

BOTANY

Cactus Plant Resources and Utilization

Edited by: Tian Guohang and Zhao Tianbang. 2011. Science Press, Beijing, China. 323 pages. 98.00 CNY.

Cactus plants belong to the Cactaceae family which is subdivided into multiple genera. There are more than 2000 cactus plant species or varieties which are found in various colors, shapes and forms. It is believed that cactus plants have grown thirty to forty million years ago, and is usually referred to as the New World plant. Their range extends from Patagonia to southern Canada, but they are densest and most diverse in the regions of northern Mexico and the southern tropics of Argentina and Bolivia. Many cactus species have become naturalized outside the Americas after having been introduced by people or migratory birds. Cacti inhabit diverse regions and habitats, from coastal plains to high mountain areas. Although cactus plants are vigorous and prosperous in many areas in the world, some species have become endangered in the wild because of over-harvesting for sale as an ornamental plant. All cacti are covered by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and many species, by virtue of their inclusion in Appendix 1, are fully protected.

The cactus form is often heralded as a striking example of the tight relationship between form and function in plants. Cactus plants are quite unusual and are adapted to grow in hot and tropical climates and desert areas where there is very low rainfall. They have developed many unique strategies to enhance their chances for survival under inhospitable conditions. The evolution of cactus plants reflects in at least three important aspects, the loss of leaves, which reduced the total transpirational surface area, the expansion of the cortex into a succulent water-storage tissue, and the conversion of leaves into spines, which protect the stored water. The most basic survival adaptation is its shape. To minimize water loss from the surface, the ideal shape is to have the lowest surface area for a given volume. The appearance of cactus plants with a wide range of shapes and sizes is very distinctive as a result of adaptations to conserve water in dry and/or hot environments. The plant body itself is also capable of absorbing moisture (through the epidermis and the spines), which is especially important for plants that

receive most of their moisture in the form of fog. Its fleshy, succulent, long-lived photosynthetic green stem performs the function of the leaves and carries out the CAM photosynthesis process with high water use efficiency, and allows it to survive periods of extreme drought while maintaining well-hydrated tissues. Cacti are very slow growing, resulting in that their water requirements per unit time are low, and can survive after considerable water loss. The development of an intimidating defensive shield, an array of spines, is another important survival strategy, which not only defend the cactus against herbivores but also provide shade that lowers the plant's water loss through transpiration. Although some cacti are spineless or nearly so, they tend to produce toxic substances that compensate for the lack of protection from grazers offered by spines. Cactus plants have an extensively complicated and big root system which enables it to absorb water from the soil. The commonly very shallow and widely spreading root system of cacti enables them to exploit water deposited in surface horizons by short periods of rain. The combination of a shallow root system and hooked spines facilitates its effective dispersal.

In many places of China, drought-resistant plants are increasing in popularity, due to water restrictions in these areas. In recent years, numerous cactus plant species have been introduced in some places of China, and entered widespread cultivation, as ornamental plants, or fodder, forage, fruits, cochineal production and other purposes. Under this background, the book *Cactus Plants Resources and Utilization* was written by Tian Guohang and Zhao Tianbang (editor-in-chief), and was published by Science Press, Beijing, China, 2011.

The main contents of the book included chapter I overview of cactus plants, including significance of cultivation, geographical distribution, morphological characteristics (e.g., shape of individual plant, leaf, edge, warts, thorn base, hair, flower shape, flower position, flowering period, flowering age, fruit type and shape), ecological characteristics (e.g., adaptability to

temperature, requirements for daylight, response to water, adaptability to soil) and breeding (e.g., stock breeding, cross breeding, introduction and domestication, nomenclature of hybrids and varieties); chapter II classification system of cactus plants, including the brief history of classification, classification system, the focus and reasons of contention about the classification system of cactus plants, evolutionary trends of classification system (combination school, detailed-classification school and intermediate school); chapter III resources of cactus plant family, including the main morphological features of five subfamilies, 10 tribes, 161 genera (including 32 hybrid genera), 696 species (including 84 hybrid species), 2 subspecies, 180 varieties, 173 variants and 132 breeds, with 388 photos and 12 plates; chapter IV cultivation techniques for cactus plants, including propagation techniques (e.g., cutting, grafting, segmentation, sowing), cultivation techniques (cultivation conditions, planting techniques, post-planting management), plastic arts (technology for potted landscape with cactus plants) and pest control; chapter V exploitation and use of cactus plants, including introduction of cactus culture in Mexico, edible cactus, medicinal cactus, ornamental cactus, cactus planting in barren mountains and deserts, establishing a cactus botanical garden.

This book is abundant in contents and concise in writing with clear illustrations. It would become a good reference for the persons who are engaged in botany, conservation ecology, cactus plant biology, cultivation, classification and breeding, and so on.

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Erratum The Canadian Field-Naturalist 126(4)

In response to the review of *Contributions to the History of Herpetology*. CFN 126(3): 344-345, the book's editor Kraig Adler pointed out (personal communication to FRC 12 May 2013): "Only one small correction. Mrs. Martof used a kitchen knife, not a gun. She told the police she slipped while cutting some pizza. But Bernie was stabbed up under his rib cage several times!"

Erratum The Canadian Field-Naturalist

It has come to our attention that sections of many of the book reviews by Li Dezhi and Qin Aili were copied from sources without attribution. The journal and the authors apologize for this oversight.