热带亚热带植物学报 2000, 8(1):11－16
Journal of Tropical and Subtropical Botany

梧桐科一些属的分类位置探讨

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摘要：梧桐科(Sterculiaceae)是锦葵目中的一个多型科，科的特征比较多样化。自从E. P. Ventenat (1830)建立该科以来，对于该科范围和包含的属种数目，各国学者至今尚存在各种不同的看法。作者认为，火桐属(*Erythropsis*)应当从梧桐属(*Firmiana*)中分出成为单独的属；午时花属(*Pentapetes*)不应归入锦葵科(Malvaceae)，应当置于梧桐科；田麻属(*Corchoropsis*)与午时花属的形态特征很近似，可置于梧桐科的当比亚族(Dombeyeae)中；梅蓝属(*Melhania*)和平当树属(*Paradombeya*)仍置于梧桐科。滇桐属(*Craigia*)原归入椴树科(Tiliaceae)，但因其花果形态与蚬木属(*Excentrodendron*)和柄翅果属(*Burretiodendron*)有很大差别，应单独成立为滇桐亚科(Craigioideae S. J. Xu et Hsue subfam. nov.)。

关键词：梧桐科；分类位置；椴树科

中图分类号：Q949.757.5 **文献标识码**：A **文章编号**：1005－3395(2000)01－0011－06

COMMENTS ON THE TAXONOMIC POSITION OF SOME GENERA IN STERCULIACEAE

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Abstract: Sterculiaceae is a polytypic family with greatly diverse characteristics in Malvales. Till now many authors have no uniform agreement on the demarcation and the numbers of genera since E. P. Ventenat established this family in 1830. According to our studies, we agree that *Erythopsis* should be separated from *Firmiana*. *Pentapetes* should not be placed in Malvaceae, its characters are quite different from that of Malvaceae, so it is better to maintain it in the Sterculiaceae. On account of the pollen morphology and some other characters, *Craigia* is similar to that of some genera of Tiliaceae, and should be placed in Tiliaceae, but the flower and fruit characters of which are quite different from *Excentrodendron* and *Burretiodendron*, so we suggest establishing a new subfamily, namely Craigioideae S. J. Xu et Hsue subfam. nov. in the Tiliaceae to accommodate the *Craigiae*. *Pentapetes, Corchoropsis, Paradombeya* and *Melhania* should be placed in Sterculiaceae.

Key words: Sterculiaceae; Taxonomic position; Tiliaceae

收稿日期：1999－09－08

基金项目：广东省高等学校基础研究重点课题资助项目.

Sterculiaceae is a polytypic family with greatly diverse characteristics in Malvales. It comprises trees, shrubs, herbs and lianas; the flowers are unisexual or bisexual, monochlamydeous or dichlamydeous, forming various inflorescence, ovary simple with 1 locule or compound with many locules, staminodes and androgynophore absent or present in some species. Fruit is capsular, follicular or a drupe. But the plants of this family are more or less stellate-pubescent, stipulate; flowers are always with staminodes, anther 2-celled. Therefore, no uniform agreement is found about the demarcation and the numbers of genera since E. P. Ventenat established the family in 1830.

According to Hutchinson[1] the Sterculiaceae comprised 68 genera with about 1100 species. Airy Shaw[2] transferred some genera to Malvaceae, Tiliaceae and Bombacaceae, and incorporated the genus *Corchoropsis* into Sterculiaceae, who recognized 60 genera and 700 species. He also pointed out that "the family probably requires considerable re-casting". A. Cronquist[3] held that there were about 65 genera and 1000 species in Sterculiaceae, and pointed out, "I see no need to depart from the traditional broad definition of the Sterculiaceae", as some authors proposed separating this family into two families, viz. Sterculiaceae and Byttneriaceae. T. C. Whitmore[4] considered that the Sterculiaceae containing about 60 genera and 700 species is very close to Tiliaceae, and on a world view, there is no sharp distinction between these two families. The main difference is the tendency for the stamens being joined as a tube or column in Sterculiaceae, and being mainly free in Tiliaceae. He also pointed out, "Hutchinson (1967) in his book Genera of Flowering Plant had suggested that the families should perhaps be united as one, but this is a task not to be undertaken without study on a worldwide basis, and the close relationship with Bombacaceae, Elaeocarpaceae and Malvaceae of Malvales and Euphorbiales must also be taken into account." B. D. Morley and H. R. Toeken[5] maintained 70 genera and about 1200 species in Sterculiaceae. N. S. Subrahamanyam[6] recognized 50 genera and about 750 species, and pointed out that the important characteristics of the Sterculiaceae are: 1. Herbs, shrubs or trees with stellate hairs, fibrous stem and mucilage sacs; 2. absence of epicalyx; 3. pentamerous flowers; 4. monadelphous stamens; 5. dithecous, extrorse anthers; 6. presence of staminodes; 7. endospermic seeds. It differs from Malvaceae in the absence of epicalyx and dithecous anthers, and the Tiliaceae can be distinguished from this family by its introrse and dithecous anthers. These comments are basically ture, but there are some exceptions. For example, in the genus *Burretiodendron* of Tiliaceae, the anthers are extrorse. Many species of Tiliaceae have 2-celled and apical porandrous anthers. D. J. Mabberbey[7] recognized 67 genera and 1500 species.

As the Sterculiaceae is a polytypic family, in some genera there seems to be no clear line of demarcation from some members of Malvales, especially some genera of Tiliaceae. That is why Hutchinson suggested that the two families (Sterculiaceae and Tiliaceae) should

perhaps be united as one. Airy Shaw[2] also considered that the Sterculiaceae probably requires considerable re-casting. Due to the lack of uniformity in selecting diagnostic characters, in the conception and limitation of this family, the number of genera and species recognized by previous authors are quite different. In the course of a study on the geographical distribution and the characteristics of the genera of Sterculiaceae, we also realized that the characteristics in the families of Malvales are very similar or even overlapped. It seems reasonable to transfer some genera originally placed in Sterculiaceae to other families, and to incorporate some genera into Sterculiaceae from other families. But there are difficulties, just as T. C. Whitmore[4] have mentioned, there is no sharp distinctions between Sterculiaceae and Tiliaceae.

Now we have comments on the taxonomic position of some controversial genera.

1. *Erythropsis* Lindley ex Schott & Endl.

There are different views in authors whether the genus *Erythropsis* should be separated from *Firmiana*. Ridley[8], Airy Shaw[2] and Hsue[9,10] maintained it as a separate genus, but Kostermans[11] treated it as a synonym of *Firmiana*. Based on the differences in the habit and floral morphology, i.e. *Erythropsis* with proteranthus (flowering before the leaves), calyx-tube tubular or cylindric, shallowly 5-toothed at apex, ovary tapering gradually to the 5 recurved stigmas, while *Firmiana* with hysteranthus (flowering after the leaves), calyx divided nearly to the base, lobe reflex, style distinct from the ovary, stigmas capitate, they are quite different. It is reasonable to separate *Erythropsis* from *Firmiana*.

2. *Pentapetes* Linn.

Airy Shaw[2] mentioned that this genus perhaps should be placed in Malvaceae. However, the plants of this genus have three conical, caducous bracteoles, five liguliform staminodes, which are equalling the petals, and dithecous extrorse anthers. These characters are quite different from that of Malvaceae. So it is better to maintain it in the Sterculiaceae.

3. *Corchoropsis* Sieb. & Zucc.

Hutchinson[1] in his book "Genera of Flowering Plants" pointed out that the genus *Corchoropsis* should be excluded from Sterculiaceae and transferred into Tiliaceae. Chang et Miau[12] also transferred this genus into Tiliaceae, but Airy Shaw maintained it in Sterculiaceae. Recently, Tang[13] was in favour of Airy Shaw's treatment.

The flower of *Corchoropsis* has 15 fertile stamens (every 3 in a bundle) and 5 spathulate staminodes. Considering these characters, it is reasonable to place it in the Sterculiaceae. *Corchoropsis* is close to *Pentapetes* and can be put in the Tribe Dombeyeae of Sterculiaceae. Actually, as early as 1933, Handel-Mazzettii in "Symbolae Sinicae" (Vol. 7, part 3) [14] was in favour of placing it in the Sterculiaceae.

4. *Paradombeya* Stapf

Airy Shaw[2] and D. J. Mabberbey[7] treated it as a member of Bombacaceae. The plants of this genus are small trees or shrubs; flowers small, congested in axils of leaves; calyx divided nearly to the base, lobes ovate-lanceolate; stamens 15, every 3 connate into a bundle and alternate to the spathulate staminodes; anther 2-celled, longitudinal dehiscence. In Bombacaceae, the flowers are large and showy, solitary or clustered; calyx cup-shape, truncate or irregularly 3－5 lobed at apex; seeds often enveloped by cottony hairs developed from endotesta. These remarkable differences do not support the notion of close affinities between this genus and any member of the Bombacaceae. So it would be better to maintain it in the Sterculiaceae. Tang[15] also had the opinion that the genus *Paradombeya* should be placed in the Sterculiaceae.

5. *Melhania* Forsk.

Airy Shaw (1973) suspected whether this genus should be transferred into Malvaceae, but the characters, viz. flowers solitary, with 3 epicalyx-like bracteoles; stalk of stamens very short, cup-shaped; staminodes 5, spathulate, conspicuous; anther 2-celled, longitudinal dehiscence, are very similar to those of the Sterculiaceae. Tang[16] also placed it in Sterculiaceae. Considering all these characters as a whole, it would be better to maintain the genus *Melhania* in Sterculiaceae.

6. *Craigia* W. W. Smith & W. E. Evans

On account of pollen morphology which is similar to that of some genera of Tiliaceae, Erdtman[17] remarked that the taxonomic position of the genus *Craigia* was uncertain, but Hutchinson[1] still treated it as a member of Sterculiaceae. Recently, Chinese botanists, Chang and Miau[12,18], Hsue and Long[19－24], published many papers on this topic. Taking all the characteristics into consideration, we agreed that *Craigia* should be placed in Tiliaceae as the treatment in the "Flora Reipublicae Popularis Sinicae" Vol. 49 No. 1. (1989) and Vol. 49 No. 2 (1984)[9,12].

Chang and Miau[18] transferred *Craigia* into Tiliaceae and created a new Tribe Craigieae, and together with the genus *Excentrodendron* and *Burretiodendron* established a new subfamily, Excentrodendroideae H. T. Chang et R. H. Miau.

Based on the characters that the flowers of *Craigia* are bisexual, apetalous; the staminodes are 10, in pairs and shortly stalked, with 4 stamens concealed in each pair of staminode, and the samara has nerved wings; these are quite different from *Excentrodendron* and *Burretiodendron*, of which the flowers are unisexual or bisexual, with calyx and petal, without staminodes, samara smooth and not nerved. The particular importance is the above-mentioned characters of the staminodes and stamens in *Craigia*, which are unique in Tiliaceae, as well as in all members of angiosperms. So we suggest establishing a new

subfamily, viz. Craigioideae, in the Tiliaceae to accommodate the Craigiae.

Craigioideae S. J. Xu et Hsue subfam. nov. (Tiliaceae)

Arbor. Flos bisexualis; sepalis 5, libris, crassis et carnosis; petalis deficientibus; staminodiis 10, binatim connatis, in quoque pari staminodiorum staminibus 4 cincto; ovariis sessilibus. Samara nervosa.

Typus subfamiliae: *Craigia* W. W. Smith et W. E. Evans

Tribe 1. Craigideae H. T. Chang et R. H. Miau in Acta. Sci. Nat. Univ. Sunyatsen. **3**: 20. 1978. Consisting one genus and two species.

Craigia W. W. Smith et W. E. Evans

Craigia yunnanensis W. W. Smith et W. E. Evans in Trans. Proc. Bot. Soc. Edinb. **28**: 64. 1921.

China: Yunnan.

Craigia kwangsiensis Hsue in Acta Phytotax. Sin. **13**: 107. 1975.

China: Guangxi.

Craigioideae differs from Tilioideae of Tiliaceae by its ten staminodes in pairs and shortly stalked, with 4 stamens concealed in each pair of staminode; petals are absent.

To sum up, in the course of this study, we have realized that the Sterculiaceae is a polytypic family greatly diversed in many characteristics, therefore, there are controversies on the taxonomic position of some genera. As there is no one single character can separate these three families of Malvales, we have to take account of the all important characters to find out a relatively natural system, and can not arbitrarily change the traditional system.

Acknowledgment

We appreciate the helpful comments on the manuscript of this paper offered by Prof. Hu Chi-ming and Prof. Wu Te-lin of South China Institute of Botany, The Chinese Academy of Sciences, and Prof. Li Ping-tao of South China Agricultural University.

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