

The Agaves

by John Moore

Agaves are in the family *Liliaceae*. Some authors put them in the family *Amaryllidaceae* if the ovary is inferior or in the *Liliaceae* if the ovary is superior. *Agave americana* was the first described species by *Linnaeus* in 1753 and probably the first to flower in Europe in an Italian garden.

Agaves include some 200-250 species. Central Mexico is the center of diversity. Mexico has more than 125 species while the U.S. has only 15 species. The rest are distributed through Central America, Baja California and the Caribbean basin. *Agave pumila* is only a few inches across and weighs less than a pound while *Agave atrovirens* can weigh over 2 tons and be 24 foot across. Each leaf may weigh more than 100 pounds.

The Genus *agave* is divided into two subgenera. *Littaea*, which has spicate inflorescence and *Agave*, which has paniculate inflorescence. Howard Scott Gentry published a monograph on the agaves in 1982 based solidly on the floral characteristics. The flowers are perfect and tube-like. They have six stamens and six tepals (3 petals and 3 sepals that are hard to tell apart). There is a three parted style and a three celled ovary. In the flowers the stamens ripen first and after the pollen is released then the stigma elongates and is ready to receive pollen. The flowers are pollinated by insects, bats or birds. The fruit is a dry capsule that splits longitudinally to release many seeds.

Most agaves, but not all, are monocarpic; that is the individual rosettes die after flowering. but in a few, like *Agave parviflora* the rosette lives on.

Agave leaves are hard or rigid with many fibers inside. *Agave sisalana* has very strong fibers and is grown in Tanzania, Indonesia, Brazil, and the Philippines for its fibers. The leaves of many have sharp teeth along the sides and almost all have a rigid, sharp terminal spine. There may be twenty to two hundred leaves in a rosette and they have special cells for water and food storage. Leaf color ranges from a bright green to dull gray-blue. Leaves live 12-15 years, often the entire life of the plant. All of the water storage and energy storage of the plant is in the leaves.

The stems of agaves are usually short, but rhizomes are common and buds along the rhizomes form colonies. Agave roots are fibrous in nature and new roots form very quickly after a rainfall.

Bloom stalks may range from six feet in small species to more than forty feet in large ones. Flowering occurs from bottom to top and may last for two months. The flowers, which are very rich in nectar and pollen, are pollinated by humming birds, other birds, bats, bees, moths and other insects. Musky smelling flowers probably attract bats, while sweet smelling flowers attract the insects.

Agaves grow where temperatures regularly exceed 106°F and where winter lows reach -15°F. They occur from sea level to mountains over 8,000 feet.

Agaves were used as a food source as long ago as 1,000 AD. They were grown on terraced hillsides. The leaves were cut away and the large heads were placed in roasting pits. The buds and flowers of agaves can also be eaten raw or cooked. Agaves were outranked as important plants by the Aztecs, Mayans and other Indians of Mexico only by corn and potatoes. Agaves have been used for: food, drink, soap, clothing, rope and other fibers, needles and thread, paper, glue, weapons, military instruments, medicines, red coloring matter, forage, and ornamental and hedge plants.

Pulque, a mildly alcoholic beverage, is made from agaves, principally *A. salmiana*, *A. salmiana*, *A. atrovirens*, *A. hookeri* and *A. americana*. Mescal is a distilled agave beverage, Tequila is mescal made in the state of Jalisco near the town of Tequila. By law that's the only mescal that can be called tequila.

Agave plants propagate by seeds, offsets or suckers and by bulbils. A particular species may propagate by one, two, or all three methods.

The agaves have a relatively small root system and do well in containers. The soil should not be too rich and should have excellent drainage. Agaves should be planted a little high with all leaves above the lip of the container. Agaves can be slightly under potted to keep them smaller. Agave roots can be trimmed before repotting and allowed to dry for a few days. Or they can be planted in a dry mix and watered a week later. Container grown plants are about half the size of plants grown in the ground. Potted agaves can be grown in partial shade as the pots dry out more quickly. They should be grown quite dry in the winter.

Agaves are easily grown from seed which remains viable for up to five years or longer if frozen. Seeds germinate in one to three weeks. Germination is faster at warmer temperatures, above 80°F. Seedlings should be grown in strong but indirect light. It should be noted that agave species hybridize very easily and can be very difficult determining if the seed is pure.

Pests of agaves include rabbits and jackrabbits. The agave snout weevil, a one inch black insect, lays eggs at the base of a leaf, usually once the plant is getting ready to bloom. A sudden wilting of leaves is usually the first sign of infection. Fungal infections caused by wet weather or overwatering can also occur. Fungicides will usually correct this problem if watering is reduced.

APPROXIMATE COLD TOLERANCES OF SELECTED SPECIES

- A. cerulata* 10°F
- A. havardiana* -10°F
- A. lechuguilla* 0°F
- A. lophantha* 10°F
- A. murpheyi* 10°F
- A. neomexicana* -20°F
- A. palmeri* 10°F
- A. parryi* -20°F
- A. parryi var. couesii* 0°F
- A. parviflora* 10°F
- A. salmiana* 5°F
- A. scabra* 10°F
- A. schottii* 10°F
- A. toumeyana* 10°F
- A. utahensis* -10°F
- A. utahensis var. eborispina* -10
- A. utahensis var. kaibabensis* -10°F
- A. utahensis var. nevadensis* 0°F
- A victoriae-reginae* 10°F
- A. weberi* 12°F

Reference:

Agaves and Yuccas, A Gardeners Guide, by Mary and Gary Irish, Timber Press Portland Oregon, 2000. \$34.95