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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Walnut Germplasm Resources in China

Edited by: Pei Dong and Lu Xinzheng. 2011. China Forestry Press, c/o Flat 21, 20/F, Acacia Building, 150 Kennedy Road, Wan Chai, Hong Kong. 208 pages. 63.00 USD.

The loss of valuable genetic resources worldwide happens in many plant species in long-term cultivation. After Vavilov first called attention to the potential of crop relatives as a source of novel trait variation for crop improvement, the establishment of modern germplasm banks was motivated, which include inbred lines, land races, open pollinated varieties, wild relatives, cultivars, and other breeding stocks. The primary importance of germplasm banks is that it carries undefined variation that is proving to be a valuable resource for breeders and research scientists in improving plant species, and giving insight into the biology of the plant species. However, until recently, the ability of scientists and researchers to maintain and preserve plant genetic resources was very limited. There are basically two approaches for conservation of plant genetic resources, namely *in situ* and *ex situ*.

Germplasm conservation demands that collection methods initially capture maximum variation and subsequently, conservation and regeneration techniques minimize losses through time. To this effect, plant genetic resources conservation activities comprise of col-

lecting, conservation and management, identification of potentially valuable material by characterization, and evaluation for subsequent use.

Collecting involves gathering samples of a species from populations in the field or natural habitats for conservation. The unit of collection may be seeds or vegetative propagules, depending on the breeding system of the species. Collecting may be easy in species producing small botanic seeds in abundance. However, it becomes problematic when seeds are unavailable or non-viable due to damage of plants by grazing or diseases, large and fleshy seeds that are difficult to transport or where samples are not likely to remain viable during transportation due to remoteness of the collecting site from the genebank. Advances in biotechnology provide useful solutions for collecting such problem species.

The walnut tree is a perennial deciduous fruit tree, with large economic values. It belongs to Juglans and Juglandaceae. Juglans consists of over 20 species distributed in Asia, Europe and the Americas. Five species originated in China, namely *J. regia*, *J. mandshurica*, *J. cathayensis*, *J. sigillata* and *J. hopeiensis*. Two species are widley cultivated, i.e., the common walnut and *J. Sigillata*. The former one widely distributes throughout the north and south of China, and the latter one is mainly distributed in the Southwest area. China is one of the major countries for walnut production. China has a long history for walnut cultivation starting in the Western Han Dynasty, and there have been many treatise about the varieties, distribution, characters, cultivation techniques and economic usage of walnuts published from A.D. 400 onwards. Traditional Chinese medicinal literatures believe that walnut is healthy to man's brains, and the fruit, peel, seed shell, wood and leaves of walnut tree can be used in industry and many other purposes. The nucleoli is nutritious with unique flavor. Walnut is recognized as one of the four famous nuts in the world. Walnut trees can play important roles in afforestation of waste land, soil and water conservation and improving the environment. Walnut has been extensively used by Chinese people for long time. The research on the walnut germplasm resources is of great significance in promotion of walnut production, use and expoitation of walnut resources, and breeding of new excellent varieties.

In China, intensive cultivation of walnut using few productive varieties is causing genetic uniformity, and some genetic resources of walnuts are disappearing at unprecedented rates, which sometimes makes these walnut plantation more vulnerable to pests and environmental stresses. Making better use of a broader range of the walnut's genetic diversity is becoming one optional solution to this problem. Fully using walnut germplasm resources can help scientists bring out more new varieties and increase the genetic diversity of cultivated walnut. The full spectrum of walnut dermplasm should comprise diversity of genetic material contained in traditional varieties, modern cultivars, wild species and other relatives. These resources of genetic diversity provides plant breeders with options to develop, through selection and breeding, new and more productive varieties, that are resistant to virulent pests and diseases and adapted to changing environments.

Using local walnut germplasm resources, walnut breeding in China has made some achievements in the past years, breeding a large number of good varieties and superior clones. With the improvement of living standards of Chinese people, and the recognition of the nutritional value and the medical effects of walnut, the demand for higher quality walnut has been increasing, promoting the development of walnut product and expanding the use and exploitation of walnut resources. Further cultivation of high-yield, strongly-resistant, better-quality and easily-processed walnut varieties is becoming an important goal for walnut breeding in the future of China.

To summarize the research results of walnut germplasm in China and introduce the achievements to more people who are interested in it, the book Walnut Germplasm Resources in China was published by China Forestry Press in 2011. Based on the walnut germplasm resources in 15 provinces or autonomous regions and municipalities of China, the book comprehensively introduced the walnut germplasm resources in China. The book is divided into two parts. The first part introduced the origin, cultivation history and the main usages of walnut, and the outlines of germplasm conditions of the common walnut, pecan and beak walnut. The second part introduced all varieties of the common walnut, pecan and beak walnut, and the geographic distribution of germplasm resources, the biological characteristics and the main features of cultivation. The book is informative, comprehensive and characteristic in both theoretical elucidation and practicality in walnut management. The book would become a good reference for the persons who are engaged in walnut geography, biology, breeding, management and other relevant fields.

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