Maligned Mesquite

by Sande Martin

“Mesquite is a trash tree.” “It is hard to get rid of.” Does anyone plant a mesquite on purpose? My husband did, near the house, his studio and along the walking trail on 1 ½ acres. That was thirty years ago. At that time it was rare to find a small mesquite tree at nurseries and flea markets. I was resistant. I had heard rancher complaints and seen abandoned land, filled with small multi-trunk mesquites and cactus. I didn’t want a tree full of bugs near the house or a million sprouting mesquite trees filling up our property. My husband managed to find some small trees and planted them.

Now, I’m in love. Those trees are large single trunk trees with branches that gracefully twist and turn. I walk underneath those branches that cross the walking trail in many places. Somehow, I feel more protected as I walk alone under those branches at dawn, when it rains and especially at night when I see their silhouettes.

I have come to appreciate how well mesquite (Prosopis) has adapted to an arid environment. Mesquite is found in dry subtropical regions of North and South America, Africa and Asia. Three species are native to Asia and only one to Africa. Nine species are found in North America and the remaining thirty-one are in South America. The origin of mesquite is thought to be in South America. Honey mesquite (Prosopis glandulosa), dominant in Texas, has developed an efficient system of acquiring and retaining water in arid and semiarid environments. Complex adaptations have enabled the successful establishment of flowers, seeds and, most important, seedlings in a detrimental climate. Through their survival, opportunities
have arisen for other plants, insects and vertebrates to occupy a hostile territory. A complex, interweaving relationship developed between tree, grasses, shrubs, insects, reptiles, birds and mammals.

Because of limited, changing water resources, the drooping branches or trunk of a mesquite are crooked. Mesquite is a hard wood that is resistant to termites and decay. The wood is premium for barbequing because it burns slow and hot, and adds a delicious flavor. Although most mesquite have spines that are up to two inches long, some do not have spines. Native Americans used the spines for sewing needles. Leaves were made into a tea to treat eye infections. Gum in mesquite heartwood eventually travels to the center of the stem. In old, wounded trees the gum is thick and black. Native Americans used the sap to treat lice and it also dyed hair black. Inconspicuous yellow-green flowers of most species are on a long, 3 inches or more, flower stem. Native Americans ate the flowers. Some species produce a small round-ball collection of flowers. Seeds are located in pods called legumes. Green legumes can be cooked down to make a syrup. Dry legumes are ground into a meal and when mixed with flour will add a nutty taste to baked goods.

The primary obstacle of arid or semiarid regions is the acquisition and retention of water. Mesquites are deciduous. The shedding of foliage is a mechanism for conserving water. In southwestern United States, leaves are lost during dry, cold winters. In adequate winter precipitation of South Texas, leaves will remain and are shed only upon emergence of new spring leaves. This has changed given the drought the Rio Grande Valley has experienced in the last decade. The lacy leaflets’ small size and their arrangement reduce the heat load. The desert sun would destroy a large leaf herbaceous plant. The heat load and loss of water would be too great for survival. The variation of South and North American mesquite species occurs as the climate becomes drier. Leaves become smaller and fruits are narrower and thinner with decreasing moisture. The leaf surface is covered with a waxy covering which helps in protecting it from moisture loss.

Mesquite rely on a shallow lateral root system when adequate moisture is available. In drought conditions, a deep tap root is utilized. The lateral root of honey mesquite has been recorded at 54 feet and the tap root at 150 feet. Seedlings have prominent primary growth in the tap root. This tap root growth greatly exceeds stem growth, indicating the importance of establishing an adequate water resource. An efficient two-root system does not ensure mesquite immunity to extreme drought. A long record-breaking drought in 1950-56 eliminated or vastly thinned the population of mesquite in southwestern United States.

The mesquite modifies the extreme environment of the desert into a more hospitable one for animals and plants. Annuals and herbaceous perennials are sheltered from the sun, soil drought and from grazing animals. Plant diversity occurs, providing a food source for desert scrub animals. Leaf litter from the mesquite adds organic matter to the soil. Within this litter live soil animals, such as the millipede. These animals aerate the soil, incorporating the organic materials. Jackrabbits and cottontails, whose diet depends upon mesquite, deposit partly chewed fresh leaves into the soil. This material decomposes at a faster rate than if it was untreated. Nutrients which originated from the mesquite are recycled back to the mesquite or to other plants which grow beneath it. Fertile soil, greater moisture and shade protection creates an environment more conducive to herbaceous plant growth. Some perennial grasses have adapted to shade. Mesquite trees allow a greater plant diversity to occur; therefore, it provides a food source for a larger diversity of desert herbivores.
The Martin's mesquite grove (left) in winter, and walking trail under a majestic mesquite (below).
There is pipecolic acid found in mesquite leaves that is a toxic alkaloid. For grazing vertebrates, such as cattle, a restricted diet of mesquite leaves would cause illness or death. Some invertebrates, the insects, feed exclusively on mesquite. These insects are specialists, consuming only one species of plant. The pipecolic acids are incorporated into their bodies and are utilized as a defensive toxin against predators. Insects that feed on a wide spectrum of plants prefer mature leaves that have lower alkaloid content, and also have a lower nutrient value. It would appear that these insects do not have detoxification mechanisms that the specialists have evolved and therefore cannot utilize the best food source. The mesquite leaves chemical defense protects it from most herbivores. The specialized insects have adapted an advantageous defense system of incorporation and utilization of pipecolic acids.

Most mesquite species will bloom two times a year. In West Texas honey mesquite blooms four times a year. Heavy flowering and fruiting occurs with low soil moisture. Mesquites lose leaves during dry seasons and produce just enough fruit that can compete for limited water. Flowering and production of mature fruits is an unfailing occurrence, even in drought years. Flowering or fruiting is not as dependable in other plant species of the desert scrub or grassland ecosystem. Mesquite is the most dependable source of food in the desert.

The predictability of mesquite flowering has assured specialization of many species of bees. Fresh pollen and nectar are presented every day by the individual opening of a flower on an inflorescence. There are no physical barriers preventing access to nectar. The florets are accessible to flower feeders with different ranges of size and mouthparts. Pollen is dispersed by insects and is extremely accessible. Mesquite pollen reflects ultraviolet light. The short wavelength of light appears as bright dots to bees. Hummingbirds and flycatchers hover around mesquite trees catching the flying insects that are attracted to the flowers. Flowers are mating sites for seed beetles, flies, moths, and wasps.

A mature tree is capable of annually producing about 140,000 seeds. The abundant number of seed crop insuresthat some will survive the vast predation by invertebrates and vertebrates. Unlike most members of the Leguminosae family, mesquite legumes do not split open at maturity. These legumes are nontoxic to vertebrates or invertebrates. If there were defense toxins in the legume, as is found in the leaves, there could be no vertebrate dispersal that is essential for maintaining the species. Seedlings cannot tolerate shade. If seeds germinated under the parent plant, there would be no offspring. Shade intolerance and competition of water resources in arid areas would make it unlikely that a seedling could survive under its parent. It is essential that germination take place away from the parent. Distant dispersal is obtained by vertebrate ingestion and defecation.

Three layers protect the mesquite pod from predation and long, dry periods. The pod is a one-celled capsule with many seeds, lying in a row. In arid areas, the extra layer prevents rapid drying out in seed development and during germination. The outer covering is thin and leathery. The lack of cracks or crevices in the outer layer prevents insects from consuming or laying eggs upon the seed. The second layer is often sweet with a high level of sugar or starch. The sweet, spongy layer is highly attractive to vertebrate herbivores. In Texas, the honey mesquite legumes contain 19 percent sugar and 13 percent protein. The third layer protects the seed from water. Seeds may be viable in the soil for a long period of time. Mesquite leaves, seeds and bark provide wildlife food for many animals: armadillo, fox, quail, white-winged dove, ground squirrel, coyote, skunk,
jack-rabbit, cottontail and white-tailed and mule deer.

Cattle are the principal herbivores responsible for the rapid mesquite colonization of natural grassland. Over 130 years of overgrazing practices has removed native grass competitors and allowed mesquite to enter new niches. Areas that were open grasslands of Argentina, Australia and southwestern United States have been replaced by mesquite. Mesquite has become an invasive plant. Man’s attempt to control by fire, or by cutting, have turned single trunked trees into multi-trunked trees. A tree can regenerate from a stump or a root six inches below ground level. Dense thickets have been formed by trampling cattle or by man’s intervention.

The mesquite's two-root system and its leaf, fruit and seed structures are successful adaptations to limited water resources and hot climates. Leaves that are toxic and fruit that is nontoxic are devices that protect necessary food production and reproduction. The attraction of insects to flowers and vertebrates to legumes guarantees pollination and seed dispersal. Dependence upon mesquite as a source of food ensures that mesquite will continue to fruit and propagate. The relationship of species within a natural arid ecosystem indicates a system that is intricate and balanced.

Someone told me years ago that if you did not know the name of a particular bird, it did not exist. I remember identifying a Kiskadee and later seeing another that I correctly identified. Thereafter, I never saw so many Kiskadees and still do. That also became true for plants. Understanding the complexities of mesquites has made me more aware and appreciative of the life on and around the trees. And, I had to tell my husband that he did the right thing by planting those mesquites many years ago.

Sande Martin is a retired science teacher, Board member of NPP, and tireless advocate for planting natives.

Honey Mesquite flowers visited by the ever present honey bee.
Nature Happenings Lower Rio Grande Valley, Texas

For a comprehensive calendar of Nature Happenings go to RGV Nature Coalition at www.rgvnaturecoalition.org Scroll down to and click on Nature Events Calendar on right side. **The following have guided walks and programs about Valley nature and wildlife:**

- **Edinburg Scenic Wetlands and World Birding Center**  (956) 381-9922
- **Quinta Mazatlan - McAllen Wing of the World Birding Center**  (956) 688-3370
- **Bentsen Rio Grande Valley State Park WBC**  (956) 584-9156
- **Santa Ana NWR** has Nature Tram rides at 9:30, 12 noon, 2:00  (956) 784-7500
- **Valley Nature Center**  (956) 969-2475 301 S. Border Ave., Weslaco, TX.
- **Estero Llano Grande State Park WBC**  (956) 565-3919 FM 1015, Weslaco, TX.
- **Valley Proud Environmental Council** (956) 412-8004 3 new planting guides available; vpec@sbcglobal.net or visit www.valleyproud.org.

*Have you seen a really big tree in the Valley? For details on registering and measuring go to: texasforestservice.tamu.edu/main/article.aspx?id=1336*

**NPP will be selling Mike Heep’s plants at the RGV Home and Garden Show** held at the new McAllen Convention Center off Ware Road on **March 27 (3-8 pm), 28 (10-6 pm) and 29 (11-6 pm)**. The many varieties of healthy plants in one gallon pots are all native to the RGV and thrive under our conditions. Plants will sell for $6.50 each or at a discounted price of $5.00 if you purchase 5 or more. If you have any questions about growing native plants, now is the time to stop by and get the answers at the NPP booth.

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The Sabal is the Newsletter of the Native Plant Project and conveys information on the native habitat, and environment of the Lower Rio Grande Valley Texas. Co-editors: Gene Lester and Eleanor Mosimann. You are invited to submit articles for *The Sabal*. They can be brief or long. Articles may be edited for length and clarity. Black and white line drawings -- and colored photos or drawings -- with or without accompanying text are encouraged. We will acknowledge all submissions. Please send them, preferable in electronic form - either Word or WordPerfect - to: Native Plant Project, P.O. Box 2742, San Juan, TX 78589 or contact Gene Lester @ 956-682-0549, or g-el1951@sbcglobal.net

See *The Sabal* and our 5 handbooks on our website: www.nativeplantproject.org

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**Native Plant Project Annual Membership Application Form**

___Regular $15 per year ___ Contributing $35 per year _____ Lifelong $250 one time fee per individual. Members are advised of meetings, field trips, and other activities through *The Sabal*. Dues are paid on a calendar year basis. Send checks to Native Plant Project, P.O. Box 2742, San Juan, Texas 78589.

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Comments/ suggestions/ speaker recommendations should be sent to: Native Plant Project, P.O. Box 2742, San Juan, TX 78589 or contact G. Lester (956)-682-0549; g-el1951@sbcglobal.net
Native Plant Project Meetings – March 24, 2009. **Board meeting** at 6:30 p.m.; **General meeting** at 7:30 p.m. **Ann Vacek**, Board member and past secretary of NPP, will present the annual Valley Wildflowers program. Although this has been a dry year and our roadsides are not as full of beauty as we have come to expect, Ann will show us gorgeous photos from years past and what we can again look forward to when the rains return.

**Board and General Meetings 2009:**

2009: January 27 February 24 March 24 April 28 May 26
September 22 October 27 November 24

**SUMMARY OF THE MINUTES OF THE BOARD MEETING – Feb. 24, 2009**

The NPP will have a booth at the RGV Home and Garden Show on March 27, 28 and 29 at the new McAllen Convention Center on Ware Road. We will sell plants and our handbooks, and also offer a free one-gallon plant with a new membership. In other news, a committee has been formed to work on a new handbook, “Landscaping with Native Plants”.

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