FLORISTICS

In the foregoing pages the aspect and composition of the various vegetation types has been discussed, with little regard to the relationships of the species and their geographical distribution. Some study of these matters too will be of interest, in a region so different from most other parts of the world.

The total number of species of flowering plants represented in the area, including weeds, must be well over 1,000, perhaps 1,500. About 870 are described in Small’s Flora of Miami and 630 in his Flora of the Keys, and the two areas together must have about 1,000;* but the distinctions between species in those works are drawn pretty finely, and a more conservative botanist might recognize fewer species. However, the number has been increased by additional discoveries since 1913, so that 1,000 may be a pretty close estimate.

Of ferns there are perhaps 50 species, mostly tropical. The mosses, liverworts, lichens, fungi, algae and lower orders of plants are numerous, but have been so little studied that one can hardly guess at the number of species at present.

The vegetation lists on the preceding pages include only about 400 species of ferns and flowering plants (and a few mosses, etc.). Of the flowering plants about 28 might be classed as large trees, 52 as small trees, 19 as woody vines, 83 as shrubs, and the rest as herbs. A complete list for the area treated might include twice as many woody plants and four or five times as many herbs. Just about 10% of the species listed are weeds, introduced by man, but a complete list would doubtless have relatively more weeds in it. About 25% of the angiosperms are monocotyledons, a slightly lower figure than for most other parts of the coastal plain.† The families of flowering plants most largely represented (using their names in the broadest sense) seem to be Compositae,

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*The sandy islands just east of Miami, namely, Key Biscayne, Virginia Key, etc., are included in both floras, though they belong properly to neither, but are the south end of the east coast strip.
Gramineae, Leguminosae, Cyperaceae, Euphorbiaceae, and Rubiaceae, in the order named. Most of these families in other parts of the world include a considerable number of lime-loving plants, and it is an interesting coincidence that they are all well represented in the cedar glades of Middle Tennessee, which are always on limestone outcrops.* The family Cyperaceae (sedges) is less calciphile than the others mentioned, though. The species belonging to it constitute less than 6% of the Miami flora and less than 4% of the flora of the Keys, as compared with over 12% of the species of flowering plants listed in our Third Annual Report as growing on peat. (In that family the large genus *Cyperus* is much more calciphile and tropical, and much better represented in South Florida, than the still larger genus *Carex*.)

The genus most largely represented in the foregoing vegetation lists is *Quercus* (the oaks), with nine species, most of them small trees. (Only one of them has decidedly lobed leaves like most of the northern oaks.) *Tillandsia* (air-plants) is a close second. Other genera with five or more species are *Rhynchospora*, *Panicum* and *Polygala*. Most of the genera are represented in the vegetation lists by only one species; and the ratio of species to genera is about 1.4, which is about the same as in the central Florida list in our 13th Annual Report, but less than in the northern Florida list in the 6th Annual Report, which has 1.6 species per genus. Of course in all these lists the rarer species are excluded, but the ratios for complete lists might not be very different. Completeness was attempted in Small’s floras of Miami and the Keys, and the ratio of species to genera in those is 1.67 and 1.54 respectively. This ratio of course varies with different authors, who may have different conceptions of genera and species, but still more with the area or number of species involved, being larger in the larger floras (4.26 in Small’s Flora of the Southeastern United States, 1903).

Among the genera represented by three or more common species in northern Florida (and farther north) and fewer or none in southern Florida are *Eleocharis, Carex, Xyris, Juncus, Sarracenia, Crataegus, Prunus, Baptisia, Meibomia, Viola, Rhexia,*

Ludwigia, Nyssa, Asclepias, Viburnum and Laciniaria. Terrestrial orchids, and the families Umbelliferae and Ericaceae, show the same tendency.

Broadly speaking, the native flora can be divided into northern, tropical, and endemic elements. Some of those here called northern range as far north as Canada, and others no farther than Georgia. They are mostly plants of sandy pine lands, swamps and marshes. A considerable number of trees and shrubs, such as Pinus Elliottii, Hicoria aquatica, Quercus obtusa, Q. Catesbaei, Magnolia grandiflora, Itea, Liquidambar, Gleditsia, Cornus florida, and Nyssa biflora, seem to reach their southern limits in the neighborhood of the Peace River, perhaps mostly because that is practically the coolest part of South Florida, or else because the soil there is more like that in the northern parts of the State. A few others extend nearly or quite as far south in the lake region or central prairies.

Such counties as Okeechobee, Glades and Charlotte have comparatively few species of trees, being too far south for most of the northern species, and too cool for most of the tropical ones.

The strictly tropical species are chiefly confined to the Miami limestone region and southward, and to very narrow strips along both coasts farther north; and nearly all of them extend farther north on the east coast than on the west, just as the isotherms do. (See the climatic map, fig. 3.) Only a few are found in the interior north of Miami, the commonest ones perhaps being Nephrolepis, Rapanea, Icacorea, and Psychotria undata.

The endemic element, comprising species peculiar to Florida, is chiefly confined to the lake region and the Miami pine lands. They are generally rarer than the more widely distributed species, so that only a few of them appear in the foregoing vegetation lists. Many of them are confined to single counties, principally Highlands and Dade. Some of our lake region endemics range north into Polk County or farther, but several are known at present only from Highlands, which up to about 1912 had no railroads and was practically a terra incognita to the scientist. Dr. Small began to visit that region in 1918, and most of its endemics were discovered and described by him. One of the commonest shrubs there, however, Prunus geniculata, was discovered by the writer
in Lake County, in 1909, and described in 1911.* In 1924† Dr. Small described two new genera and about half a dozen supposed new species in other genera, known only from Highlands County; and there are at least as many others in that region which are confined to Florida but not to that county or region.

Several herbs which are characteristic of dry sandy pine lands in southern Georgia and northern Florida, when they get as far south as Highlands County, where the climate allows them to keep growing nearly throughout the year, become more robust, and look almost like different species. One of the most striking cases is _Lupinus diffusus_, which in northern Florida is a prostrate herb, blooming in spring, but in Polk and Highlands Counties grows about three feet tall and often does not branch within a foot of the ground, blooms in winter, and is practically an evergreen shrub. The botanists apparently have not yet made any distinction between these two extremes,§ but a few other species have been described as new for similar reasons and with apparently less justification.

On the other hand, some trees which have their southern limits in Highlands County are more stunted there than farther north, probably on account of the poorer soil. A good example is the common holly, _Ilex opaca_, which is represented in the scrub near the south end of the lake region by a stunted form, described in September, 1924, by Small as _Ilex cumulicola_* and by Ashe as _Ilex arenicola_†.

In the flatwoods and dry prairies east of the lake region there are a few plants of limited range, which escaped attention until recently, on account of the comparative inaccessibility of that territory. Probably the most abundant of these is _Litrisa carnosa_, a composite related to _Carpephorus_ and _Trilisa_, which was unknown to science until Dr. Small found it in the eastern

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§Since the above was written Dr. Small has segregated the lake region form, under the name of _Lupinus cumulicola_.
part of Highlands County in August, 1922. It is common in both flatwoods and prairies, in Highlands, Okeechobee, Indian River and St. Lucie Counties, but it blooms in late summer, when very few botanists are working in Florida. Other rather local plants of the same general region are *Hymenocallis Palmeri* and *Laciniaria Garberi*. A new shrub, *Deeringothamnus pulchellus*, related to the pawpaws, has recently been described by Dr. Small from the flatwoods of Charlotte County.

In Small’s Flora of Miami, which includes flowering plants only, there are about 120 species, or more than one-eighth of the total, which are not known outside of Florida, the others ranging northward to Georgia or beyond, or southward to the West Indies, or both. Of these 120 about one-fourth are known only in the Miami region, and nearly as many range southward to the Keys. Among the endemics of that region in the strictest sense there are 5 or 6 species of Euphorbiaceae (mostly of the genus *Chamaesyce*), 5 Compositae, 3 Leguminosae, 2 Verbenaceae, and 2 Polygalaceae, but no endemic genera. Of course future explorations may change all these numbers somewhat, by extensions of known ranges and discovery or description of additional species, but the distinctions between some of the alleged species are perhaps already too fine, and probably few of these supposed endemics are so distinct that a botanist familiar with their nearest relatives would see the differences immediately.* (Some of the recently discovered endemics in the lake region and east of there are much more distinct, and two or three of them have been made the types of new genera.)

Classified by habitat, more than half the endemics of the Miami region, whether we consider those confined to that region or those more widely distributed in Florida, are assigned by Small to the pine lands, about one-fourth to “Everglades” (meaning mostly the marly glades intersecting the pine lands, rather than

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†The writer found it near Fort Pierce in August, 1923, and immediately recognized it as something undescribed, and soon sent specimens to Dr. Small, but they were not mentioned in his description, published over a year later.

*This may indicate that the country south of Lake Okeechobee is not old enough geologically to have developed any endemic genera or very distinct species yet.
the Everglades proper), and somewhat less than one-fourth to hammocks.

On the Keys the number of endemics is smaller. Only about 42 species, or 6% of all the flowering plants listed from there by Small, are supposed to be confined to Florida; though a few more (mostly cacti) have been described by him since. Fifteen of those are known only from the Keys, 12 others range northward to the vicinity of Miami, and 15 others farther north. Ten of the true endemics are known only from the lower Keys, two from the upper Keys, and three from both. The families most largely represented are Euphorbiaceae (mostly Chamaesyce), Cactaceae, Compositae and Cyperaceae.

Of the species listed by Small as growing on the Keys and in the tropics, but not in the Miami region, there are 137, of which 20 are known on the upper Keys, 79 on the lower, and 38 on both. But many of them are introduced weeds. (There are also several species, mostly weeds, which grow on the Keys and farther north or west, but are not yet known in the Miami region.) As weeds are not very well separated from natives by Small, these numbers do not mean much, but we may note in passing that the families most largely represented among the 137 tropical species are Gramineae (24), Leguminosae (15), Amaranthaceae (9), Cyperaceae (8), Convolvulaceae (7), Compositae (5), Euphorbiaceae (5), and Malvaceae (5). The reason that Key West has more weeds than Miami is doubtless that it has been settled much longer, and has been a seaport from the start, while the shipping at Miami has been insignificant until within the last few years.

Without a reasonably complete list of South Florida plants it is hardly possible to estimate the proportion of northern and tropical species in the flora, or how many extend to Georgia, Virginia, Canada, etc. But it is obvious that the proportion of tropical species is much greater in the hammocks, mangrove swamps, salt flats, and sea beaches than in the pine lands and scrub, which have practically no counterpart in the tropics; so that it is not a matter of climate entirely.

The weeds seem to be mostly of West Indian origin, but quite a number are supposed to be natives of the United States, and there are a few from Europe, Asia and Africa.