

NOTES ON BRAZILIAN CYPERACEAE. II.

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In 1943 Süssenguth published a number of new taxa of Brazilian Cyperaceae based mainly on the collections of Luetzelburg. We are at present reexamining the type material and a detailed illustrated account will appear later, but for the moment the following results are of interest.

1. *Eleocharis pygmaea* (Süss.) L.T. Eiten comb. nov.

Basionym: *Chamaegyne pygmaea* Süss. Bot. Jahrb. 73: 113 (1943).
Type of basionym: Ph. von Luetzelburg 21041, Brasília septentrionalis, Milho prope Rio Tacutu, in ditione fluvii Rio Branco, in campo humido. IX 1927. This is the only known collection of the species.

This tiny sedge, at most 3 cm tall, consists of pieces that were probably pulled out of a clump or mat. It has short culms with terminal sterile spikelets and many basal sessile fertile spikelets. Süssenguth considered it a new genus different from *Eleocharis* because (1) its culm-apex spikelets consist of only two glumes and a single flower, (2) this flower is male, containing no pistil, (3) the achenes lack bristles. In regard to the first item we may point out that several species of *Eleocharis* have one-flower spikelets with two glumes at the culm apices, such as *E. minima* occasionally, *E. capillacea* very often, and *E. naumanniana* regularly. In regard to the second point, *Eleocharis*, especially in submerged plants, occasionally has purely male flowers lacking a pistil. However, in fact, *Chamaegyne* does have a few hermaphrodite flowers in the culm-tip spikelets and so approaches the usual condition in *Eleocharis*. Süssenguth noted this too in a culm-tip spikelet that had not yet emerged from its leaf sheaths but he thought it was a teratological event. As for the third point, there are many species of *Eleocharis* that lack bristles at the base of the achene, as well as other species in which some individuals lack bristles and others possess them.

Süssenguth described *Chamaegyne* as having normal leaves, that is, leaves with blades. Thus he says that four leaves surround the pistil in the basal spikelets and these are "foliis normalibus nec bracteosis nec glumaceis". Now the presence of leaf blades, which a "normal" leaf would have, would be enough to exclude *Chamaegyne* from *Eleocharis* but, strangely, Süssenguth does not mention this as a point of difference. However, *Chamaegyne* really does not possess leaf blades, being similar to *Eleocharis* in this respect. The only laminar organs to which Süssenguth could have been referring are the glumes of the basal spikelets. He describes the leaves as being "cr. 2 mm longa, lanceolata, acuta, tenerrima, integra, glabra, aliquando subfalcata"; these are exactly the characteristics of the glumes of the basal spikelets. The drawing of *Chamaegyne* given by Süssenguth shows a pistil and a fruit between

laminae organs which are identical to what we observed surrounding the pistils and fruits in the same type material, and these laminae are plainly the glumes. When mature achenes fall the glumes remain on the plant; these empty glumes are the other "leaves" in the drawing shown not associated with pistils or fruits.

Thus all arguments for separating Chamaegyne from Eleocharis fall. The small size of the plant and the presence of basal spikelets also do not separate it from Eleocharis for the series Tenuissimae has several species with individuals that may be as small as Chamaegyne when mature, and this series also has species with basal spikelets.

It appears that Chamaegyne is most related to Eleocharis minima of the series Tenuissimae. Svenson (1937) has a drawing of basal spikelets of this species (pl. 465, fig. 8) which is very similar to a drawing we made from the Chamaegyne material before noting the relation between the two species. Also, in both species the leaf sheath apices are loose, sometimes slightly inflated. Chamaegyne is a separate species in the same series, the main difference being in the achenes. In Eleocharis minima the achenes are ellipsoidal to obovoid, trigonous, 0.75-1.0 mm long (incl. stylebase), whitish to pale brown or olive, the surface minutely striate to lightly reticulate. The depressions of the reticulation are shallow and their shape square or narrow-rectangular with the long axis of the depression vertical. The achene of Chamaegyne is globose-trigonous, 0.85-1.1 mm long, dull ivory white, surface strongly cancellate with the depressions deep and wide-rectangular with the long axis horizontal. The stylebase in Chamaegyne falls within the range of variation that this structure shows in E. minima.

2. Eleocharis minima Kunth

Süssenguth's new genus and species, Helonema estrellensis, was based on two Luetzelburg collections, 14027 and 14062, both taken in the State of Rio de Janeiro. The first is marked, "Serra dos Órgãos, Grotta do Inferno, Wasserfall, am Granit im Wasser, I. 1916", the second, "Serra Estrella, im Rio Congojoco, X. 1916". Several years ago we argued that this material really was a species of Eleocharis (L.T. Eiten, 1963), since the reasons for excluding it from that genus were not valid. The type material had few and much reduced spikelets and no achenes. This was expected since the plants were growing submersed in water and submersion frequently reduces flowering and fruiting in aquatic plants. So we attempted to obtain living topotypes to cultivate out of water to see if the plant would produce better spikelets and mature fruits.

The Grotta do Inferno is a deep canyon still containing its native vegetation on the steep forested slope of the Serra dos Órgãos south of Teresópolis. A new highway climbing the mountain face crosses it twice. However, we found no material in the clean rock stream bed although we examined it at probably the same point that Luetzelburg did, where a now abandoned cable-car railroad right-of-way crosses the canyon. The Serra Estrella of the other syntype collection is the part of the coast range between Rio and Petrópolis, with the village of Estrella at its base.

However, there is no Rio Gongojoco on this range and we could not find this name in any gazetteer or map. Luetzelburg, in his Estudos Botânicos do Nordeste, gives a list of plants he collected in Brazil which were identified up to the time of writing, and for one of these he mentions the Rio Gongojoco again, this time as near Rosário on the Baixada do Rio. Rosário (now Saracuruna) is a railroad station and village on the flat swampy lowland or Baixada, several kilometers south of the base of the Serra Estrela. From local inhabitants we found that the Rio Gongoxoco (as it is now spelled) is a stream barely one kilometer long that flows through the marshes just east of a small hill 2 km east of Saracuruna. A road leads to an old fazenda house on the hill so we were able to reach the stream. Sure enough, it contained the identical Helonema material that Luetzelburg found 50 years previous, even mixed with the same Utricularia as on the type sheet!

Kept in an aquarium for several years the material retains its thin elongated stems which produce new shoots of a few stems at their tips and these when grown produce new stems at their tips until the plant is more than 30 cm long and with several branch orders. No spikelets were ever noticed when collected nor when cultivated under water. But when transplanted to moist soil and allowed to grow in air or covered with only a centimeter or so of water, it produces small dense tufts 3-12 cm tall of thicker culms with many fertile spikelets and ripe achenes, and only very rarely short vegetative shoots at some culm tips.

In the type material from submersed plants the flowers were both hermaphrodite and male. The ovaries were not provided with bristles at the base but this is often true in Eleocharis even when the achenes possess them. In the plants grown in the air the spikelets were much more abundant (but with about the same number of glumes), the flowers were all hermaphrodite and fertile, and the achenes had bristles. The size and other vegetative characters, as well as the achenes, of the plants grown out of the water showed that the Helonema topotype was Eleocharis minima. The Helonema habit is really only an extreme aquatic modification of this species. Svenson (1937) described the variety ambigua for the aquatic phase of minima and figured it as an erect plant with several spikelets and a single shoot at the tip of one culm, that is, a plant much less modified from the terrestrial phase than Helonema. Since the more extreme Helonema can produce typical E. minima when grown out of the water, it is highly likely that var. ambigua plants can also. This throws doubt on the value of the variety; a true variety would have to be relatively genetically fixed.

3. Diplacrum longifolium Clarke

The new species of Süssenguth, Bisboeckelera paporiensis, based on Luetzelburg 23955 and 23981, both from the Rio Papori at the Brazil-Colombia border, collected July, 1928, is really Diplacrum longifolium. The material agrees with this species in all particulars. In Bisboeckelera each female flower, that is, each terminal pistil, is always enclosed in a utricle while in Diplacrum it is enclosed by two subopposite entirely free glumes, one folded inside the other. In all other charac-

ters, species of the two genera are sufficiently similar, including the branching pattern of the inflorescence, that they could be joined.

The inflorescence of the material seen is composed of 1 or 2 heads per culm. The number of heads per culm in the species in general varies from 1 to 7.

4. *Websteria submersa* (C.Wright) Britton

Süssenguth described two varieties of this species, var. *Luetzelburgii* based on *Luetzelburg s/n*, Serra do Sol [Roraima Territory], and var. *negrensis* based on *Martius 2810*, Barra do Rio Negro [near Manaus]. We examined this material plus several other collections from Pernambuco, Bahia, Roraima Territory, several places in Pará, as well as a fragment of the type of the species from Cuba (*C. Wright 3775*), and a specimen from Florida. There is a small amount of random variation from one collection to another as was to be expected, particularly in aquatic plants, but no collection was sufficiently distinct to constitute a variety.

Several other collections that Süssenguth cited as *Websteria submersa* are really aquatic phases of *Eleocharis*, such as *Luetzelburg 12518*, *12528*, and *15051*. The branching pattern is completely different (see table of comparison of *Eleocharis*, *Websteria* and *Egleria* in L.T.Eiten, 1964) and there are other differences all of which may be noted in sterile material.

It should be mentioned here that descriptions of *Websteria* in several publications say that the plant has verticillate leaves. Thus, S.H. Wright (1887) writes: "Leaves capillary, smooth, 1 to 2 inches long, sheathed at base, and in umbellate clusters, terminating the umbellate peduncles and branches." Süssenguth in the description of var. *negrensis* says: "folia penicillatim vel, se mavis, pseudo-verticillatim posita fert. Folia longe linearia, tenuissima, filiformia,..." In reality, all these "leaves" are filiform culms, that is, stems. The only foliar tissue the plant has is that of the tubular leaf sheaths, exactly as in *Eleocharis*.

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