The Social and Ecological Importance Of Mesquite in Guanajuato

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Among the most important woody plants in Mexico's arid and semi-arid areas are the species from the *Prosopis* genus, popularly known as mesquites. They have been very valuable to humanity since pre-Hispanic times. Used extensively by indigenous groups in Mexico's desert areas, mesquite played an important role in the culture and economy of their peoples.

The mesquite species native to Mexico are characterized by having curved or straight-shaped fruit (pods) and growing like bushes, from two to three meters high, or like trees, from seven to ten meters high, depending on soil conditions and available moisture.[1] Although there are 44 known species of mesquite in the world, only the *Prosopis laevigata* species has been found in Guanajuato.

In the desert areas of the state of Guanajuato, like in other regions with arid climates, the mesquite is a plant from which traditionally, a great many products can be extracted. The pod has high protein and energy content, making it a good food source with which flour is made for human consumption. In some rural communities, the pods, together with the leaves, are used for

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forage for domestic animals including pigs and fowl. The leaves, gum, trunk and pollen of the flowers are used in traditional medicine to treat different maladies including eye and respiratory diseases. The nectar of mesquite flowers is used by some bee-keepers in the region to produce honey of a particularly delicate flavor. The wood is used to make furniture and crafts, fence posts and railroad ties and traditional toys. Mesquite trunks chopped up for firewood and to make charcoal burn very well, making it an important fuel for many rural communities in Guanajuato state.

In addition, mesquite brings ecological benefits to the arid areas of the state of Guanajuato, benefits difficult to measure. They are the habitat of many species of wild fauna, including birds, mammals and reptiles that feed, mate and take refuge there. The *P. laevigata* trees act as climatic regulators by moderating extreme temperatures, increasing moisture levels and lowering wind velocity near them. The plant's roots establish an association with *Rhizobium* bacteria, characterized by its ability to introduce nitrogen into the soil, thus contributing to the tree's optimum development.

In this way, mesquite contributes to improving the microorganism and nutrient content of the soil in arid and semi-arid regions of Guanajuato state, increasing fertility and propitiating the growth of other plant species. Thus, the growth and optimum development of *P. laevigata* trees can represent an important factor for lowering erosion.

Despite the economic and ecologic benefits, appropriate management of mesquite trees does not yet exist in Guanajuato. The spread of agricultural areas and the indiscriminate harvesting of mesquite for its wood and to make firewood and charcoal have fragmented and considerably diminished the state's mesquite forests.

Guanajuato has ranked among the country's first five states in profits from the exploitation of mesquite, carried out in 53 municipalities, among them San Luis de la Paz, Dolores Hidalgo, Comonfort and San Miguel de Allende. In the Adjuntas del Río community of Dolores Hidalgo municipality, for example, around 45 carpentry workshops have been making mesquite furniture for more than 25 years. Each workshop consumes at least one tree a day. Although this activity creates jobs and supports a good many families, it has also been an important factor in the decrease in the number of *P. laevigata* trees in the region.

In addition to excessive logging for sale and to clear the land for agriculture, another problem affects the *P. laevigata* plants in the state. On the tree's leaves grows an epiphytic plant called locally *paixtle* (*Tillandsia recurvata*), which can reach levels of biomass that prevent the trees from photosynthesizing properly, thus reducing their productivity.

Given the social, economic and ecological importance of mesquite in Guanajuato and the increasing deteriora-

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tion of the areas where it grows wild, two of the authors of this article (Frías Hernández and Olalde Portugal) have been doing basic and applied research on Guanajuato mesquite to develop strategies for its conservation and rational use.

Productivity studies in the northern, arid part of the state have shown that rational use of the *P. laevigata* can yield about four times more income than the cultivation of rain-fed corn or beans. In addition, the sustainable use of mesquite prevents the environmental deterioration caused by bean and corn cultivation, averting the adverse effects on the soil, water and other wild vegetation. Also, selective and regenerative pruning of *P. laevigata* makes it possible to obtain firewood and fodder without damaging the tree, at the same time that it is the best treatment for the damage caused by the *paixtle*.[2]

Recently, the study of mesquite has intensified in order to design strategies for conservation and its rational use. The studies have improved our knowledge of other flora associated with mesquite,[3] the composition of soil microorganisms associated with it[4] and the nutritional value of its pods.[5]

Currently, our working team is interested in studying the genetics of *P. laevigata* in order to evaluate its genetic diversity in the state and see which varieties are most endangered. The studies will also make it possible to select individual specimens resistent to different factors of environmental stress that would be more likely to survive reforestation.

We only hope that time and deterioration do not defeat us in the battle to conserve this important, beautiful species of our region. VM

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Notes

[1] S.A. Galindo and E. García Moya, "Usos del mezquite (*Prosopis laevigata*) en el antiplano potosino," *Agrociencia*, vol. 1 (2) (Chapingo, Mexico), 1991, pp. 57-62.

[2] J.T. Frías Hernández, J.J. Peña Cabriales and J. Ocampo, "Comparación de dos metodologías de remoción de leña en árboles de mezquite (*Prosopis laevigata*) en zonas áridas de Guanajuato," *Manejo de Pastizales*, vol. 6, no. 1 (Mexico City), pp. 1-8.

[3] José L. Flores Flores et al., "Características de la vegetación herbácea en una comunidad semiárida dominada por mezquite (*Prosopis laevigata* [Humb. & Bonpl. Ex. Wild] M.C. Johnst)," Juan T. Frías Hernández, Víctor Olalde Portugal and Vernon Carter, eds., *El mezquite: árbol de usos múltiples* (*Estado actual del conocimiento en México*) (Mexico City: Jaime Editores, 2000), pp. 81-107.

[4] Víctor Olalde Portugal, Juan Frías Hernández et al., "Caracterización microbiológica de suelos de islas de fertilidad de mezquite (*Prosopis laevigata* [Humb. & Bonpl. Ex. Wild] M.C. Johnst) en ambientes semiáridos," ibid., pp. 95-108.

[5] Fernando Ramírez Saldaña, Juan T. Frías Hernández et al., "Caracterización proteica de la vaina de mezquite (*Prosopis laevigata* [Humb. & Bonpl. Ex. Wild] M.C. Johnst)," ibid., pp. 153-160.

ERRATA
In our last issue, number 56, on page 105, we mistakenly printed a photograph that was not of the Santa Rosa Forest.