THE DISTRIBUTION OF VENUS'S FLY TRAP (DIONAEA MUSCIPULA)

By W. C. Coker

Plate 33

Ever since its discovery the distribution of the Venus's Fly Trap has remained uncertain. It was first found in the neighborhood of Wilmington, N. C., and it is still the general impression among botanists throughout the world that it is confined to that immediate vicinity. The plant seems first to have received the notice of botanists about 1763 (see below). John Bartram sent dried plants to Peter Collinson, who in 1765 sent them to Ellis who published in the form of a letter to Linnaeus a description of the plant with a plate in his book, "Directions for Bringing over Seeds and Plants from the East Indies and Other Distant Countries in a State of Vegetation," p. 35, 1770. This was published in Latin in Nova Acta Scientiarum Upsaliensis **1**: 98. 1773. Mr. Young, the "Queen's Botanist," took over to England living plants in the summer of 1768, where he grew them successfully. (See Young's Catalogue d'Arbres, etc., d'Amerique, Preface, p. VI and p. 34. 1783.) Young's record is the first we know of from South Carolina. In the above mentioned work he says (translation, p. 34):

"This peculiar plant was first known to me from the account which some of my friends gave me in 1763: some years afterward, having been sent by Her Majesty of England to America to collect new and rare plants, I found this in great abundance in North Carolina and in some parts of South Carolina, whence I brought many of them on my return to Europe; they grew in my garden near Ilswerth and flourished with their sensitive power. It was from these plants that Mr. Ellis of the society of London had the drawing of *Muscipula* made, and gave a description of it in 1780." [In error. Correct date was 1770.]

As Ellis' interesting little book is almost unavailable in this country [there is a copy in the Library of Congress], we think it would be of interest to quote his entire letter to Linnaeus in which he describes the Fly Trap. The colored plate that accompanies the letter is well done, but the inflorescence is shown too open to be at all typical. The letter follows:

London, Sept. 23, 1769.

My dear Friend,

"I know that every discovery in nature is a treat to you; but in this you will have a feast.

You have seen the Mimosa, or Sensitive Plants, close their leaves, and bend their joints, upon the least touch: and this has astonished you; but no end or design of nature has yet appeared to you from these surprising motions: they soon recover themselves again, and their leaves are expanded as before.

But the plant, of which I now inclose you an exact figure, with a specimen of its leaves and blossoms, shews, that nature may have some view towards its *nourishment*, in forming the upper joint of its leaf like a *machine* to catch food: upon the middle of this lies the bait for the unhappy insect that becomes its prey. Many minute red glands, that cover its inner surface, and which perhaps discharge sweet liquor, tempt the poor animal to taste them: and the instant these tender parts are irritated by its feet, the two lobes rise up, grasp it fast, lock the rows of spines together, and squeeze it to death. And, further, lest the strong efforts for life, in the creature thus taken, should serve to disengage it; three small erect spines are fixed near the middle of each lobe, among the glands, that effectually put an end to all its struggles. Nor do the lobes ever open again, while the dead animal continues there. But it is nevertheless certain, that the plant cannot distinguish an animal, from a vegetable or mineral, substance; for if we introduce a straw or a pin between the lobes, it will grasp it full as fast as if it was an insect.

In the year 1765, our late worthy friend, Mr. Peter Collinson, sent me a dried specimen of this curious plant, which he had received from Mr. John Bartram, of Philadelphia, botanist to the King. The flower of this specimen Doctor Solander dissected with me, and we found it to be a new genus; but not suspecting then the extraordinary sensitive power of its leaves, as they were withered and contracted, we concluded they approached near to the *Drosera* or *Rosa Solis*, to which they have been supposed by many persons since to have a great affinity; as the leaves of the most common English species of *Rosa Solis* are round, concave, beset with small hairs, and full of red viscid glands.

But we are indebted to Mr. William Young, a native of Philadelphia (to whom likewise the Royal favour has been extended, for his encouragement in his botanical researches in America), for the introduction of this curious plant alive, and in considerable quantities. He informs me, that they grow in shady wet places, and flower in July and August; that the largest leaves, which he has seen, were about three inches long, and an inch and half across the lobes; and observes, that the glands of those that were exposed to the sun were of a beautiful bright red colour, but those in the shade were pale, and inclining to green.

It is now likely to become an inhabitant of the curious gardens in this country, and merits the attention of the ingenious.

The Botanical Characters of the Genus Dionaea, according to the Linnaean Sexual System, where it comes under the Class of Decandria Monogynia.

The *Calyx*, or Flower-cup, consists of five small, equal, erect leaves, of a concave oval form, pointed at the top.

The *Corolla*, or Flower, has five concave petals, of an oblong, inverted-oval form, blunt at the top, which curls in at each side, and is streaked from the bottom upwards with seven transparent lines.

The *Stamina* or Chives, have ten equal filaments, shorter than the petals; and their tops, which contain the male dust, are roundish. This dust, or farina foecundans, when highly magnified, appears like a tricoccous fruit.

The *Pistil*, or Female Organ, has a roundish germen or embryo seed-vessel, placed above the receptacle of the flower: this is a little depressed, and ribbed like a melon. The style is of a thread-like form, something shorter than the filaments. The stigma, or top of the style, is open, and fringed round the margin.

The *Pericarpium*, or Seed-vessel, is a gibbous capsule, with one cell or apartment.

The *Seeds* are many, very small, of an oval shape, fitting on the bottom of the capsule.

I shall now give you a general description of the species of *Dionaea* before us, called *Muscipula*, or *Venus's Fly-trap*.

This plant is herbaceous, and grows in the swamps of North-Carolina, near the confines of South-Carolina, about the latitude of 35 degrees North, where the winters are short, and the summers very hot.

The roots are squamous, sending forth but few fibers, like those of some bulbs; and are perennial.

The leaves are many, inclining to bend downwards, and are placed in a circular order; they are jointed and succulent: the lower joint, which is a kind of stalk, is flat, longish, two-edged, and inclining to heart-shaped. In some varieties they are serrated on the edges near the top. The upper joint consists of two lobes; each lobe is of a semi-oval form, with their margins furnished with stiff hairs like eye-brows, which embrace or lock into each other, when they close: this they do when they are inwardly irritated.

The upper surfaces of these lobes are covered with small red glands, each of which appears, when highly magnified, like a compressed arbutus berry.

Among the glands, about the middle of each lobe, are three very small erect spines. When the lobes inclose any substance, they never open again while it continues there. If it can be shoved out, so as not to strain the lobes, they expand again; but if force is used to open them, so strong has nature formed the spring of their fibres, that one of the lobes generally snaps off, rather than yield.

The stalk is about six inches high, round, smooth, and without leaves, ending in a spike of flowers.

The flowers are milk-white, and stand on foot stalks, at the bottom of each of which is a little pointed bractea, or flower-leaf.

As to the culture of it: the soil it grows in (as appears from what comes about the roots of the plants, when they are brought over) is a black light mould, intermixed with white sand, such as is usually found on our moorish heaths.

Being a swamp plant, a north-east aspect will be the properest situation at first to plant it in, to keep it from the direct ray of the meridian sun; and in winter, till we are acquainted with what cold weather it can endure, it will be necessary to shelter it with a bell-glass such as is used for melons; which should be covered with straw or a matt in hard frosts: by this method several plants were preserved last winter in a very vigorous state. Its sensitive quality will be found in proportion to the heat of the weather, as well as the vigour of the plant.

Our summers are not warm enough to ripen the seed; or possibly we are not yet sufficiently acquainted with the culture of this plant.

In order to try further experiments, to shew the sensitive powers of this plant, some of them may be planted in pots of light moorish earth, and placed in pans of water, in an airy stove in summer; where the heat of such a situation, being like that of its native country, will make it surprizingly active.

But your knowledge of universal nature makes it very unnecessary for me to say any thing further, than that I am, with the utmost regard and esteem,

Dear Sir,
Your assured friend,
and very humble servant,
JOHN ELLIS"

In this description Ellis makes two mistakes. The minute glands on the inner surfaces of the traps do not secrete a sweet liquid for tempting the creatures, but are for the purpose of secreting a fluid that digests the victim when caught. The three bristles on each side do not of course pierce the prey but convey the stimulus when touched. Dr. Curtis was the first to give a detailed account of the plant's habits and behavior; but he did not take it for certain that the captives served as nourishment for the plants (l.c., p. 123).

Following these remarks Young gives full directions as to the successful cultivation of the plants. He says here that the seeds do not sprout the first year, but this is at least in large part incorrect, as fine plants seeding in the greenhouse at the University of North Carolina in the spring of 1927 formed abundant seedlings in the same pan a few months later.

In his Flora Caroliniana, p. 144, 1788, Thomas Walter lists *Dionaea*. His book is supposed to cover the territory more or less approximate to his home in lower South Carolina. Whether his record is from his own observations in South Carolina or not seems unknown.

In 1791 William Bartram in his Travels, p. 472, also reports seeing the *Dionaea* in abundance south of the Cape Fear River in the savannahs of Brunswick County. For a quotation from Bartram and an accurate painting, see Addisonia **10:** 1, pl. 321. 1925.

In his Genera of North American Plants (**1:** 278. 1818) Nuttall overlooks the South Carolina and Brunswick records and says, "Hitherto exclusively found on the north side of Cape Fear River, North Carolina, and no where more abundant than round Wilmington. I have traced it for 50 miles north of that place, and am informed that it extends to Fayetteville."

Mr. Canby of Wilmington, Del., noted (Gardener's Monthly, Aug., 1868, p. 229) its occurrence in parts of South Carolina adjacent to the Wilmington district. He experimented on the digestive powers of the leaf and published his results before the appearance of Darwin's well known book on insectivorous plants. As indicating the remarkable powers of the leaf, we quote his note of July 13, 1867, "I found today that a good sized leaf had caught and devoured a large centipede."

Confusion regarding the distribution of *Dionaea*, is clearly shown by a note from a correspondent in the same magazine (Sept., 1868, p. 273) who says:

"I have had plants from the boggy grounds on the table lands in Georgia, and plants have been sent from there to Kew, and my impression is they can be found pretty plentifully there now."

We hardly think it is going too far to say that this is certainly a mistake. Such reports are being constantly made by people who take the pitcher plants for *Dionaea*.

Elliott on the authority of Gen. C. C. Pinckney of Revolutionary fame records the plant as growing "plentifully on the margins of the creeks running into the Santee River from the south, between Lynch's Ferry and the sea; particularly at Collin's and Bowman's bridges." (Sketch, etc. **1:** 479. 1821.)

Mr. H. B. Croom of New Bern, a graduate of the University of North Carolina, and author of a Catalogue of Plants in the Vicinity of New Bern, N. C., writing in 1834, says (Amer. Journ. Sci. **26:** 313. 1834): "It is probable that it will be found to extend from the Albemarle Sound to the Pee Dee River,[1] at which last place it was observed by Gen. C. C. Pinckney." Later Mr. Croom, in the Catalogue of New Bern plants above mentioned, says that he has "ascertained that this plant, which, for a long time, was supposed to be confined to the neighborhood

[1] He corrects this to Santee River in the same Journal **28:** 168. 1835.

of Wilmington, N. C., occurs in the counties of Bladen, Duplin, Jones, Lenoir, Onslow and Craven."

The Rev. M. A. Curtis, a botanist of excellent reputation, says of *Dionaea* (Catalogue of Plants Growing Spontaneously around Wilmington. 1834):

"This plant is found as far north as New Bern, N. C., and from the mouth of the Cape Fear River nearly to Fayetteville. Elliott says on the authority of Gen. Pinckney that it grows along the lower branches of the Santee in South Carolina. Dr. Bachman has received it from Georgetown, S. C., and Mr. Audubon informed me, with the plant before us, that he has seen it in Florida, of enormous size. I think it not improbable, therefore, that it inhabits the savannahs, more or less abundantly, from the latter place to New Bern."

In commenting on this statement of Dr. Curtis', Dr. T. F. Wood says (Mitchell Journal **3**: 77. 1886): "I find upon diligent inquiry that it is not to be found at Georgetown but near Bucksville, S. C., about 70 miles from Wilmington and is very scarce there."

In 1892 Bashford Dean says (Trans. N. Y. Acad. Sci. **12**: 9–17. 1892):

"The plant's northern range appears to be sharply drawn at the Cape Fear River. West of Wilmington the plant occurs, but it is said to be rare. Southward it is still more uncommon; it has been taken by Walter Hoxie of Beaufort, S. C., on Fripp's Island, on Coxspur Island, off the Georgia coast, and once at the head of Mosquito Lagoon below St. Augustine."

On reading this statement of Dr. Dean's about 18 years ago I at once undertook to get in communication with Mr. Hoxie, and at last found that he had moved to Savannah. After some correspondence I went to Savannah to see him and soon found that if he had ever seen *Dionaea*, which was very doubtful, he could not now find it.

In regard to the Georgetown record, we may add that there is in the Herbarium of the New York Botanical Garden a collection labelled from Georgetown (with no date) made by the Rev. Alexander Glennie. However, from all the evidence we agree with what Dr. Wood says above in regard to these Georgetown records. Mr. James Henry Rice, Jr., of Wiggins, S. C., who is notably well posted on the coastal region of South Carolina and who is thoroughly familiar with *Dionaea*, in a letter to me (July 18, 1927) says:

"From the vicinity of Georgetown means somewhere within fifty miles," and adds that a number of Georgetown planters, such as the

Withers, Allstons, and others, had plantations near Withers's Swash, the present Myrtle Beach. Mr. Rice thinks that plants collected at Myrtle Beach would be distributed in the old days under a Georgetown label. He further says:

"During a residence of ten years in and around Georgetown, hunting over the country, looking timber, etc., I never once met with *Dionaea,* nor did I ever hear of it. One may be fairly certain that the plant was never found west of Waccamaw river, in *Georgetown county.*

"Since 1898 I have found it repeatedly from the northern rim of the hammocks north to the mouth of Cape Fear river; it begins to be abundant near Ocean Drive. I have seen whole patches of the plants in the pinelands in North Carolina, between Calabash and Supply. They grew in masses." I, too, have looked for the plant a number of times around Georgetown and have written some of the best posted older people of that section about its occurrence, but have never found it and have no evidence that it grows near there.

For a number of years I have been trying to get together actual collections of *Dionaea* to illustrate its true range, and can now confirm its occurrence in South Carolina as far south as Murrell's Inlet. I can report also a remarkable western extension of its range to Lakeview 30 miles west of Fayetteville, which has heretofore been considered its western limit.

I am printing herewith an outline map (pl. 33) indicating the true range of the plant so far as at present known. On this map circles are used to designate actual stations represented by collections in herbaria, all in the University of North Carolina, United States National Herbarium or New York Botanical Garden. Cross marks indicate stations not represented by collections but confirmed to a practical certainty on good authority. The Neuse River collections at Washington were made by Gerald McCarthy and are noted as from "wet savannahs, Neuse River, July 7, 1884." We put the circle at Newbern on the Neuse as it was said by Croom to occur there. The Pinckney-Elliott record below the Santee River has remained unconfirmed to date, though Pinckney was a man of excellent ability and some reputation as an amateur botanist, and this station cannot be dismissed without a most careful search. Audubon's statement to Curtis that he had seen it in Florida of enormous size must almost certainly be dismissed as an error.

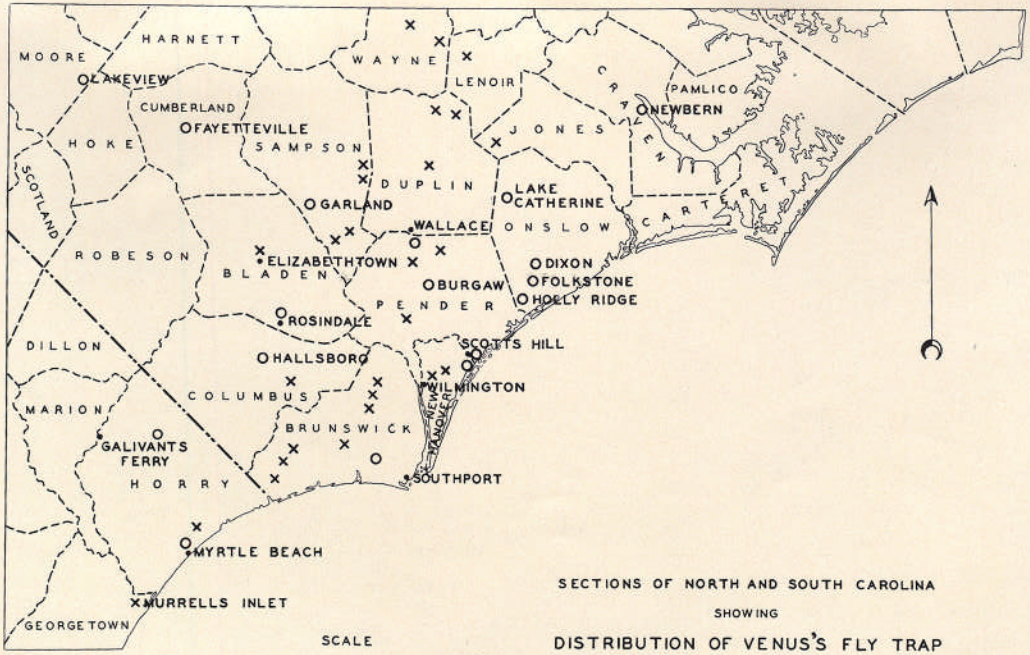
We can say then that the plant occurs in eastern North and South Carolina, inhabiting often in scattered and distant colonies an area of 155 miles north and south, from New Bern to Murrell's Inlet, and about 115 miles east and west from the seacoast to Lakeview.

In regard to the actual numbers of plants at any one so-called station and any danger of its extermination, it may be said that the plants are still growing in two states in vast numbers, and that the danger of extermination is very remote. Wood and McCarthy in their Wilmington Flora (Mitchell Journal **3**: 88) also express the opinion that the plant is in no danger of early extermination. Its continuance in certain stations now known is, however, in many cases precarious. For instance, at the westernmost station near Lakeview, details of which have kindly been furnished us by Mr. R. E. Wicker, there are four separated colonies occurring in an area of about one-half mile in length. The four together are estimated by Mr. Wicker to contain about 1000 plants. This entire station could easily be wiped out by any commercial development of the area. In New Hanover and Brunswick Counties, however, the plants are so widely distributed and so abundant that they remain by the millions, although many of their stations have been destroyed by new land developments around Wilmington.

As this is not an article on the structure and habits of *Dionaea*, we omit references to nearly all the literature on the subject. Most of it can be found in papers by J. M. Macfarlane and John W. Harshberger in Contributions from the Botanical Laboratory of the University of Pennsylvania **1**: 7, 45. 1892.

In Harshberger's paper is shown a remarkable abnormality (pls. 5 and 6) with young plants being produced adventitiously by bud propagation in the inflorescence.

In conclusion we wish to acknowledge with thanks the coöperation of the following in establishing important records: R. E. Wicker, Pinehurst, N. C.; W. Bedford Moore, Jr., Columbia, S. C.; D. R. Coker, Hartsville, S. C.; James Henry Rice, Wiggins, S. C.; L. E. Singleton, Myrtle Beach, S. C.; A. J. Baker, Conway, S. C.; and Solomon Gore, a negro boy who found the Pine Island station and led us to it.



SECTIONS OF NORTH AND SOUTH CAROLINA
SHOWING
DISTRIBUTION OF VENUS'S FLY TRAP

PLATE 33