Muslim College, Ijebu-Ode for his 'A' Level Studies between 1966 and 1967, with a state scholarship. His testimonial when leaving Muslim College read: 'He will be a University don'. He was admitted to the University of Ibadan, to read B.Sc. Zoology in 1968, also as a state scholar. He graduated in 1971 as the best graduating student. He was awarded a University Scholarship to pursue a Ph.D. programme and obtained his Ph.D. degree in 1974 at the age of 26 years.

Professor Hassan taught briefly at The Polytechnic, Ibadan for a year, before joining the Department of Zoology, University of Ibadan as Lecturer II in July 1975. He rose through the ranks until he became a Professor on October 1, 1996. Professor Hassan has served the University of Ibadan in various administrative capacities, amongst which are: Assistant Hall Warden and Ag. Hall Warden, Tedder Hall (October, 1979 to July, 1984); Ag. Director, Zoological Garden (August 1986 to May 1989); Twice Sub-Dean (Postgraduate), Faculty of Science (August 1984 to December, 1985, August 1998 to July 1999); Ag. Head, Department of Zoology (August 1993 to July 1995); Hall Master, Obafemi Awolowo Hall (September 1999 to November 2002); substantive Head, Department of Zoology (January 2003 to July 2005); Dean of Faculty of Science

(August 2005 to July, 2007), amongst others. He has also served on a number of committees of Senate and on Administrative panels set up to investigate some cases in the University.

Professor Hassan's thrusts of research works have been on entomology, pest management, biodiversity and the environment. He has developed linkages with a number of external bodies in Britain, USA, Sweden, IITA Cotonou, Republic of Benin and China and was a recipient of a number of equipment and travel grants. He has served as external examiner at both undergraduate and post-graduate levels to 18 Universities. His research works have produced ten Ph.D. graduates, two of whom are non-Nigerians. Two of his Ph.D. students are now Professors at Federal University of Technology, Akure and University of Ngoundere, Cameroon. Six other Ph.D. students are currently working in his areas of research interest. Professor Hassan is a member of many academic societies. He was Treasurer of Entomological Society of Nigeria (December 1974 to December 1977), Secretary, Science Association of Nigeria (July 1980 to July 1983) and member of Council, West African Science Association (July 1980 to August 1983). He is also a member of the Institute of Public Analysts of Nigeria (IPAN), the first Zoologist to be admitted into the Institute.

Professor Hassan involves himself in public service and charities. He was Chairman, Central Working Committee (CWC) of New Covenant Church, Nigeria (1999 to 2008), and Member of the Working Committee in Nigeria of 'Liberty International' (2000 – 2009) – a registered charity organization in the United Kingdom. He is a member of Board of Governors of two mission-oriented Primary Schools, at Imini and Sepeteri, Oyo State; and Zinnia College, Lagos. He is Chairman; Board of Trustees of three NGO's dedicated to the improvement of lives and norms in our society: Moringa Society of Nigeria, Hatis Foundation Pty and Bambino Bible Club. Professor Hassan is happily married with children.