AN UNDERVIEW OF THE GENUS SCHISTOCARPHA (ASTERACEAE-HELIANTHEAE)

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INTRODUCTION

Robinson (1979) presented a study of Schistocarpha which is revisionary in nature, albeit based almost entirely upon herbarium sheets at the U. S. National Herbarium (US). None of the 16 species which he recognized was observed in the field, nor did he avail himself of the large suite of specimens to be found in yet other herbaria. Because of this I have felt the need to provide an "underview" (as opposed to overview) of the genus, a view from the bottom-up, looking at relationships from the populational level, and with a much broader survey of materials from institutions other than those at US.

Robinson (1979) provides a reliable introduction to the history of the group and correctly notes that the genus is properly positioned in the subtribe Galinsoginae of the Heliantheae, and that what was long thought to be its nearest generic relative, Neurolaena, is not especially close. He fails to note, however, that the most compelling evidence for a more remote relationship is the relatively small chromosomes on a base of x=11 in Neurolaena, versus the relatively large chromosomes on a base of x=8 in Schistocarpha (Turner, 1982). It would appear that the latter genus is most closely related to Oteiza, as noted by Robinson (1979); indeed, so much so that the latter worker "unnecessarily redescribed" O. raucophila (J. D. Smith) Fay, naming this Schistocarpha steyermarkii H. Robs. Oteiza, with only two disparate species, predated Schistocarpha so, as noted by Robinson, it would be unseemly to unite the two genera. Fay (1977; pers. correspondence) has noted that his Oteiza raucophila "obviously has close affinities with S. seleri and probably should be placed in Schistocarpha." But Robinson (1979), while noting the relationship suggested by Fay, states that "the species of Oteiza seem clearly outside of Schistocarpha and more closely related to each other, but differences between the two species are greater than any seen within the larger genus Schistocarpha." This would appear to be an accurate analysis. All of this is complicated by generic relationships in the subtribe Galinsoginae generally, and relates to such well known taxa as Galinsoga and Sabazia, as attested to by Robinson (1979). Even Fay (pers. comm.) notes that Oteiza might be included "in a further expanded Sabazia" or its relatives (i.e., those elements separated from Calea and placed in Sabazia by Urbatsch and Turner, 1975).

An accurate generic boundary of Schistocarpha is difficult to draw, largely because no one has undertaken a broad inclusive study of the subtribe Galinsoginae. Such a study among the 10 or more genera which relate to Schistocarpha is much-needed. Until this is undertaken it would seem prudent to accept Oteiza as recommended by Fay (1975), Urbatsch and Turner (1975) and Robinson (1979). However, transfer of O. raucophila to Schistocarpha might seem appropriate, leaving Oteiza itself monotypic; yet such a transfer ought await newly assembled information, namely chromosomal and chemical data.

SPECIES RELATIONSHIPS

In the abbreviated account that follows I saw little reason to describe again the various taxa or species-groups treated by Robinson. Rather, where judgement and field work suggest concordance with his views I have merely noted that fact. Where I have placed into synonymy one or more of Robinson's "recognized" species it will be understood that the older name to which they are appended includes the description of those taxa rendered by Robinson, and the deliniations should be expanded accordingly. In most instances the descriptions so emended would be trivial. Indeed, Strother (pers. comm.) would go much further than I and include nearly all of Robinson's segregate taxa, and several of my own, in a wide-spread, variable, Schistocarpha bicolor.

Strother's view is essentially that derived from a limited sample largely without accompaning field studies. Which is, coincidentally, the same kind of background for Robinson's study. But oh the difference!

My study culminates some 10 years of interest in the genus. It was largely piqued by my observations of taxa in the wild, especially from field work in northcentral Oaxaca where putative hybrids between Schistocarpha liebmannii and S. bicolor were detected. As a consequence of my field observations I believe that the present study has a sound biological focus and that the specific taxa recognized are populational entities with cohering characters reflective of integrated gene pools which are largely confined to specific habitat types which extend over reasonably large regions.

I freely admit that my treatment of the Schistocarpha longiligula complex is based upon inferences from my field experience with yet other species of Schistocarpha elsewhere than in Chiapas and Guatemala, and that my recognition of but two regionally intergrading varieties is largely arbitrary. Clearly the extremes would be worthy of recognition were there not a plethera of intermediates. I do believe, however, that competent field observations will show that the local populations are probably fairly homogeneous but variable from population to population, with occasional hybridization and gene flow between

these. Which is perhaps the rule for many species of the montane cloud forests in Central America where spatial isolation and small populations has permitted the localization and subsequent divergence of this or that founder group. To include all such variant populations under a single specific name, as envisioned by Strother is perhaps defensible on pragmatic grounds, but it obscures useful information; to recognize the numerous intergrading local populational units as "good" taxa is equally misleading in a biological or "species" sense. All we can hope for at the present time is a "balanced" treatment of Schistocarpha with the knowledge that some field-oriented, quasi-experimentalist, will, in due course, unravel the more intractible species-knots.

CHROMOSOME NUMBERS

Robinson (1979) failed to provide an account of the chromosome numbers which have been reported for the various species of the genus, consequently such is provided here. The first counts for the genus were obtained by Turner et al. (1961) from Schistocarpha bicolor. It proved to be n=8 pairs. Subsequent counts for 8 of the 10 species have been diploid with 2n=16, confirming a base number of x=8.

Species	Voucher and/or reference
S. bicolor	Turner et al. (1961)
S. bicolor	Turner et al. (1962)
S. eupatorioides	Turner and King (1964)
S. eupatorioides	Kiel and Stuessy (1975)
S. eupatorioides	Jansen and Stuessy (1980)
S. eupatorioides	Jansen et al. (1984). Reported as S. paniculata.
S. eupatorioides	Robinson et al. (1981)
S. liebmannii	Poole & McDonald 2238 (TEX)
S. longiligula var. longiligula	Robinson et al. (1981)
S. longiligula var. seleri	Strother (1983).
S. matudae	Strother (1983)
S. paniculata	Robinson et al. (1981)
S. platyphylla	Strother (1983)
S. sinforosii	Escobar & Uribe 398 (LL)
S. sinforosii	Jansen et al. (1984)
S. sinforosii	Wurdack 796 (TEX)

Jansen et al. (1984) report a chromosome count of n=8 for Schistocarpha paniculata from Colombia but examination of their voucher (Stuessy & Funk 5667, OSU) shows the plant to be rather typical S. eupatorioides. Schistocarpha paniculata has well-developed ligules and is known only from Costa Rica.

ACKNOWLEDGEMENTS

Elizabeth Lawson (currently a doctoral candidate at Cornell University) stimulated my interest in Schistocarpha while engaged in a study of the group during 1977-78. She provided a fairly conservative overview of the genus based upon material from most of the major herbaria in North America except that at US. Her brief written report to me (as part of a graduate research problem in advanced systematics), before Robinsons publication and without access to his material, recognized but 7 or 8 species. I subsequently examined collections from DUKE, MSC, OSU, UC, US and XAL. Collectively this material serves as the basis for the present study. I am grateful to the Directors of the following herbaria for the loan of materials (CAS, DS, DUKE, ENCB, F, GH, LL, MICH, MO, MSC, NY, OSU, TEX, UL, US, XAL). John Strother provided tart but friendly comments regarding this or that taxon as represented in Chiapas, which provoked me to put all this down on paper.

KEY TO SPECIES OF SCHISTOCARPHA

1. Ray florets (21)30-80 in 2-4 series [2]
1. Ray florets (3)5-21 in a single series [4]

2. Rays yellow; ligule of ray floret 1/5 the length of the tube or less (or absent).....1. S. eupatorioides
2. Rays white; ligule of ray floret 1/3 the length of the tube or longer [3]

3. Ray florets mostly 40-60, their ligules 5-10 mm long.....2. S. paniculata
3. Ray florets mostly 21-34(39), their ligules mostly 3-5 mm long [3a]

3a. Ligules of ray florets 5-10 mm long; N. Am. plants.....3. S. croatii
3a. Ligules of ray florets 2-4 mm long; S. Am. plants.....(hybrids, S. eupatorioides x S. sinforosii).

4. Petioles conspicuously winged throughout, often expanded at the base and extending across the node; ray florets mostly 11-15 (hybridizes with S. liebmannii, in which case F_1 and backcrosses may not readily key to either taxon).....4. S. bicolor
4. Plants without the above combination of characters [5]

5. Capitulescence lax, containing 8-12 heads on pedicels 20-50 mm long at maturity; heads (excluding rays) broader than long.....5. S. pedicellata
5. Capitulescence strict, congested, containing 30 or more heads on pedicels mostly 15(20) mm

long or less; heads (excluding rays) as long as broad or longer[6]

6. Involucres mostly 6-8 mm long; South American species.....6. S. sinforosii
6. Involucres mostly 5-6 mm long; North American species[7]

7. Ligules of the ray florets 2/3 or less the length of the tube (or absent) [8]
7. Ligules of the ray florets 2/3 or more the length of the tube [9]

8. Florets ca. 20 per head; involucral bracts 14-18, mostly 2-3 seriate, glabrous or nearly so, straminous, not spreading at maturity.....7. S. platyphylla
8. Florets ca. 30 per head; involucral bracts dirty brown or blackish, mostly 3-4 seriate, variously pubescent, usually spreading at maturity...10. S. longiligula

9. Stems, at maturity, glabrate or nearly so; lower surfaces of the blade (except for veins) glabrous, the upper surface somewhat darker than the lower; disc florets 10-12, their corollas sparsely pubescent; populations of montane cloud forests of northcentral Oaxaca and adjacent Veracruz.....8. S. liebmannii
9. Plants without the above combination of characters and distribution [9]

10. Ray florets 12-21, their ligules 1-4 mm long....9. S. matudae
10. Ray florets 5-12(16), their ligules (3)4-8 mm long.....10. S. longiligula

1. SCHISTOCARPHA EUPATORIOIDES (Fenzl) O. Kuntze (1898)

S. margaritensis Cuatr. (1954) - a putative hybrid, discussed below.

In spite of H. Robinson's acceptance of this taxon as a widespread, highly variable, tropical or subtropical, species (Fig. 1) ranging from Argentina to northeastern Mexico, he saw fit to retain the segregate, S. margaritensis, which "is more than just an extreme form of that species. The corymbose inflorescence with longer pedicels differs from the more thysoid [sic] form with densely corymbose branches in S. eupatorioides. The smaller number of ray florets with longer limbs and the larger number of disk flowers provide additional significant distinctions".

In his key to species, S. margaritensis is said to be distinguished by its 25-30 rays, their limbs being near 3 mm; disk flowers 25-40 and pedicels 10-20 mm long. In his description of S.

eupatorioides he notes the rays to range from 40-70, the limbs 1 mm or less; disk flowers 5-11, rarely 18 and pedicels mostly 2-10 mm.

These are of course, highly variable characters and isolated exceptions for nearly all of these can be found in S. eupatorioides (e. g., pedicels up to 20 mm long in Nicaraguan plants; Stevens 3217, TEX; and 15-20 mm long in Ecuadoran plants, Harling & Andersson 11984, US; ligules vary from 0.1-1.5 mm over a large range of the species, e.g. 1.0-1.5 mm long in Colombian plants, Stuessy & Funk 5735, US; etc.)

Nevertheless, the two known collections of S. margaritensis are distinctive in several characters, the most notable being the fewer, longer, white rays which, in combination, distinguish these from S. eupatorioides. In my opinion, however, both sheets are probably hybrids or hybrid derivatives from occasionally crosses between S. eupatorioides and S. sinforosii. The best evidence for this is the fact that the characters that mark S. margaritensis are pretty much what one might expect in any putative hybrid between the taxa involved. Further, both of the putative parents are sympatric over a broad region of Colombia and both occur within the vicinity of the only two known collections of S. margaritensis (e.g., Killip & Hazen 9037, Dept. of Caldas, Rio Quindio, 1500-1700 m, 27-30 Jul 1922, is S. eupatorioides; Killip & Hazen 9159, Dept. of Caldas, "Old Quindio Trail", 3200-3500 m, 2 Aug 1922, is S. sinforosii; the putative hybrid between these, Pennell, Killip & Hazen 8694, Dept. of Caldas, Rio Quindio, 1300-1500 m, 25 Jul 1922, is cited by Robinson as S. margaritensis).

Occasional natural hybrids between yet other disparate species of Schistocarpha are known from Mexico (e.g., S. liebmannii x S. bicolor) consequently those proposed here seem reasonable.

2. SCHISTOCARPHA PANICULATA Klatt (1892)

Schistocarpha wilburii H. Robinson (1979)

This species is seemingly confined to Costa Rica where it occurs in cloud forest communities at elevations of 1800-2800 meters, mostly on volcanic slopes. In spite of its restricted distribution, the species is exceedingly variable, both in number of ray florets (21-39) and the length of the limbs (5-10 mm). Robinson notes the number of ray florets as 20-25 in his description but I counted up to 39 on at least 1 sheet (Utley 3805, DUKE), although the number of ray florets typically varies from 21-34, even on the same specimen. Nevertheless, Robinson segregated two sheets from Panama with more numerous ray florets (40-60) and smaller limbs (2-3 mm) and somewhat smaller involucres as S. croatii. The latter species is retained here, primarily because more recent collections from Panama (D'Arcy 11089, US; Utley 5671, DUKE; Wilbur 24286, 24305, DUKE) show that the characters concerned are presumably populational in nature. Nevertheless, the plants

concerned are so nearly like S. paniculata that one must suspect that relatively few genes are involved in the expression of the diagnostic characters concerned and that additional collection of montane populations between Costa Rica and Panama might yield intergrading populations.

Schistocarpha wilburii was distinguished from S. paniculata by its coriaceous involucral bracts which recurve at the apices and more indurated central awn of the receptacular bracts, characters which are highly variable and these are nearly matched in recent indubitable collections of S. paniculata from Provincia de Cartago, Costa Rica (e.g., Wilbur 24719, 25478, DUKE). In short, the present author can find little or no justification for the recognition of S. wilburii.

3. SCHISTOCARPHA CROATII H. Robinson (1975)

When first described by its author, this species was compared to Schistocarpha oppositifolia (=S. eupatorioides) but, as noted above, it is most closely related to S. paniculata. Robinson (1978) subsequently perceived this relationship, retracting his initial comparisons, noting that its "closest relationship is actually to S. paniculata of Costa Rica, though the latter differs clearly by the smaller numbers of rays with larger limbs."

4. SCHISTOCARPHA BICOLOR Less. (1831)

My understanding of this species is essentially the same as that of Robinson. The latter author did not provide a map of its distribution but records at TEX show the plant to occur, as noted by Robinson, along the eastern Gulf-ward, escarpments of Mexico. Robinson, however, did not examine specimens from its northernmost state, Tamaulipas or its southernmost state, Oaxaca. General sites from which collections were examined by the present author are shown in Fig. 2.

As noted under the discussion of Schistocarpha liebmannii, the weedy S. bicolor apparently hybridizes with other species of Schistocarpha where they grow in close proximity.

5. SCHITOCARPHA PEDICELLATA Klatt (1887)

Other than fragments of the type, Robinson examined only 2 specimens of this taxon, both from the slopes of Mount Orizaba and both with gland-tipped hairs on their pedicels. The species, however, possesses forms both with and without glandular trichomes (e.g., the following collections, cited below, lack glandular hairs: Ventura 2393, 4666), thus the major key-lead employed by Robinson to identify the taxon fails on this point. Further, glandular trichomes also occur occasionally upon the pedicels of S. longiligula, consequently his key-leads to these taxa will not always suffice. The best characters to distinguish S. pedicellata

from yet other species are its relatively few, large, heads with conspicuous rays which are borne upon elongate pedicels.

The distribution in the present treatment (Fig.) is based upon 12 collections; those not examined by Robinson are: OAXACA: Warnock 2505 (TEX). VERACRUZ: Cosson 563 (GH); Dorantes & Acosta 2200 (ENCB); Nee & Taylor 26256 (TEX); Ventura 57 (ENCB); Ventura 57 (ENCB); Ventura 2393 (ENCB, MICH, TEX); Ventura 3465 (ENCB, MICH, TEX); Ventura 4666 (ENCB, LL, TEX); Ventura 5125 (DUKE, ENCB, MICH, NY); Ventura 7729 (ENCB).

6. SCHISTOCARPHA SINFOROSII Cautrecasas (1935)

My understanding of this species is essentially the same as that of Robinson (1979). It is obviously closely related to S. longiligula and S. platyphylla of Central America but, as noted by Robinson, it is for the most part readily distinguished by its somewhat larger heads and longer ray corollas.

Nevertheless there is considerable variation in Schistocarpha sinforosii, especially in Colombia. Thus Cuatrecasas et al. 27598 (US) and Todzia et al. 2458 (TEX) have involucres 5-6 mm long and ray ligules 4-5 mm long (much resembling collections of S. longiligula from Guatemala) while Cuatrecasas et al. 26830 (US), has involucres 7-8 mm long and ray ligules 8-9 mm long; occasional collections have rays 9-11 mm long (e.g., Dept. Caldas, Nevada del Ruiz, King et al. 5964, US). Relatively small-headed, short-rayed plants, superficially resembling S. longiligula, also occur in Peru (e.g., Macbride 4080, 4915, US). In fact the late S. F. Blake has appended a note to Macbride 4080 commenting that the specimen is so close to the Mexican and Guatemalan S. bicolor (including S. longiligula) that he would "hesitate to separate it ... were it not for the great gap in range." Schistocarpha bicolor of northeastern Mexico, as noted by Robinson (1979), is readily distinguished by its broadly winged, often perfoliate petioles and smaller heads with more numerous ray florets, but S. longiligula of Guatemala and adjacent Chiapas might readily encompass S. sinforosii. Lawson (pers. corr.) proposed just that in her preliminary study of the group. Both taxa are relatively wide-ranging and both show similar kinds of variation in the size of their heads and the number and length of their ray florets. Perhaps much of this seemingly homologous variation is due to recurrent hybridization with one or more sympatric species, as noted under S. eupatorioides (which apparently hybridizes upon occasion with S. sinforosii). In any case both S. longiligula and S. sinforosii are maintained here largely because of their continental isolation; certainly the characters that mark them are weak, variable and loosely cohering, not too unlike the variables associated with the several intergrading races of Homo sapiens.

It should be added that Robinson (1979) notes that collections of S. sinforosii were not known from Ecuador thus making the

Peruvian populations appear as disjunctional elements; relatively recent collections from southern Colombia (Dept. Huila, Olsen & Escobar 531, LL) and adjacent Ecuador (Prov. Pichincha, Boeke 2242, US; Harling et al. 10459, US) have vitiated this observation.

7. SCHISTOCARPHA PLATYPHYLLA Greenm. (1907)

Schistocarpha kellermanii Greenm. (1927)

My understanding of this species is essentially the same as that of Robinson. However, a few of his annotations apparently apply to eligulate forms of S. longiligula (e.g. discussion under that species, below).

8. SCHISTOCARPHA LIEBMANNII Klatt (1887)

Other than fragments of the type, Robinson examined only 3 specimens of this taxon, all from Veracruz. I have examined 12 additional collections from Veracruz (excepting 0-44), as follows: Paray 3465 (ENCB); Poole et al. 1262, 2237, 2238 (TEX); Turner 0-44 (TEX); Turner 15101 (TEX); Vazquez 1907 (ENCB); Ventura 894 (ENCB, MSC), 3140 (ENCB); Ventura 4875 (CAS, ENCB, MICH, TEX); Ventura 5041 (DS, DUKE, ENCB, LL, MICH); Ventura 9479, 11096 (ENCB).

Along highway 175 in Oaxaca (Tuxtepec-Oaxaca), 24 mi S of Valle Nacional, Schistocarpha liebmannii grows in close proximity to S. bicolor, which is a weed along the roadside, while the former is largely confined to damp cliff sides associated with tree ferns, Selaginella, etc. The species grows in similar habitats in Veracruz (Turner 15101). Turner 0-44 (cited above) is a putative F_1 between these taxa while Poole 2238 is a putative backcross to one or the other. Poole 2237 is typical S. liebmannii.

Since Strother (pers. comm.) has questioned whether or not S. liebmannii is distinct from S. bicolor I list below some of the many characters that distinguish between them.

Schistocarpha bicolor	Schistocarpha liebmannii
1. Robust annual 1-3 m tall	1. Perennial shrublet 1.5-3.0 m tall
2. Foliage clearly pubescent on both surfaces	2. Foliage glabrous or nearly so (pubescent along veins)
3. Petioles broadly winged throughout on the mid-stem and usually connate across the node	3. Petioles tapering above but essentially unwinged below and never connate across the node
4. Heads hemispheric, 7-9 mm wide	4. Heads narrowly campanulate 3-6 mm wide
5. Involucral bracts 20-25, variously pubescent	5. Involucral bracts 16-20, glabrous or nearly so
6. Ray florets 12-16	6. Ray florets 8(10)

7. Ray tube very pubescent	7. Ray tube nearly glabrous (rarely moderately pubescent)
8. Anthers 1.3-1.6 mm long	8. Anthers 1.6-2.0 mm long
9. Pappus of 30-35 setae	9. Pappus of 20-30 setae
10. Plants of lower, drier, habitats	10. Plants of cloud forest dominated by tree ferns
11. Widespread weed in disturbed areas	11. Localized wet areas with other localized endemics

The two species form uniform populations but when growing together they hybridize - cf. Turner 0-44 (LL), etc.

9. SCHISTOCARPHA MATUDAE H. Robinson (1979)

This species was known to its author by a single specimen from Mt. Ovando, Chiapas. It is a weakly differentiated taxon, closely related to S. longiligula but distinguished by its relatively numerous short ray florets. Robinson related the species to S. bicolor, but on leaf, involucral and floral characters, as well as geographic position, it appears closer to the former.

In addition to an isotype, I have examined 7 other sheets (cited below) which I take to be this taxon. The rays may vary from 12 to 21 and seem to occur in 1 or 2 series, although Robinson describes the rays as 12-15 in a single series. The additional sheets, all from Chiapas, are: Breedlove 34573, 41959 (CAS) Ton 3574 (DS, ENCB, MICH), 3860 (CAS, LL).

10. SCHISTOCARPHA LONGILIGULA Rydb. (1927)

This is a variable widespread species of Central America and adjacent Mexico. H. Robinson recognized 5 species from among this variation, 2 of these concocted by him, the latter each represented by but a single sheet. Both are within the geographical range of S. longiligula as treated here. Within the S. longiligula complex I am able to recognize but 2 intergrading infraspecific taxa as follows:

Ray florets predominantly 11-18; disc corollas usually densely hispidulous; stems variously hirsute to appressed-puberulent to glabrate (rarely with glandular trichomes).....var. longiligula

Ray florets predominantly 8-12(16); disc corollas usually sparsely hispidulous; stems appressed-puberulent to glabrate (rarely with glandular trichomes).....var. seleri

Robinson included S. longiligula in his "bicolor group" (including also S. bicolor, S. matudae and S. seleri) while S. hondurensis, S. chiapensis and S. pseudoseleri were included (along with S. platyphylla, S. liebmannii and S. sinforosii) in his "platyphylla group". These allocations are apparently arbitrary, inclusion in the latter depending primarily upon ray-floret number (8-10, rarely 12, vs. 11-18) and involucral bract number (16-20 vs.

20-40), meristic characters which are highly variable both within and between populations, especially in southern Mexico, to judge from the suite of specimens examined in the present study. As noted below, considering the seemingly homologous character-variations found in both S. pedicellata and S. longiligula var. seleri (e.g., glandular trichomes) and the fact that the latter taxon intergrades with the var. longiligula (e.g., in ray floret number, mostly 12-18 in the former, 5-11 in the latter), it would appear more reasonable to include both S. pedicellata and S. longiligula within the "bicolor" group. This is especially suggestive since S. bicolor apparently hybridizes with S. liebmannii in Oaxaca forming both putative F_1 and backcrosses (discussed under the latter taxon). Altogether its pattern of geographic variation, and capacity to exchange genes under sympatric situations, strongly suggests that the species delineated by Robinson are artificially conceived and arbitrarily clustered into species groups.

Finally, it should be noted that Strother (pers. comm.) would include nearly all of the species with well-developed rays (including S. paniculata, S. platyphylla and S. liebmannii) in synonymy under Schistocarpha bicolor. While such a treatment makes easy the recognition and annotation of herbarium sheets it belies the assortment of correlated morphological characters found in populational form in nature; indeed, my field experience in the states of Veracruz and Oaxaca show that populations of S. paniculata, S. liebmannii and S. pedicellata are quite distinct, occupying montane habitats mostly isolated from the widespread, more lowland, weedy, S. bicolor. But where the latter occasionally enters in or near the range of yet other species, hybridization can be expected (c.f. comments under S. liebmannii).

10a. SCHISTOCARPHA LONGILIGULA Rydb. var. LONGILIGULA

S. hondurensis Standl. & L. Wms. (1952)

S. chiapensis H. Robinson (1979)

S. pseudoseleri H. Robinson (1979)

The var. longiligula is exceedingly variable. Unfortunately Robinson, in his study, did not avail himself of the abundant material of this taxon housed as CAS, DS, LL, MSC, TEX, or UC. In the present study I have examined over 15 different Chiapan collections from 9 or more municipa lities, none of which was examined by Robinson. At the type locality and vicinity (Dept. of Quiche, Guatemala) the taxon possesses hirsute stems and 11-13 rays, however, populations to the west become progressively less pubescent and the rays become reduced in number (8-12). A single depauperate plant from among the latter (with 8 ray florets and 8-10 disc florets) was designated S. pseudoseleri by H. Robinson. He also recognized an additional plant from Chiapas with more numerous

florets but with puberulous or glabrate stems as S. chiapensis. Thus, his recognition of S. hondurensis, after initially sinking this into synonymy with S. longiligula (Robinson, 1974), is not surprising, since to single out 2 weakly differentiated individuals as "new species" in his 1979 study almost mandated such reconsideration. According to Robinson, S. hondurensis can be recognized by its eight ray florets "and by the unique, uniformly scabrid surface of the disk corollas." The uniformly scabrid disk corollas are not unique to those populations designated as S. hondurensis. Rather this is a variable character found in several other taxa within Schistocarpha; indeed, it occurs in plants of S. longiligula from southeastern Chiapas, Mexico (Matuda 5046, LL; 5080 LL) near and about the type locality of Robinson's S. chiapensis which, as noted above, I take to be synonymous with var. longiligula (although it grades toward var. seleri). In addition, it would appear that characters which mark populations of the latter variety intergrade with populations about Municipio Tenejapa; the latter belong to the var. seleri, c.f. below. Another intermediate appears to be the Breedlove 9487 (LL) from Municipio Zinacantan.

Finally, it should be noted that occasional plants may possess relatively few ray florets (ca 8) which appear eligulate (e.g., El Salvador: Tucker 1280; UC, US). Robinson cites the latter collection as belonging to S. platyphylla, although, except for their eligulate condition, they more readily relate to S. longiligula (as noted in my key to species).

10b. SCHISTOCARPHA LONGILIGULA var. SELERI (Rybd.) Turner, comb nov. - based upon Schistocarpha seleri Rydb., N. Amer. FL. 34: 305. 1927.

Lawson (unpubl.) included this taxon in her broad concept of S. longiligula. Sufficient collections from the region about Ococingo and Tenejapa, Chiapas, exist so as to suggest that the suite of characters used to recognize the taxon are diagnostic. Nevertheless, the characters which distinguish var. seleri from var. longiligula appear to intergrade and occasional plants from both their range may possess pedicellate glands. This strongly suggests that the taxa are largely allopatric, intergrading, units deserving of varietal status at most. It is likely that the pedicellate glands and more numerous ray florets link these western populations of S. longiligula with the Veracruz-Oaxacan species, S. pedicellata, which is largely distinguished by its fewer-headed capitulescence and generally longer pedicels and ray ligules.

Other than the type, Robinson examined only two sheets of the var. seleri. In addition, I have examined the following, all from the Municipio of Tenejapa in central Chiapas (Fig.): Breedlove 9290 (DS, LL) 15283 (DS); Ton 695 (LL), 699 (MSC), 2107 (LL, MSC), 2249 (LL, MSC). Ton 695 and 2107 approach the var. longiligula.

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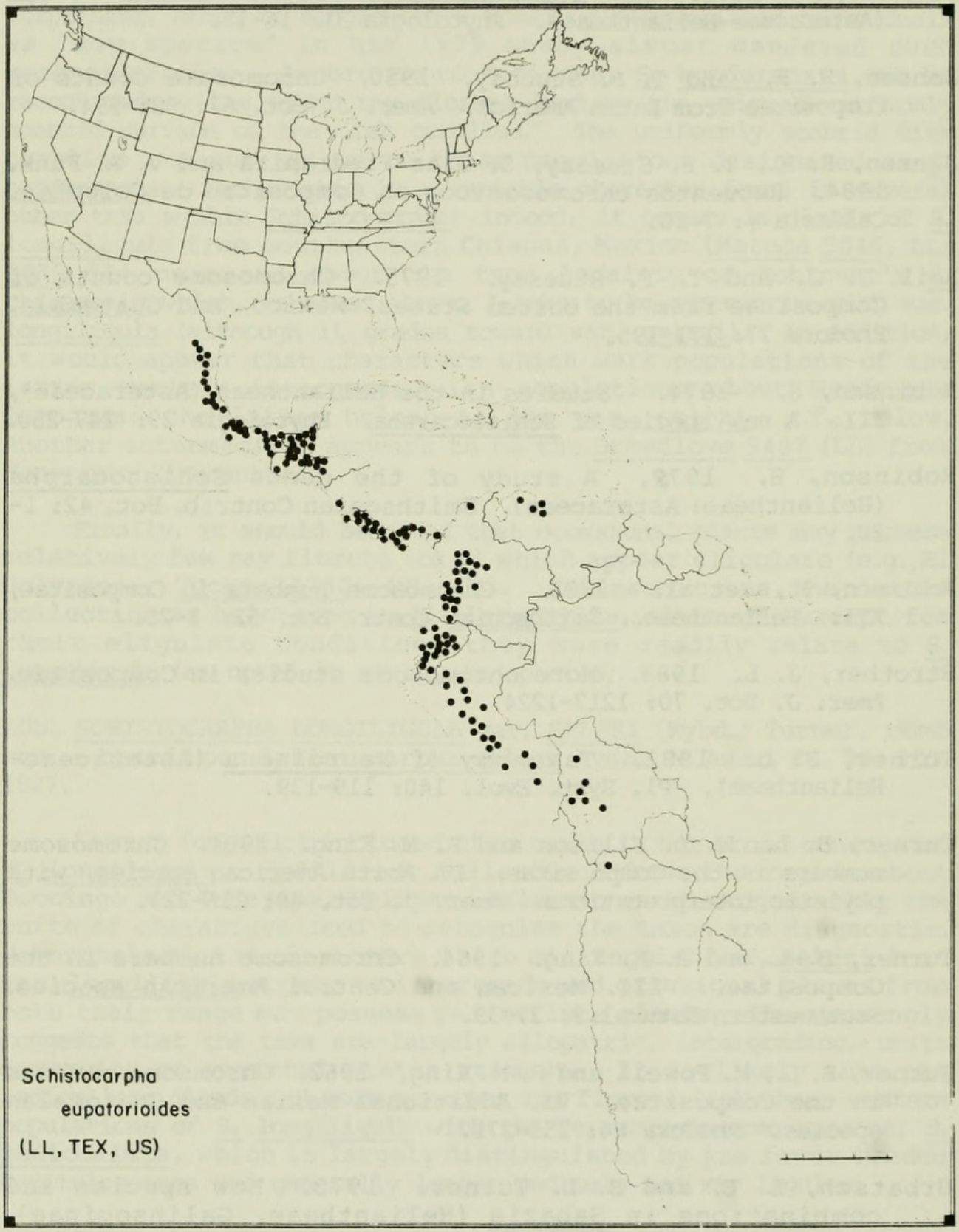

Fig. 1. Schistocarpha eupatorioides

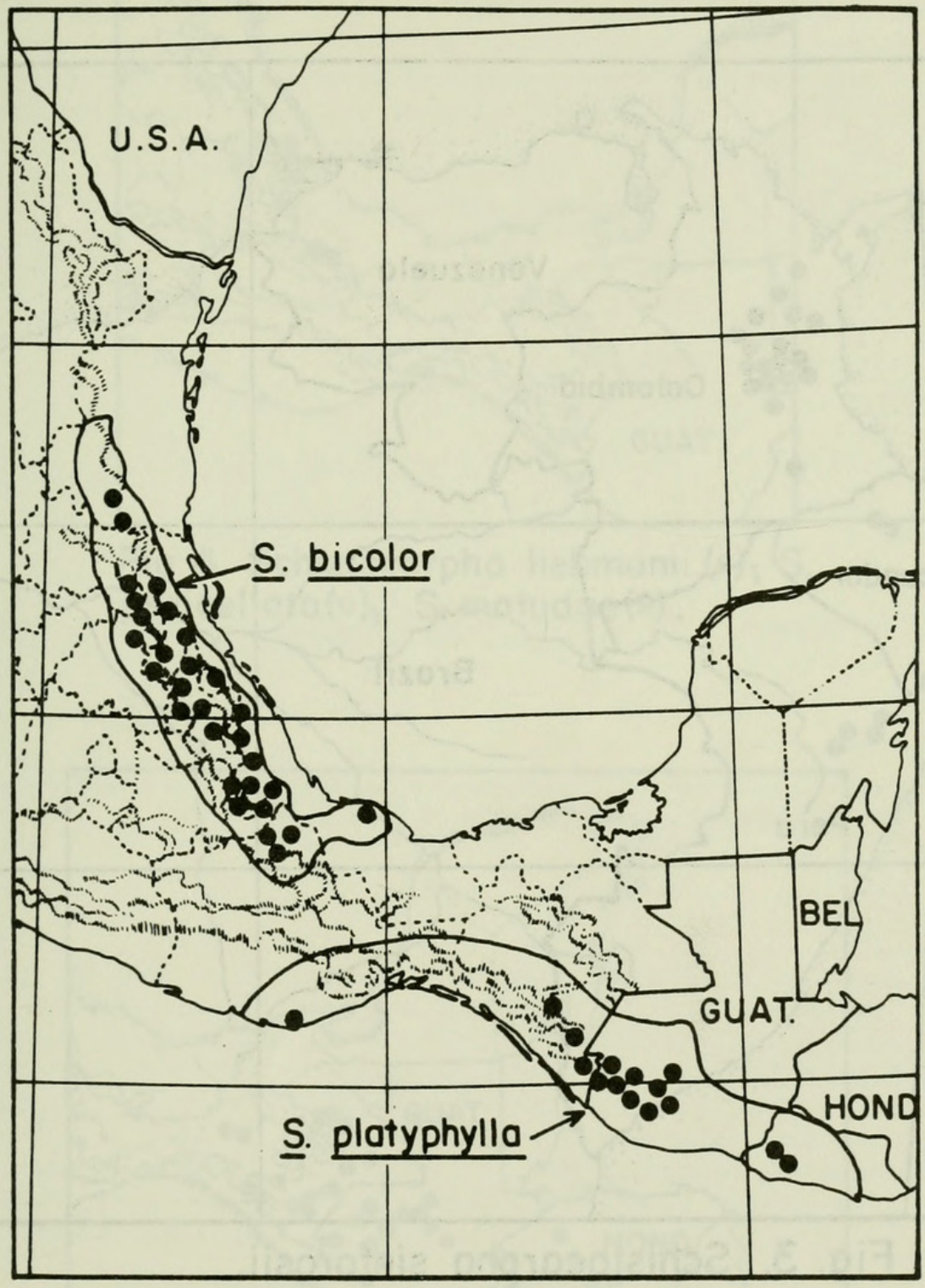

Fig. 2. Schistocarpha bicolor; S. platyphylla.

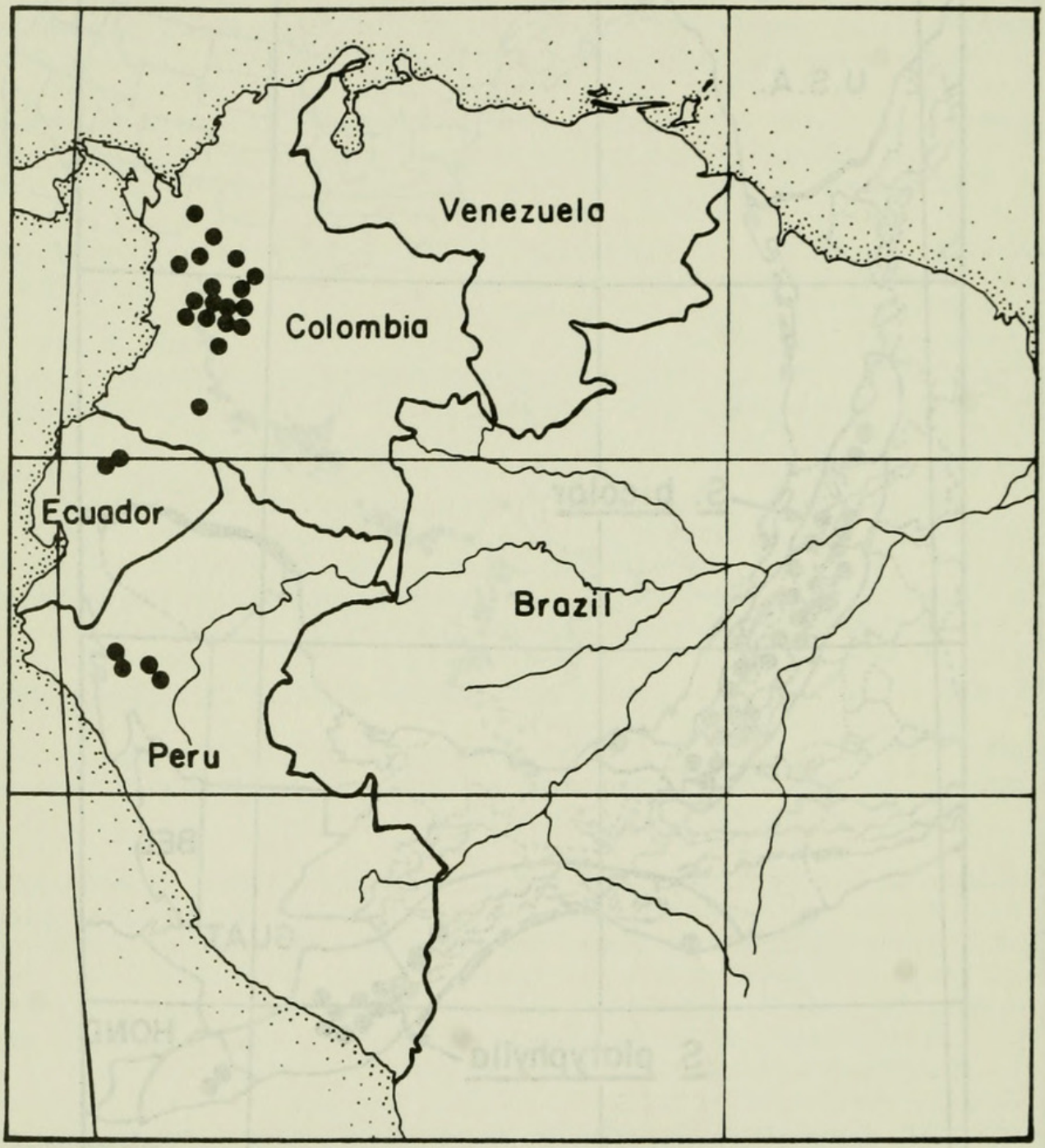

Fig. 3. Schistocarpha sinforosii.

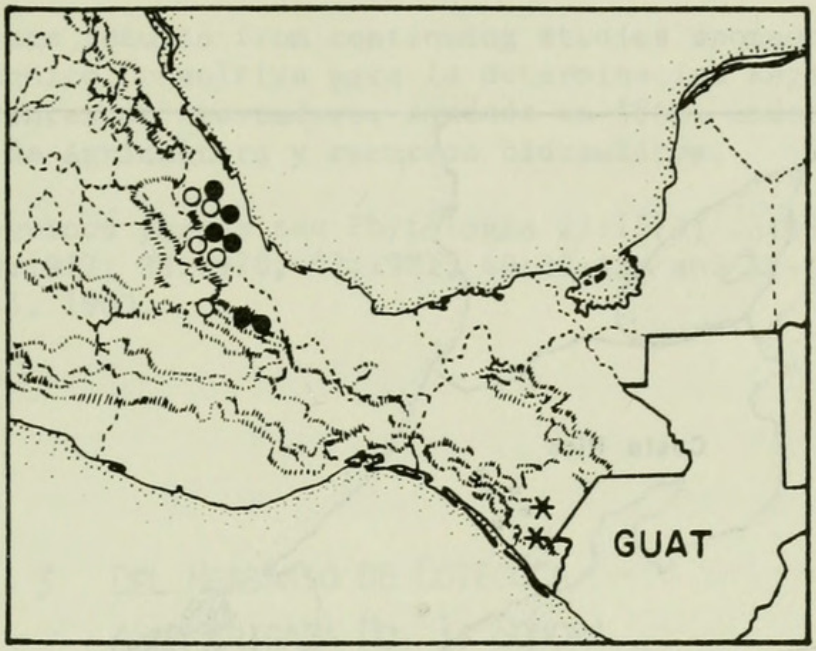

Fig. 4. Schistocarpha liebmanii (•); S. pedicellata(○); S. matudae(*).

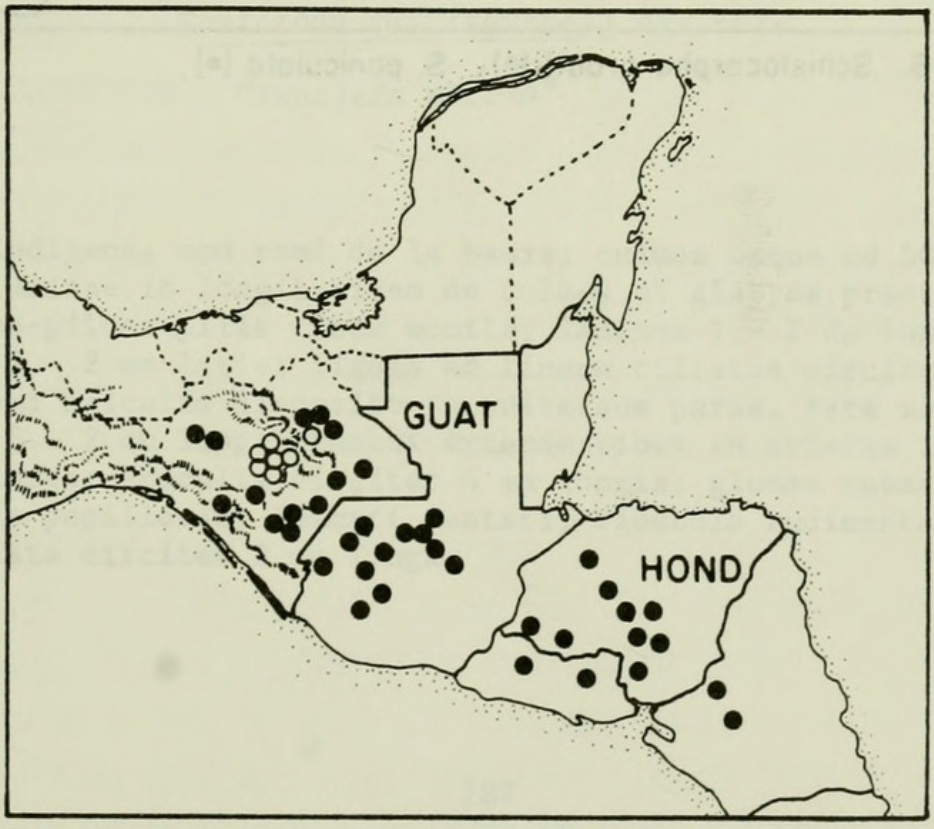

Fig. 5. Schistocarpha longiligula var. longiligula (•); var. seleri (○).

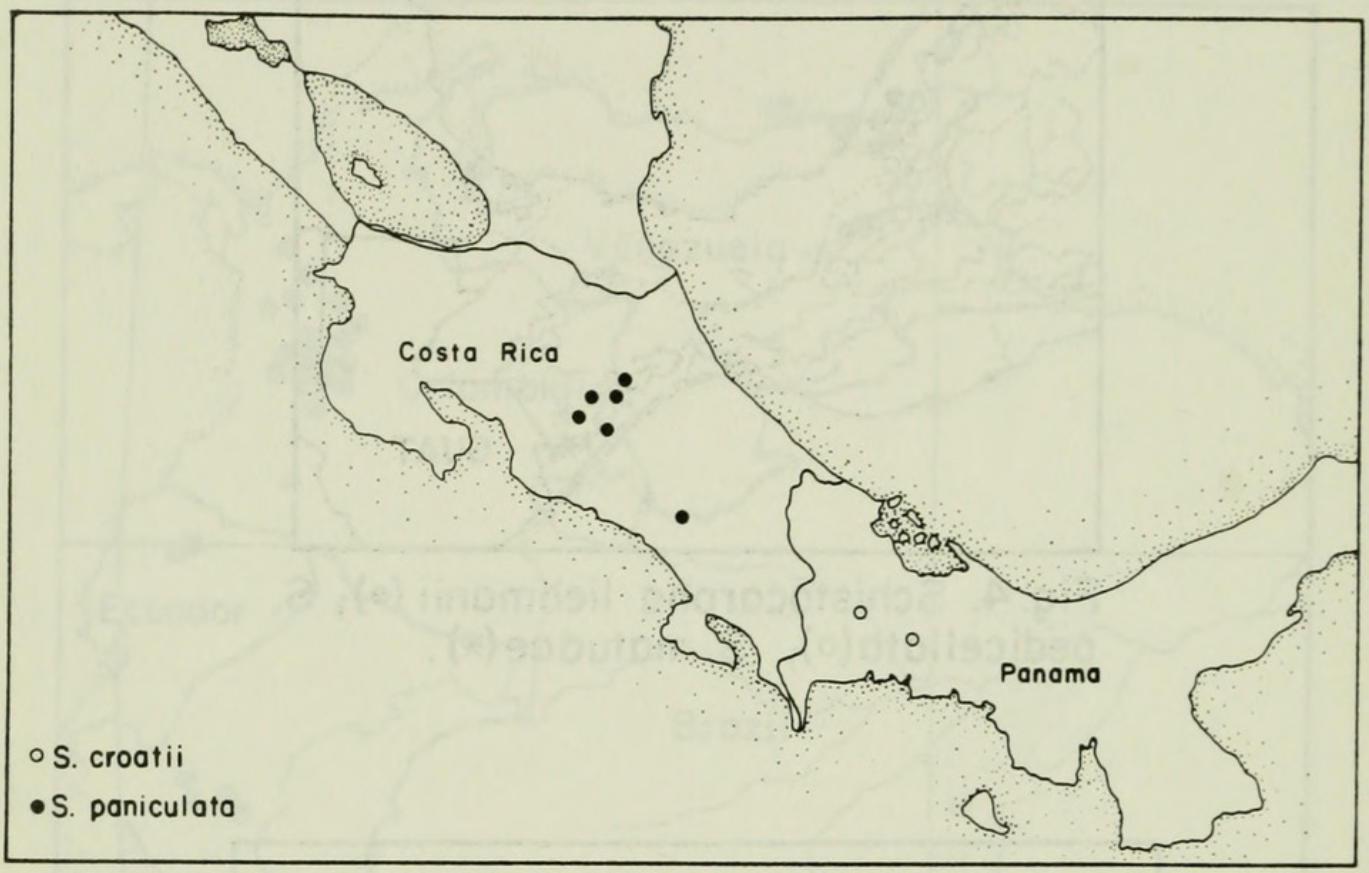

Fig. 6. Schistocarpha croatii(○); S. paniculata (●).