

Review Article**Status of Biological Garden in Tertiary Institutions in Imo State:
Implication for Effective Teaching and Learning of Biology****Nwachukwu, C.U., Onoja, A.I, Kemka-Evans, C I and Onyirioha C**

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Email: nwachukwucu2005@yahoo.co.uk**ABSTRACT**

This work investigated the status of biological garden in tertiary institutions in Imo state: implication for effective teaching and learning of biology. 50 lecturers from five tertiary institutions in the state were used for the study. The instrument for data collection is the checklist which was validated by experts in botany and zoology. Data collected were analyzed using frequency counts and percentages. The results of the research showed that biological garden exist in tertiary institutions in Imo state but the plants and animals species in the garden are insufficient. There is however a handful of plants and animals for teaching purposes. The researchers recommended among others that school authorities should upgrade the existing biological garden in their institution. This can be done through acquisition and introduction of more plants and animals species into the garden to ease teaching and learning as well as centre for tourism. These measures will go a long way to revive and restore the glory of biological garden as well as promoting outdoor laboratory activities

Keywords: *Biological garden, Status, Teaching, Learning Flora, Fauna*

INTRODUCTION

Biology is the study of life [1]] It deals with plants (flora) and animals (fauna). Thus, the establishment of biological garden enhances the comprehensive and scientific study of plant and animal in their natural environment. Biological garden may be either botanical or zoological or a combination of both. Zoological garden is a place where various species of animal are kept for scientific, educational, commercial and recreational purposes. Animal of biological interest, especially the one facing danger of extinction are preserve there. Botanical garden on the other hand is a portion of land set aside for the cultivation of diversity of plant species. These plant species could be for ornamental medicinal, economic plants or trees. Blair and Ballard [2] defined biological garden as a controlled and staffed institution for the collection and maintenance of living things under scientific management for the purpose of education research and recreation. The first recorded Biological garden was found in Italy between 16th and 17th centuries. The oldest biological garden was the one established by the University of Pisa by Lucca ghini in 1543. Other biological gardens that were established include panda (1543), Florence (1545) and botanic dell university garden established in 1947. In Nigeria, the oldest biological garden is the university of Ibadan garden established in 1948.

Steere [3] maintained that the origin of modern biological garden can be traced to gardens established in European countries such as Holland, Spain, Portugal and Britain who used gardens to test the economically important plants available in those countries for possible exploration. With rapid rise of European imperialism in the late 18th century, biological gardens were established in the tropic, of which Nigeria is one of the countries that benefited.

The learning of science is rooted in observation of the real world leading to questions, hypothesis, predictions, and experiments. Outdoor laboratory or biological garden provides one of the opportunities in a science curriculum where students quite literally observe the real world and use it as the basis for scientific inquiry. Conley [4] maintained that student's collaborate in learning activities that are relevant and enable them to learn in a positive way. Over the past few years, there has been a steady and accelerated trend for biologist to become increasingly specialized to a point where a molecular biologist may be isolated from an ecologist and vice versa. Thus fragmentation is now being pictured in school biology teaching where student learn bit of biology such that the learner isolate the content from each other. The use of biological garden in the teaching and learning of biology enable integration of different elements of biology and shows how the different areas of

biology are interrelated. Biology is an experimental subject and any activity that lends credence to ecological and interactive studies provides an opportunity to investigate and collect data which can be subjected to statistical analysis and provide empirical evidence for scientific research.

Azoro, Onoja and Egeruoh [5] asserted that taking students out of the classroom to learn is an essential strategy for learning biology. Learning outside the classroom is a tour undertaken by both students and teachers into the natural environment of the organism in order to study its characteristic. Organisms are observed in their natural environment in order to expose the details of its general characteristics. Students are expected to carry along their writing materials to jot down important events or observation made in the course of the study. Students are equally expected to give a formal report of their observations and discoveries in the biological garden.

According to Iwu, Onoja, and Ogwo [6], plants of different types are usually assembled in botanical gardens. A botanical garden may be specialized or unspecialized. A specialized botanical garden contain a collection of related plant which may belong to the same family or genus while an unspecialized botanic garden comprises a collection of diverse plants from different geographical regions. Plant cultivated in the botanical garden may be planted or organized according to habitats or by their natural pattern of relationship or variation. Similarly, zoological gardens which are the equivalent of botanical garden assemble animals of different species, types, genera, families of diverse groups of animals. In zoological garden, animals are put in enclosures to check unwarranted mobility. The enclosures are separated from one another and are made to reflect certain ecological features of the natural habitat of the animals. Iwu, Onoja, and Ogwo [6] further stated that biological gardens serve several purposes such as comparative study of flora and fauna, phytogeographical, cytological, physiological, morphological and anatomical studies as well as tissue culture, plants and animal breeding, biochemical investigations, preservation of endangered species of plants and animals and sources of materials for scientific studies of plants and animals among others.

Desmond [7] argued that the tropical gardens are very small and in impoverished condition. They lack adequate materials and maintenance and as a result usually lose their scientific merits. Biological garden should be constructed based on needs and funds available. Nwachukwu and Ikpeama [8] insist that biological garden provide excellent media for much needed communication between science and the society at large. According to them biological garden can help the public to develop a greater awareness about our environment and leads to better understanding of the meaning and importance of ideas like conservation and sustainability [8].

In view of the above facts, the researchers have decided to investigate the status of biological garden in tertiary institutions in Imo state, Nigeria: Implication for effective teaching and learning of Biology. The study specifically focused on:

- (i) Determining the existence of biological garden in tertiary institutions in Imo state.
- (ii) Determining the adequacy of plants species in the garden.
- (iii) Determining the adequacy of animals' species in the garden.

Research questions

The following research questions guided the study:

- (i) What is the level of existence of biological garden in tertiary institution in Imo State?.
- (ii) How adequate are the plant species in biological garden in tertiary institutions in Imo State?
- (iii) How adequate are the animal species in biological garden in tertiary institutions in Imo State?

METHODOLOGY

The survey research design was used for the study. All the tertiary institution in Imo state was purposely used for the study. A sample of fifty lecturers was used for the study. A check list to determine the existence of biological garden and the adequacy of plants and animals species in the garden was used to collect data. The check list was validated by experts in Botany and Zoology. Data collected were analysed using frequency counts and percentages.

Analysis and Interpretation of data.

The data collected from the research work were analysed and the result are presented below and interpreted alongside the research questions.

Research question 1: What is the level of existence of biological garden in tertiary institutions in Imo state?

Table 1: Existence of biological garden in tertiary institutions in Imo state.

| S/NO | Items | Responses | | | |
|----------------|---|-----------|-----|------|-----|
| | | Yes | o/o | No | o/o |
| 1 | There is no biological garden since the Inception of the school. | 15 | 30 | 35 | 70 |
| 2 | Biological garden was initially established before but is no longer in use. | 20 | 40 | 30 | 60 |
| 3 | The biological garden in our school is out dated | 18 | 36 | 32 | 64 |
| Cumulative o/o | | 35.6 | | 64.4 | |

The result of the data analysed in table 1 show that tertiary institutions in Imo state have biological garden. This implies that in addition to the indoor laboratory, there exist outdoor laboratory and learning of biology,

Research question 2: There is no adequate plant species in the biological garden in tertiary institutions Imo state?

Table 2: Adequacy of plants species in biological garden in tertiary institutions in Imo state,

| S/no | Items | Response | | | |
|----------------|---|----------|----|----|----|
| | | Yes | % | No | % |
| i. | Are plants species in the garden enough? | 12 | 24 | 38 | 76 |
| ii. | Does the garden have plants species for special purpose? | 14 | 28 | 36 | 72 |
| iii. | Does the garden have plants species that are medicinal? | 10 | 20 | 40 | 80 |
| iv. | Does the garden contain plants of different taxonomic groups? | 26 | 52 | 24 | 48 |
| v. | Does the garden contain horticulture plants? | 30 | 60 | 20 | 40 |
| vi. | Does the garden contain plants used for teaching purposes? | 28 | 56 | 22 | 44 |
| Cumulative o/o | | 40 | | 60 | |

The result of the data analysed in table 2 on the adequacy of plant species in biological garden in tertiary institution in Imo state indicates that the collection of different species of plant in the garden is not sufficient. Thus there is need to intensify effort to collect more plant species for the garden. The analysis however indicates that plants in the garden shows plant from different taxonomic groups and plants that are use for teaching purposes.

Research question 3: How adequate are the animal species in the biological garden in tertiary institutions in Imo state?

Table 3: Adequacy of animals' species in biological garden in tertiary institutions in Imo state.

| S/No | Items | Response | | | |
|----------------|--|----------|-----|------|-----|
| | | Yes | o/o | No | o/o |
| 1 | Are the animal species in the garden enough? | 10 | 20 | 40 | 80 |
| 2 | Does the garden contain animals from different classes. | 32 | 64 | 18 | 36 |
| 3 | Does the garden contain animals of zoological importance? | 20 | 40 | 30 | 60 |
| 4 | Does the garden contain animal from different geographical areas? | 10 | 20 | 40 | 80 |
| 5 | Does the garden contains animals for tourist attraction | 17 | 34 | 33 | 66 |
| 6 | Does the garden contain animal that are used for Teaching purposes | 30 | 60 | 20 | 40 |
| Cumulative o/o | | 39.6 | | 60.3 | |

- a. The result of data analyzed in table 3 on the adequacy of animal species in the biological garden shows that the collection of animals in the garden are insufficient hence more animals should be collected for the biological garden.
- b. The result also reveals that animals in the garden are not the types that attract tourists. The result equally shows that the garden contain animal for teaching purpose.

DISCUSSION

The result obtained from the analysis of data collected for this research work are discussed here taking into cognizance the purposes of the study and the research question that guided the research work.

Research question 1: What is the level of existence of biological garden in tertiary institutions in Imo state?

The research findings show that biological garden exit in tertiary institutions in Imo state. This result agrees with the opinions of Iwu, Onoja and Ogwo [6] who stated that the established biological garden enhance the comprehensive and scientific study of plants and animals in their natural habitat. The authors stated that biological garden serve several purposes such as comparative study of plants and animals, geographical, cytological, physiological and anatomical studies as well as tissue culture, plants and animals breeding and preservation of endangered species. Furthermore, the preservation of endangered species of plants and animals is one of the major purposes which biological garden serves in order to prevent such an endangered species from extinction. Due to increase in human population, urbanization and the destruction of natural habitats of plants and animals, a lot of them are facing the dangers of extinction in some parts of the world. Biological garden have to be developed to ensure continuity of life forms.

Research question 2: How adequate are the plants species in the biological garden in tertiary institutions in Imo state?

The result of data analyzed in table 2 on this research question revealed that the plants species in the biological garden are insufficient. This finding is in line with the view of Desmond [7] who argued that the tropical gardens are very small and in impoverished conditions. They lack adequate materials and maintenance and as a result usually lose their scientific merit. Biological garden should be constructed and equipped based on the needs and available fund. The equipment of biological garden especially the introduction of different plant species into the garden can be supplemented by the effort of the teachers and students. Students could be asked to bring important plant species that are available in their environment. Students that come from different part of the country can help in bringing some plant species that are not found within the school locations and its environment. Lecturers could equally make sacrifice to collect plant specimen from other part of the country as they attend conferences and workshops. These efforts will go a long way in alleviating the insufficiency of some plant species in the garden.

Research question 3: How adequate are the animal species in biological garden in tertiary institutions in Imo state?

The finding of this research indicates that the animals that are available in the garden are very few though are used for teaching purposes. This finding is in contrast with the view of Conley [4] who maintained that the use of biological garden in the teaching and learning of biology enable the integration of different elements of biology and shows how the different areas of biology are related .In a situation where the garden lacks the appropriate animals for teaching, the aim of establishing the garden may not be achieved. In order to ensure the appropriate maintenance of animals in the biological garden, the authority concerned should engage the services of a curator who will take proper care of animals in the garden. Special enclosure should be constructed for different animal species in line with their characteristics and adaptability.

RECOMMENDATIONS

In line with the findings of the research work, the following recommendations are made to improve the status of biological garden in institutions of learning.

- i. Each institution should construct a standard biological garden for use in the teaching and learning process. If possible, the garden should be specialized i.e. separate construction of botanical garden and zoological garden.

- ii. Efforts should be made to acquire the necessary plant species for the garden. This can be done through the collaborative efforts of the school authority, the teacher and students.
- iii. Enough animals' species should be obtained for the garden. Before the acquisition of these animals, adequate arrangements should be made for its accommodation, feeding and security. The collection of animal species for the garden should be done by a specialist so that the animal will be in good health condition. Also animal species to be collected should be such that will attract tourists so that revenue will be generated which supplement the financial burden of running the garden.

LIMITATIONS OF THE RESEARCH

The researchers encountered various problems in the course of the investigation. One of the problems is that of creating time from the available tight schedule of official duties. The second is that of convincing the respondents that their responses are not to expose the institutions but will be used for academic purposes which will help the authorities concern to update their garden and construct new ones where the garden did not exist.

CONCLUSION

The teaching and learning of science is better done when the facilities are available. The experimental nature of science require that students have a practical experience of what is being taught to them in theory The outdoor laboratory provide real life experience as the learners interact with plants and animals in their natural environment. This exposes all the characteristics of the organisms to the learner and provides them with undistorted information.

Outdoor laboratory provide students with the opportunities of observing, recording, reporting and discussing their views about the natural world. These facts make the provision of standard biological garden inevitable for successful teaching and learning of biological sciences.

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