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Contributors

Coleridge A. Braithwaite, Professor of Fine Arts

Blanton E. Black, Assistant Professor of Social Science

Madeline G. Harrison, Catalogue Librarian and Assistant Professor

Elonnie J. Josey, Librarian and Associate Professor

Zelia E. Owens, Nursery School Director and Instructor in Home Economics

Margaret C. Robinson, Instructor in Biology

W. H. M. Bowens, Assistant Professor of Business Administration

Luetta B. Colvin Upshur, Assistant Professor of English

Velma V. Watters, Assistant Professor of Education

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Ecological and Economical Aspects of Spanish Moss

by

Margaret C. Robinson

The Spanish Moss, Dendropogon usneoides (L.), is a widely distributed epiphyte (air-plant) that extends from Southern Virginia to Eastern Texas. It is this species which lends romantic charm to the picturesque landscape of the Savannah State College campus and the coastal strip of the southeastern United States.

It has received some attention from investigators who have discussed its distribution and described its gross structure and embroyogeny, and economic importance in considerable detail. This paper is intended to present some of these interesting aspects of this air-plant.

Swinging in graceful festoons from Southern trees, Spanish Moss was originally known to Botany as Tillandsia usneoides (L.). Its accepted scientific name is now Dendropogon usneoides (L.). The species name comes from the fact that this growth resembles the lichen Usnea.

The Spanish moss usually prefers a well-lighted but moist habitat. It occurs not only on living and dead trees but also on wires and other exposed supports if the atmosphere is sufficiently humid. It thrives best along bayous, rivers, ponds and lakes. In some cases the epiphyte is confined largely to the side of the tree facing the water. There is often considerable discussion as to what trees are suitable for the ecesis of Spanish moss. This epiphyte has been observed on all species of trees on the Savannah State College campus, the oaks, needle-leaved evergreens and shrubs. More of this epiphyte occurs on Quercus Virginiana, the American live oak, possibly due to the more nearly horizontal disposition of their branches.

Belying its name, it is not a moss at all, but a flowering plant belonging to the pineapple family, Bromeliaceae. If one examines the festoons of moss, he finds a tangled mass of stringy, spiraling stems, jointed every inch or so, covered with minute scales. The leaves are owl-shaped and in their axils are borne inconspicuous, fragrant green flowers, blooming in May and June. It produces feather-barbed seeds and the time of seed distribution is given as late December to late January, but may continue until early March. Billings, ('04),[2] suggests that the time of seed dispersal for all southern states is March.

In regard to the seeds Billings ('04)[2] says that "the embryos appear perfectly normal with the exception of the

dead cortical cells in the root and hypocotyl." He made efforts to germinate them in a germinator, but without success. The sequence of events requisite to germination is still unknown. It is believed that the Spanish moss seedling is fixed to the substratum by weak roots which soon dry up. In discussing seed development Billings ('04)[2] says that "there occurs a degradation of certain cortical cells of either the root or the end of the hypocotyl nearest the root-tip." Penfound ('45)[6] observed seedlings over a period of years and noted that they were always firmly attached to the supporting object. Observations of seedlings made on the Savannah State College campus support Penfound's ('45)[6] observations. Most seedlings were observed to be firmly attached to the smooth bark of young live oak trees. As soon as the young plants reach a few centimeters in length they may be carried away and suspend themselves on any support to which they fall or are blown.

The host tree or support to which Dendropogon anchors or suspends itself does not furnish any nourishment for the plant though one may think so, thereby harming the tree. The only way in which Spanish Moss can harm a host tree is for it to become so dense that it smothers the leaves. This xeric epiphyte obtains all its nutrients from the atmosphere. The minute scales with which it is covered are thought to aid in filtering particulate matter from the air and probably serve to hold water by capillarity while the plant is absorbing therefrom the mineral constituents it requires.

The mineral nutriment of the Spanish moss is evidently obtained then from what salts happen to be present in the rain which falls upon it, in water which drops from nearby trees, or in dust which is blown in by the wind.

Wherry and Buchann[9] collected samples of Spanish moss from the sea-coast in South Carolina and from far inland in Georgia. The compositions of their ash were determined, both, with and without washing loosely adherent dust. The analyses of the ash proved to be unusually high in soda, ferric oxide, sulfur, chlorine and silica. The chlorine was somewhat higher in the sea-coast plant, and although the sodium was lower, this was connected with a much higher content of ferric oxide, diminishing all the other bases proportionally. Sodium and chlorine are of course the most abundant mineral constituents present in rain water, being derived from ocean spray carried to high levels of the atmosphere and accordingly diminishing in amount on receding from the sea coast; and chlorine was found to be actually higher in the sample from the coast than in the inland one. Table (1) shows the result of analyses of two samples which were performed by official methods. In comparison to the composition of rain water, this table indicates that this plant exhibits selective absorption and accumulation of individual constituents in propor-

tion to the constituents present in the water. Nothing is known about the absorption process.

TABLE 1[9]

Percent of ash	No.	Na_2O	K_2O	MgO	CaO	Fe_2O_3	$Si\ O_2$	P_2O_5	Cl	SO_3
6.6	1	2.9	7.1	6.79	9.27	19.82	39.00	1.97	5.31	—Coast S.C.
3.4	2	4.5	11.7	7.73	11.49	8.26	36.08	3.75	3.96	10.23 Inland Georgia

The water content of Spanish Moss has been found to fluctuate rapidly to changing conditions of atmospheric moisture from day to day. Experiments were devised by Penfound[6] to study or test the effects of desiccation and humidification on the water relations of this plant which revealed the following:

a. The water content of the Spanish moss always remains relatively high.

b. Spanish moss may either absorb or lose water vapor to the air depending on the relative humidity of the air.

c. This xeric epiphyte has a very high water-retaining capacity. Penfound suggests that absorption of water is primarily an imhibitional phenomenon. This is supported by the fact that absorption by desiccated plants is very rapid at first and becomes progressively slower as the cells become hydrated.

Spanish moss is not only one of the unique and decorative features of the Southern landscape, but a commercially important asset as well. Its inner fibrous portion resembles horsehair, and like the latter it is tough, durable, resilient and unlikely to lump. Because of these properties it has long been used as a filling or padding in a variety of manufactured goods, and herein lies its greatest commercial importance. The bayous of Florida and Louisiana are well-known for their Spanish Moss Industries.

The Louisiana Department of Conservation[5] published the following figures relative to their Annual Commercial Moss Crop which shows the highest yield and price received by the industry:

1925—8,120 tons were ginned and sold for a total of $2,273,000

1926—8,400 tons were ginned and sold for $1,934,000

These figures of production and price are above average for the past ten years.[5]

The productive technology is simple: Moss gathered from trees must be cured and retted. It is piled in long rows about 4 ft. wide to about shoulder height of an average man. Here it is wetted thoroughly and left to go

through a heating by sun radiation. Two months later the row of moss is turned up-side-down, again wetted and left to heat. The action of heat and moisture causes the pulpy cortex to sluff away from the strong, black fiber, which resembles the hair of a horsetail.

The black fiber is then scattered out to dry. The roof of a building, a fence, the top of a levee or anything that will suspend it in the air and expose it to the sun is used. After drying, the moss is ready for ginning, which operation disentangles the fiber and relieves it of foreign matter such as bark, twigs and leaves. After ginning, it is pressed into uniform 300 pound bales.

The moss-picker sells to the ginner who in turn sells to the manufacturer of upholstery. The fiber is used in many articles of services, such as automobile seats, cushioned chairs, pillows, and mattresses.

Economically, it is believed that the waste material from the processing of fibers of Spanish Moss for the upholstery industry may be utilized as a fodder supplement for beef cattle. Haligan[4] gives the analysis of green moss as:

Protein	3.68%	Iron and Aluminum Oxide	0.28 %
Carbohydrate	15.9 %	Phosphate	0.032%
Fiber	8.24%	Calcium Oxide	0.058%
H_2O	69.2 %	Sodium Oxide	0.58 %
Ash	1.57%	Potassium Oxide	0.31 %

Feurt and Fox[4], studied the estrogenic substance in Spanish Moss and its oral administration which revealed estrogenic administration begun before 4-6 weeks of age inhibits growth and development, but if begun after full growth is attained it does not cause loss of weight in rats.

The Spanish Moss, Dendropogon usneoides (L.), may be considered one of the most interesting and economical plants of the southeastern United States. It only requires various plants to support or suspend it in the air, from which it selects certain minerals to be used as nourishment. It may harm the host only if the plant grows very dense and shuts out the sunlight. Spanish Moss contributes greatly to the beauty of the Southern landscape and to the economy of the southeastern coastal states.

Harmful as it may appear, this plant is used for fillings or padding in upholstery, a fodder supplement for cattle, insulation for birdnests, and the estrogenic substances which it contains may eventually be used to improve the growth of livestock and other field crops.

Is it true, therefore, "that money grows on trees?" There is an abundance of wealth hanging above the heads of our Savannah State College family.

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