

## ETHNOBOTANICAL CONSERVATION STATUS OF MARGALLA HILLS NATIONAL PARK, ISLAMABAD

Muhammad Ibrar Shinwari Mir Ajab Khan

(Department of Biological Sciences, Quaid-I-Azam University, Islamabad, Pakistan)

**Abstract** This paper is based on the results of an ethnobotanical research project conducted in Margalla Hills National Park, which has faced several constraints in achieving the objectives of conservation of the natural environment since its establishment. The inhabitants of the park have always used medicinal plants for various ailments and have for a long time been dependent on surrounding plant resources for their food, shelter, fodder, health care and other cultural purposes. However, encroaching industrialisation and the accompanying changes in their life styles are responsible for the decrease of practice in the local use of plants for medicine. It is, therefore, felt worthwhile to record the native uses of these plants before the information is lost. About 100 informants were interviewed in this regard. *Asparagus adscendens* Roxb., *Berberis lycium* Royle and *Viola canescence* Wall. ex Roxb. are found vulnerable to harvesting. *Acacia modesta* Wall., *A. nilotica* (L.) Delile, *Buxus pilifosa* C. K. Schneid. and *Dodonaea viscosa* (L.) Jacq. have fuel wood pressure. while *Grewia optiva* Drum. ex Burret emerges as the most sustainable species as being used as fodder and for rope making.

**Key words** Ethnobotany; Conservation status; Margalla Hills National Park; medicinal plant

巴基斯坦伊斯兰堡马加拉山国家公园民族植物学的保护现状 M·I·兴瓦里, M·A·汗(巴基斯坦伊斯兰堡, 夸德-艾-阿泽姆大学生物系), 植物资源与环境, 1999, 8(2): 53~60

**摘要** 马加拉山国家公园自建立以来, 在自然环境保护方面面临着一些问题。园内住民向来使用药用植物治疗各种疾病, 长期依赖周围的植物资源提供食品、房舍、饲料、保健品和其他人文生活的需要。然而, 工业化的兴起以及随之而来的人们生活方式的改变, 使得利用当地植物作医药的情况不断减少。因此, 有必要进行民族植物学研究, 把本土植物的利用信息在丧失之前记录下来。调查结果表明, *Asparagus adscendens* Roxb., *Berberis lycium* Royle(柯杞小檗)和 *Viola canescence* Wall. ex Roxb. 只能少量采集, *Acacia modesta* Wall., *A. nilotica* (L.) Delile(阿拉伯胶金合欢), *Buxus pilifosa* C. K. Schneid.和 *Dodonaea viscosa* (L.) Jacq.(车桑子)等作为薪材面临砍伐的压力。而 *Grewia optiva* Drum. ex Burret 作为持续利用的饲料和制绳用的种类显示良好的前景。

**关键词** 民族植物学; 保护现状; 马加拉山国家公园; 药用植物

Margalla Hills National Park (12 605 hm<sup>2</sup>) located between 33°40'~33°44'N and 72°55'~73°20'E and forms the north eastern edge of Islamabad. It spreads in a roughly east-west

direction and its altitude varies from 465 m to 1 600 m, having rugged topography comprising mainly of steep slopes and gullies where rock structure is basically limestone. Deforestation and grazing have caused soil erosion leaving little but parent rock with shallow residual soil and silty loess. The average maximum temperature is 34.3°C while the average minimum temperature is 3.4°C. Snow is occasional. Rain fall occurs in the monsoon and winter, the average being 1 200 mm per year. The park is under pressure due to illegal settlements, quarries, fires, extensive tree cuttings, urban encroachment and pollution.

The area has been included in the sub-tropical scrub forest by previous workers. Amin and Ashraf (1982) studied the vegetation of Ayub National Park and established *Acacia modesta* Wall.-*Cannabis sativa* Linn., *A. modesta*-*Cynodon dactylon* (L.) Pers., *A. modesta*-*Lantana camara* Linn. communities<sup>[1]</sup>. *Dodonaea viscosa* (L.) Jacq. was the most common shrub of Margalla Hills National Park. It was reported that the presence of *Pinus roxburghii* Sarg.-*Apluda mutica* L.-*Quercus incana* Roxb. community on the north facing slopes and *Acacia modesta*-*Woodfordia fruticosa* (L.) Kurz.-*Dodonaea viscosa* community on the south facing slopes of Margalla Hills. According to them, the north facing slopes showed a greater species diversity as compare to the south facing slopes having the similarity index as 46%.

This Park has never been explored before ethnobotanically, so it was felt worthwhile to record the native uses of plants in this park before the information is lost. These ethnobotanical information is aimed to be used for the solution of several constraints, the park faced, in achieving the objectives of conservation of the natural environment since its establishment.

## 1 Methodology

During the field work, trips were arranged on proper time of plants collection and use by the inhabitants. Interviews were taken and observations were made during guided and transect walks. Plant specimens were collected and preserved in the herbarium of Quaid-I-Azam University Islamabad. Interviews of about 100 informants including local inhabitants, herbalists, pansaries, park authorities and societies were conducted on random bases. Questionnaires were adopted for interviews. Two girl students were involved for survey in women communities. Out come of the results were rechecked and compared with literature. Analysis of the data was done and indigenous knowledge was documented.

## 2 Results and Discussion

Since its establishment, the Margalla Hills National Park has faced several constraints in achieving the objectives of conservation of the natural environment: urban encroachment, industrial developments, and general misuse of the available natural resources. Future developments in the capital area will further increase this pressure. The main reason for such

exploitation is found to be due to either ignorance, short-term profit making, or simply the lack of alternatives depending on the population groups observed.

### **2.1 Urgent Need for Documentation of Ethnobotanical Knowledge**

An over-riding aspect of the indigenous knowledge system is that it tends to be held by the older, as opposed to the younger generations. The Hakims found in the area are all over 50 years of age and they said that their knowledge had been passed down to them from previous generations. As there is no young Hakim found in the area. Hence it seems no reason that this knowledge should again, as has happened before, be passed to the next generation. Nevertheless, it has been observed that as modern health care becomes more accessible in these remote areas, the upcoming generations may discard such knowledge, adopting the new in the spirit of 'modernisation'.

The major loss of indigenous knowledge in the population of villages is the disruption of the traditional channel of oral communication due to shift to written exchange of communications. This made it difficult for the older generation to pass their knowledge on to the younger generation. Those who attend modern schools, usually men, receive an education based on westernised system. This system may not value the cultural knowledge origination with women. The oral transference of indigenous knowledge is also hindered by urbanisation. With the change in the living style in an urban setting in recent past, people quickly forget their rural heritage.

### **2.2 Use of Medicinal Plants**

The people of Margalla Hills have always used medicinal plants for various ailments and have for a long time been dependent on surrounding plant resources for their food, shelter, fuel, fodder, health care and other cultural purposes. However, encroaching urbanisation and the accompanying changes in their life styles are responsible for the decrease of the practice in the local use of plants for medicine. It is therefore, felt worthwhile to record the native uses of these plants before the information is lost.

It has been estimated that more than 65% of the local people in some remote areas depend upon medicinal plants since it is their traditional knowledge and being poor these people do not have access to clinic or hospital. Medicinal plants are readily available in the area, while advice and consultation can be paid for through exchange of goods or services rather than cash. Rest of the 35% people have changed their life style as they obtain their earning from the urban area and have an access to get modern health facility for the city. Hence it justifies the ethnobotanical studies in this area, before the total disappearance of ethnobotanical information due to acculturation.

### **2.3 Useful Findings About Medicinal Plants**

As far as plant use in relation to centres of development goes, there seems to be more of a reliance on traditional medicine in the remote areas. In an answer to questions concerning the use of modern medicine, interviewees in and close to Islamabad i. e, the developed villages of the park, use allopathic medicine instead of traditional remedies. This is mainly due to the wider

availability of drugs and easier accessibility to a practising doctor. In areas such as Shahdara, Narias, Kotla, Gokeena, Thalhar and Pir sohawa villages, which are distanced from the developed area, modern medicine is much less accessible and it seems to be attributed to this fact.

As was quite apparent, medicinal plants are a common resource available to all. However, their availability is to a certain extent limited to the specific ecological niche where each plant grows in. Common knowledge are generally held by all and are usually related to the common plants in the locality, whereas specialist knowledge tended to span beyond the surrounding locality, and plants from beyond the area were often cited by Hakims.

The wild medicinal plants of the area are collected by low income villagers, collectors and concerned drug dealers from the city market without any consideration of age and size of the plants which result in the depletion of this natural resource from the area. However, with the increasing labour cost and search for better job opportunities by the workers, the collection of plants is slowly declining. This is the necessitating emphasis on their organised cultivation which is virtually absent at present.

Generally, the plants having the perennial nature and require a prolonged period of growth i. e. 6~8 years depending upon the plant species concerned. Some of the plant requires at least three to four years to reach the flowering and fruiting stage and thus minimising its regeneration possibilities. For example, *Berberis lycium* Royle found in the area is normally valued to the people for its important medicinal uses of its root and bark. This plant has a prolong period of growth and due to use of root and bark of this plant, it is vulnerable and is infect rather threatened since its population is thinly scattered and can not be commercially utilised on large scale in the area for future.

Similarly, the roots of *Asparagus adscendens* Roxb. and the whole plant of *Viola canescens* Wall. ex Roxb. is sold in the local market. But due to their parts used and more demand made the existence of these species in future is threatened. The only way to protect these species from becoming extinct in the area, is to make the local communities aware of their well managed propagation and regeneration techniques. Seeds of such species may be collected at the time of seed maturation for regeneration in the next season.

Although fruit product of *Cassia fistula* L. is being sold in the local market but the species have some other pressures like being cut down for fuel, furniture and some other purposes. Yet, the species density in the area is satisfactory and can be sustained if other pressures are removed. Same is the case with *Justicia adhatoda* L. and *Carissa opaca* Stapf ex Haines.

Grafting is already done on *Pyrus pashia* Buch. Ham. ex D. Don. to get more fruit production by the local villagers for the improvement of their microeconomy and is quite successful. So this species is at the stage of sustain. There is another possibility of grafting *Olea europea* L. (olive) on the native *Olea ferruginea* Royle. (wild olive) to make it more profitable and sustainable species for the local people. In this regard experimental trials have been already done at National Agricultural Research Centre, Islamabad and was found successful but the results

are still not applied practically in the area. Grafting of different strains of *O. europea* from different countries should be used to make grafting successful.

The population of *Zizyphus mauritiana* Lam. in the area needs to be promoted as this tree has a good economic potential being used as medicinal (fruit as tonic), fuel wood, fodder and in apiculture.

During the survey, a number of information obtained about the use of plants against different medical problems practised by the people and Hakims. For example, against diabetes ripen fruit of *Melia azedarach* Linn., *Olea ferruginea*, leaf decoction of *Zizyphus nummularia* Burm. and *Fumaria indica* Pugsley. are used. Similarly, bark of *Albizia lebbeck* (L.) Benth. for lymphatic tuberculosis, leaves of *Ficus virgata* Wall. ex Roxb. to soften the arteries, root of *Olea ferruginea* and leaf decoction of *Carissa opaca* for asthma, root of *Nerium oleander* L. for abortion, root powder of *Berberis lycium* for bone fracture, stem sticks of *Zanthoxylum armatum* D. C. Prodr. to heal piles, *Achyranthus aspera* L. for seasonal cough, leaves of *Calendula arvensis* L. to heal wounds, leaves of *Achyranthus aspera* with fruit of *Rubus fruticosus* Linn. for eye diseases, *Chenopodium ambrosoides* L. for piles, *Fumaria indica* for bladder infection, flowers of *Leucas capitata* for cough, cold and snake bite, while *Argyrolobium rosium* (Camb.) Jaub. et Spach. has been used as aphrodisiac. Biochemical analysis and pharmaceutical screening of these species need to be carried out in order to cross check local information and check side effects. The observation of the people that monkeys of the area often eat flowers of *Taraxicum officinale* Weber. also gives a meaningful indication, as it is one of the best remedy in liver complaints.

*Acacia catechu* (L. f.) Willd., *Asparagus adscendens*, *Berberis lycium*, and *Viola canescens* are found vulnerable due to their parts used, growth rate, quantity of consumption and pressures like grazing, erosion and fuel wood collection etc. They are particularly needed to be conserved by domestication and regeneration techniques. The flowers of *Jasminum humile* L. are used to extract oil which is very expensive and useful generally not available in the market. Jasmine oil which is available in the market is extracted from other species of Jasmine which is of inferior quality. This plant also needs to be promoted in this area and should be conserved.

The glorious findings of the ethnobotanical research is the discovery of some precious medicinal plants in the area, such as *Asparagus adscendens*, *Viola canescens*, *Embelia ribes* Burm., *Jasminum humile* and *Acacia catechu*. As an exmple if the commercial value of *Asparagus adscendens* is considered, its tubers are sold about 800 PRs/kg in the local market. It is very essential to regenerate and propagate this plant through and other modern techniques for quick regeneration. This plant can serve as a good source of income for commercial purpose for the people of this area.

There is a need to develop close liaison with all stakeholders at local market for long term sustainable protection of habitat and its resources. In this regard awareness may be enhanced for wise use of available resources. As for example, one may narrate about the habitat to locals

including Hakims about sustainable plant collection method that they may pluck half of the plant parts so that the left ones may grow up next year and could sustain for next visit and so on for next generations.

In order to avoid further loss of endangered and rare species, *in situ* and *ex situ* conservation methods can be practised as long term conservation programme. The *in situ* method involves protection of plants in their natural habitats followed by *ex situ* devices by growing important and subsequently re-introduce in their natural environment. In this respect research institutions like National Institute of Health, National Agricultural Research Centre and Quaid-I-Azam University should be involved. For all such studies researchers are needed to develop deep understanding of plant life cycles, pollination, dispersal mechanism, biochemical analysis and relation among species and the habitat.

#### 2.4 Pressure on Fuel Wood Species

A lot of pressure has been found on *Dodonaea viscosa* (L.) Jacq., *Justicia adhatoda*, *Carissa opaca*, *Buxus papillosa* C. K. Schneid., *Acacia modesta*, and *A. nilotica* as being used as fuel wood and is increasing due to expansion of population. Reforestation trend of these native species is lacking among the local communities. So, along with regeneration activities, an alternate source should be provided to reduce dependency on fuel wood. For instance, natural gas which is available in nearby city Islamabad can be provided through pipeline or cylinders. Similarly, for less earning people, energy efficient cookstoves and tandoors can be provided which lead to save 25% ~ 40% of fuel use.

It has been proved from the phytosociological study of Rumli village that the wood products are 6 times more at the places which are intentionally declared sacred (shrines, graveyards) by the people than the reserved and unreserved areas. They pay great homage to the shrines particularly. These intentions of the people can be suggested to use for the protection of the reserved areas if the areas near around the shrines may dedicated to the name of the respective saint or shrine by preaching through local religious leaders. However, miss-use of fuel wood found in 'Much' fire at Bari Imam Shrine burning 24 h/day through out the year, can be minimise by clarifying the misconceptions of the people through local religious leaders or by proper management of the wood used for fire.

#### 2.5 Use of Fodder Species

Local people suggest that grazing of animals provide a very good natural manure for the soil which insure the regeneration of fodder species next year. However, they may be informed to avoid periodic grazing of the specific areas, so that to give enough time for recovery. This can be achieved through rotatory grazing, community based self-management; by encouraging to keep livestock of improved breed and help in the formation of livestock association.

*Grewia optiva* emerges as the most sustainable species of the area as it grows quickly and regenerate within a year. This tree play a vital role in maintaining the fodder supply through leaves during the off-season of November to February and lower bark of branches are used to make

ropes. Its wood is avoided to use as fuel along with the bark as it produce bad smell on burning, only the bi-product of rope making process, the remaining stem wood is burnt. Most of the trees of this species in the area are old, new plantation is needed to be encouraged. Cultivated fodder like *Trifolium* should be introduced in order to reduce pressure on the existing species particularly for the off season.

The use of Non Timber Forest Products like wild fruit and flowers for food, handicraft making, mates and dry decoration pieces from leaves, and rope making from bark of plants should be monitored by the local social organisation for better use of resources by the local people and protection of ethnobotanical culture.

Old people of the area were found to have some mythical concepts about the tree species like *Olea ferruginea* and *Zizyphus mauritiana* that it is an evil act to cut these trees and may cause any loose to yourself or your property. But now due to acculturation and urbanisation these concepts have lost their value.

It has been found that the area at the foothill of Margalla near Islamabad Zoo were given the name "Khaira de mori" means "centre of khair (*Acacia catechu*)" by the people due to dominant vegetation of this tree species in this location in the past. At present, both the tree species density and the name of the area has not been found due to urbanisation. Similarly, gardening was one of the important hobby of the area in the past but after the acquisition of land by CDA, this useful trend starts decreasing as the people become unsure about their settlement in future. This trend could be re-encouraged by providing tree seedlings for plantation on private lands and official land on contract bases for this specific activity.

## 2.6 Beekeeping as a Useful Incentive

Beekeeping is a very useful activity both from conservation and commercial point of view. Chemas and Gray (1991) presented the results of field work and a series of interviews with Mayan beekeepers in Mexico<sup>[2]</sup>, in order to know the factors relevant in establishment of an apiary, choose of melliferous flora, management of vegetation by the local people for surrounding their apiaries, and their knowledge of flowering phenology and honey production cycle. They found the knowledge of the people about the flowering phonology and production cycle quite complex and discussed the problems, the beekeepers were facing in regards to forest clearing and commercialisation of the products etc.

The flora of Margalla Hills National Park has a great potential for honey beekeeping. Their is a dominant vegetation of *Acacia modesta* which is the major constituent (70%) of the honey produced in April to May. The other plants which are normally visited by the bees are *Justicia adhatoda*, *Bauhinia variegata* L., *Carissa opaca*, *Zea mays* L., *Eriobotrya japonica* (Thunb.) Lindl., *Dalbergia sissoo* Roxb., *Brassica* spp. and *Trifolium repens* Linn. etc.

Beekeeping has been identified as a small scale non-land based, off-farm activity that can facilitate use of land resources without degrading them. Encouragement of this industry in the park will intentionally involve the local community to keep the flora alive as well as to be cautious

about the fire ignition in the local forest; as fumigation disturb the beekeeping badly. This activity can be acquired by the retired old aged people and also the household women of the area as a domestic industry or hobby.

### 2.7 Wild Plants and Wild Animals

Association of the wild animals with the plants density is a natural phenomenon. For example, according to the old aged inhabitants of the park there was a good population of Barking deer when there exist a dense vegetation of *Acacia modesta*, *Olea ferruginea* co-dominates with *Zizyphus mauritiana* and *Dodonaea viscosa*. But due to habitat degradation this population is critically depleted. Several other species became extinct which are need to be re-introduced in the area after re-habitation. Similarly the Kalij pheasant used to live in thick pine forests of this Park, when the horizontal branches provided a shelter for the bird, since pine (*Pinus roxburghii*) density has been decreased and such a habitat is no more available. So this pheasant is also diminished from the area.

## 3 Conclusion

The results of the survey can be applied to the management plan of the park for conservation. Vulnerable medicinal species should be focussed for regeneration and propagation. Establishment of botanical garden is suggested in this regard. Afforestation programme should be started and energy efficient stoves must be introduced in the area in order to minimize the fuel wood use pressure on the park. Periodic grazing should be replaced by rotatory grazing. Native and sustainable species should be given preference in afforestation. Local people should be involved in decision making.

To make the participatory planning more sustainable, adaptable and acceptable by the villagers, the real benefactor of the plant resources, demands consideration. To document traditional knowledge of the plants used in the area; could be supportive tool for communities participation to natural resource management on sustainable basis.

## References

- 1 Amin A, Ashfaq R M. Phytosociological studies of Ayub National Park, Rawalpindi. Pak J For, 1982, 32(4): 130-135.
- 2 Chemas A, Gray V R. Apiculture and management of associated vegetation by the Maya of Tixcaltuyub, Yucatam, Mexico. Agroforestry Syst, 1991, 13(1): 13-26.

(责任编辑:惠红)