

Soaptree Yucca

(Family Agavaceae, *Yucca elata*)

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Recognition. These yuccas are recognized by their overall physical appearance. Young specimens grow as a rosette composed of narrow leaves. The leaves are up to 2.5 feet in length, yellowish green, have threadlike fine fibers along the white margins and a sharp spine at the terminal end of each. The rosette arrangement of the leaves channels moisture to the center of the plants. As the yuccas grow, a fibrous trunk raises the rosette of leaves progressively upwards. New leaves are vertical and are encased within the center of the rosette of more mature leaves. As each leaf grows it assumes an acute angle to the stem and then over time becomes horizontal or slightly drooping in position. Older leaves gradually point increasingly downward. Dead leaves remain on the trunks for many years. Mature Soaptree Yuccas are erect in form and may have trunks as high as 20 feet and with 5 foot long flower stalks. These plants often occur in clonal clusters that are the result of vegetative reproduction. The evergreen leaves radiate outwards from the tops of the trunks. Mature specimens may have trunks that branch at the top and produce several rosettes of leaves. From approximately May into July, the yuccas have upright flower stalks that Arizona long as approximately 5 feet and whose ends have a dense cluster of flowers. The creamy white colored flowers are bell shaped and up to approximately 2 inches in length. The flowers give way to approximately 2 inches long brown colored seed capsules that each has three interior cells.

In her 2006 analysis of the plants of SPRNCA, Makings listed Soaptree Yuccas as common. She also provided a photograph of a hybrid between the Banana Yucca (*Yucca baccata*) and the Sierra Madre Yucca (*Yucca madrensis*). Makings listed the hybrid as infrequent within SPRNCA, collected in the Hereford area, and characterized Soaptree Yucca as common in SPRNCA. The hybrids differ from Soaptree Yuccas by being shorter in form (trunks only reaching approximately 8 feet long), having thicker and more succulent leaves that do not have a spine at the tip of each, and a much shorter flower stalk. The hybrid also flowers earlier, producing flowers from April to May versus the May to July flowers of Soaptree Yucca. Makings did not describe the fruit of the yucca, but both of the species that comprise the rare hybrids have fleshy banana like fruits in contrast to the woody capsules of Soaptree Yuccas.

Geographical Distribution. Soaptree Yucca occurs in southeastern Nevada, central and southern Arizona, southern New Mexico, western Texas, and Coahuila and Chihuahua, Mexico. It occurs in habitats such as desert scrub communities and semi-desert grasslands. It is one of the few plants able to survive on sand dunes. Soaptree Yucca is common in many places within SPRNCA.

Uses by Humans or Their Domestic Animals. Food uses by Native Americans included: boiling the flowers and eating them as vegetables; cooking the flowers in soups or stews; cooking the trunks in pits and then pounding them into flour or drying and storing them for future food use; cooking young stalks, peeling them and eating them while hot. Other uses included: weaving the leaves into trays or baskets; using fibers from the leaves to make ropes; using leaves to form a head shade for a cradleboard; weaving leaves into mats; using the red roots for basket decorations; using the roots for soap; and using the leaves to make a fastening loop for sandals. Wislizenus reported in 1848 that the wood of the Soaptree Yucca was too porous and spongy to be very useful but that poor people in northern Mexico built their huts entirely from this plant. The accumulated dead leaves on the trunks of the yuccas burn well, and cowboys or travelers often fired them to briefly acquire a warming place.



Young Soaptree Yucca.



Soaptree Yucca with flower stalks.



Soaptree Yucca flowers.



Leaves in rosette. Note the many whitish fibers.

Cattle readily eat the Soaptree Yucca flowers and the fresh tender flower stalks. Cows will even push over the trunks of tall yuccas to get at the flowering stalks and flowers. When other food is limited, cattle learn to feed on the green leaves by chewing them outward from the stem to avoid the sharp ends. Studies have shown that some cattle during the spring prefer the Soaptree Yucca flowers and developing flower stalks over other foods. Some of these cattle were adept at locating and cropping the developing flower stalks and spent

most of their grazing time searching for them. Cattle would sometimes fight for the flowers and flower stalks and if necessary would stand on their hind legs to reach them.



Soaptree Yucca seed capsules

Ranchers have used Soaptree Yuccas as emergency food for cattle. By approximately 1900, much of the rangelands in the southwestern US had been stocked to a level where periodic droughts resulted in insufficient feed for cattle. Ranchers tried processing various native plants to make them more palatable to cattle. By the early part of the 20th century, Soaptree Yucca was the most frequently used such emergency food. People initially harvested and chopped these plants into small pieces with hand axes. This process was tedious and required one person for every 40 cows. Moreover, hand chopping often produced pieces that were too large and resulted in cows choking while attempting to swallow them. By approximately 1918, several specially designed machines were available for converting Soaptree Yucca stems to fodder. (Photos of Soaptree Yucca harvesting and conversion to fodder are in the 1990 paper by Wood et al.)

Pollination Biology. Scientists have been intrigued for more than a century by the complex pollination biology of yuccas, including Soaptree Yuccas. These plants depend upon female yucca moths for pollination. The moths emerge from pupation chamber at the base of yucca plants and mate. The females then use specialized tentacle like mouthparts to collect pollen from a Soaptree Yucca and afterwards fly to flowers on a different stalk. The females lay their eggs in the ovary of a newly opened flower. They then use their specialized mouthparts to pack the pollen down into a cavity on the female part of the flower. The Soaptree Yucca flowers will only produce seeds if pollen is packed into that cavity. The moth larvae feed only on yucca seeds and therefore only have food if the female packs the pollen into the appropriate cavity. The yucca moth larvae don't

eat all of the seeds, and both the moth and the yucca depend on each other for sexual reproduction. If the Yucca moth lays too many eggs, the extra weight may result in the yucca shedding the flower.

Scientists are studying how Soaptree Yuccas and other yuccas defend themselves against "cheaters" moths. Two cheaters species have evolved from the moths that pollinate yuccas. The cheater moths have lost the tentacles that are used for pollination, emerge later than the pollinators, and lay their eggs directly into the fruit of yuccas. The cheaters do not pollinate the yuccas and thus depend completely on their pollinating relatives for reproduction. The cheaters exploit the fact that five days after successful pollination, the addition of excessive numbers of eggs no longer causes the flower to drop off. Biologists still don't understand all of the defense mechanisms used by yuccas. However, some studies suggest that the defense mechanisms may involve highly variable timing of fruit production and the fact that abortion rates of developing fruits is high, even for those without too many moth eggs. This high abortion rate may favor risk spreading strategies of egg laying in which the female deposits eggs into several flowers rather than into a single one.

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