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Spanish Moss and Ball Moss [1]

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Spanish moss *(Tillandsia usneoides)* and ball moss *(T. recurvata)* are common elements of the Florida landscape. They are two of Florida's native members of the Bromeliaceae, also known as the pineapple family. This family includes species as diverse as pineapples, Spanish moss and a carnivorous relative native to Australia. Bromeliads are members of the plant division Magnoliophyta--the flowering plants. While most Floridians are at least vaguely familiar with Spanish moss, many have never seen it flower and may be surprised at the beauty of its delicate blossom. Of course, the fact that both Spanish moss and ball moss produce flowers is proof that they are not truly mosses at all.

This fact sheet will help the reader to distinguish between the two common *Tillandsias* . It also provides basic information on the biology and ecology of these fascinating plants and provides recommendations for their management in the home landscape.

Bromeliads

Like almost all members of the Bromeliaceae, Spanish moss and ball moss are perennial herbs. This means they do not have permanent woody stems above ground, but that individual plants persist for years and will reproduce without human intervention. Like many other bromeliads, these plants are epiphytes or "air plants". This indicates that they do not require soil to root in, but can survive and thrive growing above the ground hanging on branches of trees or other structures. They are not parasites. Without soil as a source of nutrients, these plants have evolved the capacity to make use of minerals dissolved in the water which flows across leaves and down branches.

Spanish moss plants appear to vary in mineral content and it has been proven that they gain a significant portion of their nutrients from stem run-off from the trees on which they are anchored.

The native ranges of Spanish moss and ball moss include the entire state of Florida. Ball moss can be found along the margins of new world continents from the southern U.S. to central Argentina.

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Spanish moss grows as far north as Virginia. It is believed to have evolved in the Peruvian Andes and can be found growing as far south as Argentina and Chile. This gives it the broadest natural geographic range of any bromeliad.

Tillandsia Biology

The genus *Tillandsia* is one of three sub-families of the Bromeliaceae family. The leaves of all *Tillandsias* are entire--they have no spines on the edges of the leaves. There are some 500 recognized species of *Tillandsia* , as well as many cultivated hybrids. All these species have scales on their leaves. These scales, also known as trichomes, help the plants to capture and conserve water and are critical to their survival in most climates.

Under natural conditions, moisture content of the atmosphere surrounding Spanish moss and ball moss varies greatly. Rather than absorbing water through roots, they absorb moisture through the scales of the leaves. These scales act as pumps, drawing moisture from the outside of the plant into its interior, allowing the capture of water and the minerals dissolved in it.

While both species will grow on wires, fences and other non-living structures, they are particularly well- adapted to growth on trees. There is some evidence that Spanish moss grows better on dead trees than on live ones. This may be due to its preference for well lighted, but moist habitats. Research on ball moss conducted in Argentina, indicated that it can cause significant shade competition and limb breakage when present in great numbers on host trees. Heavy infestations of Spanish moss may lead to the same results, but before homeowners rush out to eradicate these picturesque plants from their trees, they should recognize the ecological significance of these "epiphytic weeds".

Spanish moss, **Figure 1 ,** which prefers well-lighted but moist habitats, is commonly found near rivers, ponds and lakes. It will also grow away from wetlands if humidity is fairly high. It is found on both broadleaf and needle-leaf trees, deciduous trees and evergreens. It is common in Florida on hackberry and live oak trees, since these trees have more nearly horizontal branches than many other species. Characteristics of preferred host trees include: significant branching, resulting in many forks; rough bark with fissures or scales to capture and hold seeds or fragments of stem; thick permanent (non-exfoliating) bark; lack of allelopathic substances. The latter factor is the reason camphor trees appear to resist infestation. Many tropical trees release chemicals which make conditions unfavorable for growth of young *Tillandsias* .

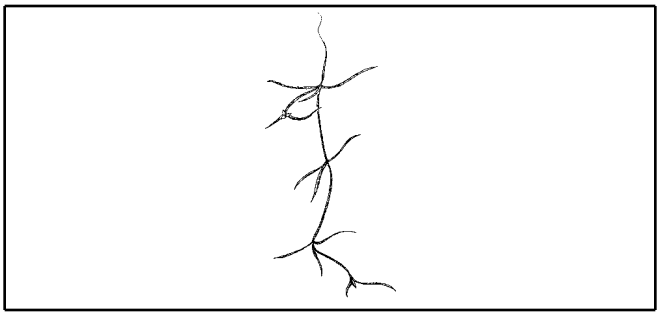

Figure 1.

Greener plants are indicative of a healthier environment. Festoons of gray Spanish moss may not be healthy or may be suffering from moisture stress or other environmental factors. A careful inspection of a heavy festoon of moss will reveal that individual plants are usually only 15 to 20 centimeters in length. While plants do occasionally reach lengths of 45 centimeters, the apparent length is the result of numerous plants overlapping each other. The living portion is that which is covered by the grey-green scales which superficially resemble foam-rubber. Dead portions of the plant look like black horsehair. Like horsehair, they were once used to stuff furniture and automobile seats. The "hair' is actually a primitive vascular system.

A single strand of Spanish moss, laid on a flat surface, will reveal its scorpoid dichotomous growth pattern. This pattern is the result of alternate branching of the plant at each growth point or node. The plant forks at each node. At the first, the branch on one side will elongate and a few short leaves will appear. At the next node, the opposite branch will elongate, resulting in a zigzagging pattern. The length of the distance between nodes appears to be an indicator of the plants' response to its habitat.

The plant reproduces both by seeds and by vegetative growth. When small pieces of the plant are

broken off and moved (usually by wind or animals) to another appropriate growth site, they will begin to grow into new plants. Dissemination of Spanish moss through vegetative reproduction is greatly accelerated by violent storms. Seeds appear to disperse between December and March. While little is known about conditions necessary for germination, the seeds do germinate and become fixed to their new growth site after being distributed by the wind. Small non-absorbing root-like hold-fasts help the seed to anchor, but quickly dry up as the plant grows at its terminal end and dies back at its root end.

Flowers appear in spring on the terminal ends of Spanish moss strands. Flowers in most bromeliads are terminal. They may appear to be on side strands, but once a strand flowers, a new branch is formed at the node above, sending growth responses along an alternate path which had only supported a simple leaf. Flowers blossom in April in Florida, usually a single flower on each plant. The yellow-green blossoms are relatively inconspicuous, but have a pleasant, subtle fragrance when many are massed together. Flowers last about four days and are followed by development of a seed capsule. These capsules open the following December or January, releasing 2 to 23 seeds. Each seed has a mass of hairs which function as a parachute. The hairs are covered with tiny barbs, enabling the seed to catch and anchor on appropriate substrates.

Ball moss, **Figure 2** , exhibits many of the same *Tillandsia* characteristics, including absorbing scales and entire margins. Unlike the pendent Spanish moss, however, ball moss exhibits a highly compact growth form. The stiff, narrow, pointed, green-grey leaves arise from the central mass of the plant curving outward. They are covered with trichomes which give the plant a somewhat spongy appearance. Individual plants generally measure between 15 and 18 centimeters in diameter, although larger masses of multiple plants are frequently encountered.

Ball moss flowers are a more conspicuous blue-to-violet. They appear in spring on a long stem emerging from the central mass of the "ball" of leaves. Examination of "balls" which have fallen to the ground will often provide an opportunity to see the seed capsule. Like seeds of Spanish moss, these

Figure 2.

seeds are wind-dispersed. The structure of ball moss is a compact mass of stiff leaves arising from a central core.

Ecological Relationships

Both *Tillandsias* , as mentioned above, are part of the image of Florida. Masses of ball moss, like beads on a giant necklace, can be seen on telephone wires stretched across streets and highways in southern Florida where the humidity allows survival in such exposed areas. Spanish moss, on live and dead trees and fences is part of the image of the South. Although the ecological significance of ball moss is still to be examined, Spanish moss serves a variety of ecological roles.

Many animals use Spanish moss for protection, taking cover in thick masses of pendent strands. Many insects and other invertebrates hide in moss masses, making it an unlikely choice for bedding by campers. The prevalence of "red bugs" or chiggers in the plant is legendary. Spiders, thrips, and dozens of other insects hide in the moss as well. This abundance of invertebrates may or may not be the reason that at least two species of bats also use festoons of Spanish moss for cover. Both red bats and pipistrelles use masses of Spanish moss as day-time resting sites.

Spanish moss is also a significant component of the nests of several species of birds: namely the parula warbler (*Parula Americana*) and the Baltimore oriole (*Icterus galbula*). While many other species of birds may use strands of moss in their nest building, when these two species nest in the Southeast, Spanish moss is the major constituent of nests, being woven into hanging sacs to hold eggs and young.

Ball moss has not been studied as intensively as Spanish moss and so evidence of its ecological significance is lacking. Still, it represents another strand in the web of life, contributing to biological diversity. In South America, concerns have been raised about its negative effects on many forest and urban trees. There is no doubt that heavily laden branches do shade lower vegetation and intercept light needed for photosynthesis. Also, branch breakage does occur. Fortunately, such heavy infestations are not too common in Florida.

Management

Chemical control of *Tillandsia* is possible. As of 1996, the following materials are licensed for control of Spanish moss and/or ball moss: TC Tribasic Copper Sulphate, Blue Shield, Basic Copper 53, Micro Flo Basic Copper 53, Micro Flo Copper 3 FL. It should be noted that there is evidence that copper-based herbicides and fungicides may cause damage to tender growth on oak trees. As with all herbicides, when using these materials read and follow label directions carefully.

Hand removal of Spanish moss is possible and can be done successfully on small trees by standing on a ladder or using a pole. For larger trees, a basket-truck or "cherry-picker" is usually necessary. The procedure is labor intensive and costly. Homeowners would be well advised to consider the ecological benefits of Spanish moss and let the plant grow unless heavy infestation is endangering the health of the tree through reduced light. In such cases, hand removal of the denser festoons coupled with judicious pruning of light-suppressed branches will usually restore the tree to a more attractive and healthier condition. Hand removal of ball moss is possible as well. Use caution, as tearing out of firmly attached clumps may damage twigs, opening the way for secondary infection by fungi or insects.

To obtain a deeper understanding of these plants and their relatives, consult *Tillandsia: The World's Most Unusual Air Plants* by Paul Isley III, published by The Botanical Press, 1987.