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PROSPECTS OF BOTANICAL GARDEN EDUCATION PROGRAMS IN CHINA

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Abstract Based on the development of Chinese botanical gardens, education programs on botany, including materials, facilities, measures and ways were reviewed and summarized. Authors suggested that major points for improving the public awareness in botanical gardens should be emphasized as follows: 1. to reform the traditional popularization programs of botany into environmental education. 2. to improve and renew the facilities for botanical garden education programs. 3. to use as much information of new scientific achievements as possible for education programs and assimilate good experience from both domestic and overseas botanical gardens. 4. to emphasize the "participation" of visitors in programs.

Key words public awareness; environmental education; botanical garden

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根据中国植物园发展的历史,总结分析了植物园科普工作在内容、设施、方法和型式方面的发展,提出了当前植物园科普工作的重点是:1. 要变传统的植物学普及为以环境教育为中心的科普。2. 设施上要更新。3. 要大力吸收国内外科普工作的先进经验,利用新的科技成果作为科普材料。4. 在方式上要强调被教育对象的参与性等问题。

关键词 科学普及;环境教育;植物园

Education is recognized as one of the important functions of botanical gardens. It is interest to review the development of Chinese botanical gardens and to summarize the achievements of education programs in Chinese botanical gardens in facing the high tide of popularization of science and technology in the country.

1. Outline of Chinese botanical gardens and the development of education programs

Before 1949 there were a few botanical gardens in China and most of them were forestry collections, nurseries, stations and two large botanical gardens, such as Lushan Botanical Garden and heavily destroyed Mem. Sun Yat-Sen Botanical Garden. In that period, those botanical gardens could not have any program on education. In the 1950s and 1960s, the number of

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Chinese botanical gardens increased step by step, reaching the first peak of development of Chinese botanical gardens in the history. The construction of botanical gardens was being perfected and in the mean time education was gradually developed. During this period, education program was mainly on disseminating knowledge of botany and horticulture as well as showing the public with the beauty, strangeness uniqueness and spectacular of botanical cycle. These are the so called traditional botanical garden popularization activities. Since the development of environmental science in the 1980s and people pay more attention to environmental problems, botanical gardens are taken seriously into consideration by the society and recognized as the "ark" of botanical variety protection. Hence, botanical gardens should emphasize education on environmental science. Certainly, the botanical garden education program focused on environmental science is still the continuation of the original popularization activities of sciences in botanical gardens. Now the important issue is how to emphasize botanical garden education on environmental science in order to improve and promote botanical garden education to adapt the developing situation and to meet the necessity of the public.

2. Contents, facilities, measures and ways of botanical garden education

Regarding the contents and facilities, what we have seen in Chinese botanical gardens including the following items:

2.1 Plant label

Biodiversity characterizes botanical gardens and is the important condition for botanical garden education. Plant labelling is very important and the first step for the public to know and understand plants. From labels, they can know the position of the plant in taxonomic system and also can understand its distribution and climate environment where the plant located. Therefore, the main problem is having labels of good quality in order not to be heavily destroyed. This problem occurs in all the botanical gardens in the world. But, it is often more serious in Chinese botanical gardens. Botanical gardens should change the idea in using cheap labels and should considerablely improve the quality of labels and its scientific contents.

2.2 Guiding tourists

In order to let people enjoying and appreciating the beauty of nature, guiding map is very important. A good guiding map is also a good education material.

Up to now there are only a few botanical gardens providing tourist guides. Some large botanical gardens such as Shanghai, Hangzhou, Guangzhou and Nanjing Botanical Gardens are organizing groups to guide tourists. The conclusion from a special study in Shanghai Botanical Garden indicated that to accommodate education in tourism is one of the main way for botanical garden education program.

2.3 Display windows and painting galleries

These facilities are commonly used to show new plants, flowers and beautiful landscapes. It

is also a good "territory" for education program. The common problem in this aspect is the facilities need to be modernized and more attractive.

2.4 Small exhibitions

It is a vivid and lively measure of education firmly making the public awareness. Main small exhibitions in botanical gardens are flower display, plant science drawings, decoration plants inside and outside of doors, dried flower cards, famous flower varieties, bonsai and so on.

2.5 Education lectures and training courses

Different levels of lectures and training courses are held in botanical gardens. It is organized at different levels to let the trainees and visitors get more information and understanding on plant resources, humanbeing activities and environment, and also strengthen the scientific thought in their mind that people should develop harmoniously with nature.

2.6 Winter and summer camps

Young people like this kind of programs, which can make people love nature, protect plants and ecological environments. It not only enriches the holiday of young people but also gives the opportunity to environmental education.

2.7 Knowledge competition

In order to train young people having interest and hobbies on plants and animals, competition is a desirable and appreciated measure. Since 1990, Nanjing Botanical Garden, Mem. Sun Yat-Sen has had six knowledge competitions about "Plant and Environment" with industrial units, schools and museums. Through these young people not only enrich their extracurricular life but also improve their knowledge on plant and nature. It is really the responsibility of the botanical gardens to become education centers for students and teachers outside classes.

2.8 Publications, broadcasting and television

Botanical gardens can make good programs in these fields. For example, Nanjing Botanical Garden, Mem. Sun Yat-Sen has individually or jointly made 20 short education films, and some programs on broadcasting stations and TV stations.

3. Botanical gardens should pay more attention to following problems in education to adapt the changing globe

3.1 Make the main content of education program not only botany but also environmental sciences

3.1.1 Environmental problems and how man exists harmoniously with nature are hot points of the time

Botanical garden education should have more improvements to face the changing world. Botany has good relationship with people's life. To resolve environmental problems needs people's understanding and participation. Hence, botanical garden education program is a good way to learn people the environmental problems and how man exists harmoniously with their planet.

3.1.2 Botanical gardens have special good conditions to run education program

A botanical garden itself is a vast natural environment. Visiting botanical garden, people can recognize the importance and necessity of people to exist harmoniously with nature. Secondly, botanical garden has a rich biodiversity displayed to encourage people to realize the importance and protect it.

3.1.3 Botanical gardens have traditional facilities to develop awareness of people

Education is one of the main functions of botanical garden, especially this kind of education is different from school education. It is a kind of education that is directed to different ages, different races and different cultural backgrounds. This kind of education is a way to accommodate education into entertainment and recreation. Using botanical garden to enlighten the public has its own special potentiality.

3.2 Strengthen and improve the facilities in order to make it modern

Botanical gardens should have attractive landscapes and facilities to disseminate knowledge to the public with quite and delightful environments. It is necessary to have better facilities, such as slide, movie and video facilities as well as computers in order to carry on education programs actively.

3.3 Choose the education material from new and modern technological achievements and pay attention to its novelty and fascination

Botanical garden environment education program should not only pay attention to the environment problems, such as greenhouse effect, temperature increasing, sea level elevation, land desertation and so on, but also needs to explore some new discoveries with close relation to plants in order to encourage people to understand the importance of plants in the environment and enlighten people to be of imagination on plant utilization. For example, *Eichhornia crassipes*, an aggressive tropical aquatic plant, which damages agricultural production and stops water transportation. But after scientists made some study on it, it can be still used as forage, fertilizer, making paper, knitting material and so on. Further study found that it can absorb heavy metals on its roots and the leaf can be used as forage also. Absorbed roots can recover metals. One hectare *Eichhornia crassipes* can absorbed more than 1 kg of silver per day and some uranium radiative things. *Eichhornia crassipes* is recognized as "green factory" because of cleaning up function. Another example which is very interesting is the newly discovered interactions among species which provides direct benefits for mankind. The caterpillars of day-flying moth, *Urania fulgens*, of northern South America and Mexico, feed exclusively on trees and vines of the genus *Omphalos*. When the caterpillar population reaches locally high levels the plant become heavily defoliated, and this heavy defoliation causes the trees and vines to produce protective chemical toxins. As the plants become unpalatable the moth begins to migrate to new areas. In this case, the toxic plant compounds, which have been shown to be effective against the HIV virus in vitro, are produced only from the interaction between plant and moth and only when moth populations reach a threshold intensity[1]. Such material is so vivid and wonderful for education programs.

3.4 Emphasize the trainee's participation

After a review on original education program it has been found that in original programs, visitors are often in a passive position and will easily feel dull and tired. Hence it is important to give more than lectures and exhibitions, and to increase the visitor's participation in public education. Increasing participation may combine education with tourism and reflect the principal of accommodating education in entertainment and recreation.

Although education is listed as one of the main tasks of botanical gardens in the world, actually it has not been noticed enough. According to statistics, there are only 34% botanical gardens that have education group among approximately 1 600 botanical gardens in the world and only 6% have formal plans, so strengthening education in botanical gardens is a worldwide problem[2].

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中国首届国际植物园科普教育培训班在南京中山植物园召开

南京中山植物园与国际植物园保护组织(BGCI),于1996年3月15日~4月3日,在南京中山植物园共同主办了中国首届国际植物园科普培训班。

培训班由BGCI指派来自英国、澳大利亚和香港的4位教育官员任主讲教师,另由以中山植物园主任、国际植物园协会副主席贺善安教授为首的4位中山植物园的专家任教师。来自中科院北京植物园、华南植物园、西双版纳植物园和上海、武汉、深圳、新疆、内蒙、沈阳等14座植物园以及韩国国立大学树木园的20名学员参加了这期培训班。培训班的内容包括有关植物园教育的理论与实践,涉及"何为植物园教育?"、标牌制作、展览、宣传材料、游览小道设计、环境教育游戏,教育计划的组织和评估。师生们还就如何利用植物园的优势与特点,实施植物园教育计划展开了讨论。该培训班将理论传授、实际操作及讨论交流有机结合在一起,取得了良好的学习效果。本期培训班是南京中山植物园继与BGCI成功合编了《根》(文摘)——中国植物园教育通讯之后,中国植物园界与国际组织在植物园教育领域的又一次成功合作。它对于推进中国植物园科普教育,加强国内外交流与合作起到了积极作用。

(李 梅)