STUDIES IN THE GESNERIACEAE OF THE OLD WORLD

XXIX: A RECONSIDERATION OF GENERIC LIMITS IN TRIBE TRICHOSPOREAE

B. L. BURTT

It needs only a cursory glance at the tentative key to the genera of the tribe Trichosporeae in a previous paper (Burtt, 1963, pp. 208–209) to realize that a number of problems were then left unresolved. Now some headway has been made and certain decisions can be taken.

I admitted then that I could not deal satisfactorily with the genus *Tetradema* Schlechter. The crucial character on which Schlechter chiefly relied was that one of the terminal hairs on the seed of *Tetradema* was, so he said, the funicle; in *Aeschynanthus*, *Agalmyla* and *Dichrotrichum* it was an appendage unconnected with the attachment of the seed. On the face of it, there seemed something wrong with the idea that structures so similar should be of a fundamentally different nature. My difficulty was that, on the material then available to me, I just could not make convincing observations either to prove or disprove this statement. C. B. Clarke had already (1883, p. 15) used just this character to separate *Aeschynanthus*, *Agalmyla* and *Dichrotrichum* on the one hand from *Lysionotus* and *Loxostigma* on the other. Here again the apparent lack of homology between hair and capillary funicle was strangely puzzling but there was no reason to doubt the observations.

To return to *Tetradema*, I have now been able to examine better material, in particular that collected by the Royal Society North Borneo expedition on Mt. Kinabalu. First, however, it may be said that I have confirmed the condition normally found in *Dichrotrichum*: the appendage at one end of the seed is brown, that at the other is hyaline: the seed is attached by a short funicle at the base of the hyaline appendage. My observations were made chiefly on the New Guinea species *D. villosum* Schlechter and agree with the description given by C. B. Clarke, who contradicted Reinwardt's original statement that one hair was the funicle. I have also confirmed the same condition in *Agalmyla parasitica*.

Kinabalu material (RSNB 769) of the plant that Schlechter called *Tetradema tuberculatum* (*Agalmyla tuberculata* Hook. fil., referred to *Dichrotrichum* by Bentham and by Clarke!) has now been examined. The hyaline appendage is broader and flatter than in true *Dichrotrichum* and the point of attachment of the funicle was near, but not quite at, the tip of this appendage. Now these appendages are not present in the ovule: they are post-fertilization developments. In *Tetradema* it thus appears that the zone from which the appendage grows includes the point of attachment of the funicle, which is thus carried up the appendage. It is therefore not a very great error to say that the terminal appendage is the funicle. The evidence from this new material shows how the situation may be interpreted without presenting the apparent contradiction of the non-homology of two very similar structures, filiform appendage and funicle, in two closely related plants.

Similarly it is reasonable to interpret the situation in *Lysionotus* as being

due to the growth of the appendage from the zone of the hilum, so that once again the point of attachment is carried up. Clarke mentioned that occasionally the hyaline appendage is bifid and I have seen it thus myself, but only on seeds already separated from the placenta. It is, however, very probable that this observation simply refers to instances where there has been a separate growth of funicle and appendage instead of the normal coalescence into a single structure.

There is another point made about *Tetradema*; the leaves of a pair are said to be more or less equal, not very unequal as in *Agalmyla*. Once again RSNB 769 permits a more adequate study than was previously possible. The high inequality of the leaves is just as marked in this *Tetradema tuberculatum* as it is in *Agalmyla*! It is however heavily disguised by two consecutive pairs of leaves being very closely approximate to one another; an apparent node really consists of 2 pairs of leaves each with one leaf well-developed and the other one reduced to a small stipuliform structure, the latter not being exactly opposite to the large leaf.

The plants associated together as *Tetradema* by Schlechter have a more bushy habit of growth than the elongate climbing *Agalmyla* and *Dichrotrichum*; the group is more homogeneous than I originally thought. But there is no fundamental difference. We will return to a decision on its status after examining the relationship of *Agalmyla* and *Dichrotrichum*.

Agalmyla parasitica (Lam.) O. Kuntze, the correct name for the type of the genus *A. staminea* Bl., has only two fertile stamens. The same is true of two other species, *A. beccarii* C. B. Cl. and *A. angustifolia* Miq. *Dichrotrichum*, as exemplified by the type species *D. ternateum* Reinw., differs from *Agalmyla* in the shape of the corolla, in the long peduncle and in possessing four fertile stamens. In the gradual expansion of the genus as new plants were discovered it was the character of 4 fertile stamens which was considered diagnostic. Thus *D. brevipes* C. B. Clarke has a short peduncle and corolla-shape approaching *Agalmyla*, but the characteristic androecium of *Dichrotrichum*.

In 1919 Schlechter gave the situation rather more formal recognition. He suggested that *D. borneense*, which he then described, and another species from Celebes would form a new section *Agalmylopsis*; curiously, he did not discuss the position of *D. brevipes*. In fact there is scarcely a specific difference between *D. borneense* and *A. parasitica* except in the number of fertile stamens. This was bad enough, but other plants in Borneo, including *Dichrotrichum bracteatum* Stapf, come exactly between a good *Dichrotrichum* and a good *Agalmyla*. They have 4 fertile stamens, but one pair has anthers only half the size of those of the other. An exactly similar condition was found in Bornean plants of *Rhynchoglossum* and helped to confirm the reduction of *Klugia* to that genus (see Burtt, 1962, p. 167). Further afield I have already referred to a similar condition in *Didissandra begoniifolia* Lévl. (Burtt, 1960, p. 100). C. B. Clarke's boast (1883, p. 7) that he had made all the genera of Gesneriaceae either wholly tetrandrous or wholly diandrous is shown to have been ill-advised. There are clearly many instances where intermediate stages in the transition still survive, and as a sole generic distinction the difference is far too weak to be trusted. One remembers too that the monotypic *Protocyrtandra* Hosokawa differs from the huge genus *Cyrtandra* only in having four fertile anthers: as a "genus" it serves little purpose.

Dichrotrichum sect. *Agalmylopsis* must certainly be included in *Agalmyla*.

Can the genus *Dichrotrichum* be retained for species close to the type, *D. ternateum*? Here one would have to rely on the less arcuate corolla with more spreading lobes and on the long peduncle.

In seeking a sound decision on the status of *Agalmyla*, *Dichrotrichum* and *Tetradema* it is reasonable to give consideration to the concepts in use in other groups of the Gesneriaceae. One immediately thinks of three large genera: *Aeschynanthus*, *Cyrtandra* and *Columnea*. In *Aeschynanthus* the main sections of the genus are based on the seed-appendages; the four types are, a short thick appendage at each end, a single hair at each end, a single hair one end and two the other, and a single hair one end and a tuft of hairs at the other. This range is greater than that offered by *Agalmyla*, *Dichrotrichum* and *Tetradema* combined. In habit the more bushy growth of *Tetradema* and the long climbing habit of most *Agalmyla* and *Dichrotrichum* is paralleled by bushy and trailing types in both *Aeschynanthus* and *Columnea*. The range from the nearly actinomorphic corolla of *Dichrotrichum* to the strong bilateral symmetry of *Agalmyla* is no more than that between subgenus *Collandra* and subgenus *Columnea* in *Columnea*. Another American genus, *Rechsteineria*, has a similar range in corolla form, from the nearly actinomorphic corolla of *R. lineata* to the hooded strongly zygomorphic corolla of *R. cardinalis*. Similarly the difference in corolla-form between *Dichrotrichum* and *Agalmyla* is less than between the white-flowered *Cyrtandra cymosa* Forst. with an almost regular corolla limb and the red-flowered *C. bracteata* Warb. which is typical of *Cyrtandra* subgenus *Glossophora* Schlechter (1923, p. 342).

If we unite *Agalmyla*, *Dichrotrichum* and *Tetradema* a genus emerges which is in every way comparable to *Aeschynanthus*, *Columnea* or *Cyrtandra*. The taxonomic position gains immeasurably in clarity thereby. *Agalmyla* as a genus restricted to a few species with only two fertile anthers is meaningless, a mere super-species: it must be united to other plants essentially similar but showing a sensible degree of variation: only then does it become a genus.

It may be felt unfortunate that the larger genus *Dichrotrichum* must be swallowed up in the smaller but older *Agalmyla*; nevertheless the name is more euphonious and *Agalmyla parasitica* is certainly the best known species in the whole group.

Some few new combinations into *Agalmyla* are made below when the position seems to be clear beyond doubt and the names are currently needed. I am not prepared at this juncture, however, to embark on a wholesale transfer of all the species proposed in *Dichrotrichum*. There are probably more names than species and unfortunately it is the earlier ones (such as *D. chalmersii* F. Muell., *D. triflorum* Valeton) about whose correct application there is most uncertainty. The specific epithet of even *D. ternateum*, the type of the genus, needs investigation. For the time being I am quite prepared to use the names in the form, for example, *Agalmyla* (*Dichrotrichum chalmersii* F. Muell.).

In this reconsideration of Trichosporeae the genera closely allied to *Aeschynanthus* have also been appraised against the wider generic background. *Oxychlamys* is still unknown to me apart from the original description and illustration, but it seems more than ever just an anomalous *Aeschynanthus*, for I now know that deeply 5-partite calyces and calyces split on one side occur in closely related species of *Cyrtandra*. I shall refer to this plant, if

occasion arises, as *Aeschynanthus* (*Oxychlamys pullei* Schlechter) until good material becomes available.

Euthamnus Schlechter cannot be keyed out on its erect terrestrial habit. In suggesting this in the earlier paper I entirely overlooked such species as the Malayan *Aeschynanthus rhododendron* which is also an erect terrestrial shrub. The pedunculate bracteate inflorescence of *Euthamnus* is, of course, well known in the Indian *Aeschynanthus bracteatus* Wall. I have now seen one specimen (NGF 14197, foot of Red Hill, near Oomsis, Wau-Lae road, Morobe district, Territory of New Guinea) which I identify as *Euthamnus* despite its being described as a climber. I see no reason to keep it out of *Aeschynanthus*.

Finally there is *Micraeschynanthus* Ridley, another genus that has been found but once. Its short campanulate corolla was distinctive enough, but there seems to be nothing else to go with it, and one even wonders if it was normal. The description could fit an *Aeschynanthus* flower that had opened in the bud condition. However, we have no data on which to make a decision; although we cannot say that there really is such a genus, it must remain in the key for the time being.

The results of the anatomical survey just made by Dr. E. Rosser have been taken into consideration in reaching these conclusions. Anatomy does not contradict gross morphology and it has therefore seemed convenient to deal with the taxonomy first and thereby exclude nomenclatural complications from the anatomical paper. Dr. Rosser's work which was done as a comparison of *Agalmyla* (sensu stricto) and *Dichrotrichum* is therefore published as an account of anatomical variability in *Agalmyla* (sensu lato). Some further discussion in the light of the anatomical evidence will be found at the end of that paper, to be published shortly.

There is no need to say anything about the two remaining genera of Trichosporeae, *Lysionotus* and *Loxostigma*, at the moment: their limits are not in doubt. The nature of the funicle—appendage on the seed has already been discussed (p. 219).

The following key may now be found simpler than that previously given.

1a. Corolla not exceeding the calyx, tube shorter than lobes, campanulate; anthers 4, free, longer than their filaments. *Micraeschynanthus* Ridley

1b. Corolla exceeding the calyx, tube much longer than lobes; anthers 2–4, joined in pairs at the tip, much shorter than filaments . . . 2

2a. Anthers exserted from corolla-tube, if scarcely so then corolla bright red 3

2b. Anthers included in corolla-tube, corolla never bright red . . . 4

3a. Leaves opposite or whorled, more or less equal, more or less entire, leathery or fleshy, lateral veins immersed; stigma capitate with a horizontal median groove; appendages of the seed hyaline . . . . . *Aeschynanthus* Jack

3b. Leaves of a pair very unequal, or apparently alternate, often strongly toothed, herbaceous, main veins raised on the lower surface; stigma divided vertically into two lamellae; seeds with a hyaline appendage at one end and a brown one at the other . . . *Agalmyla* Blume

4a. Fertile stamens 2; leaves fleshy, more or less equal, often whorled; corolla slightly swollen on lower side, with yellow lines in throat; fruit drying light brown . . . . . *Lysionotus* G. Don

4b. Fertile stamens 4; leaves herbaceous, those of a pair very unequal in size, never whorled; corolla strongly ventricose, spotted within; fruit drying almost black . . . . . *Loxostigma* C.B.Cl.

The reduction of *Euthamnus* necessitates the following new combination:-

Aeschynanthus papuanus (Schlechter) B. L. Burtt, **comb. nov.**

Syn.: *Euthamnus papuanus* Schlechter (1923, p. 284).

The synonymy of *Agalmyla*, in the sense now adopted, follows. To this is added a description of the genus, and the new combinations that it seems desirable to make at present. Some new Bornean records will follow in a later contribution. *Tetradema urdanatense* (Elmer) Merrill, based on *Dichrotrichum urdanatense* Elmer is unknown to me. The epithet *asperifolia* will be found in all three genera: this comes from *Agalmyla asperifolia* Blume (1826, p. 767) and Dr. Bakhuizen van den Brink (1950, p. 394) has shown recently that the type of this is the plant that was previously long known as *Chirita blumei* C.B.Cl.; Bakhuizen includes *Chirita* in *Didymocarpus*, but accepting it as a distinct genus this plant is known as *Chirita asperifolia* (Bl.) B. L. Burtt. There is only one *Agalmyla* on Java, *A. parasitica*; I do not believe that those who used the epithet *asperifolium* in *Dichrotrichum* or *Tetradema* ever had Javanese material, although Java was always quoted in the distribution.

Agalmyla Blume (1826, p. 766).

Syn.: *Dichrotrichum* [Reinw. ex] de Vriese (1856, p. 7, tab. 1).
Dichrotrichum sect. *Agalmylopsis* Schlechter (1919, p. 213).
Tetradema Schlechter (1920, p. 359).

Bushy epiphytes or climbing plants with short roots produced along the stem. *Leaves* paired but those of a pair very unequal in size and the smaller not exactly opposite the larger; small leaf stipuliform or with short petiole and blade 1–2 cm long; large leaf variable in shape and indumentum but, even when nearly glabrous, the margin always bearing short, curved, more or less appressed hairs. *Inflorescences* axillary, subsessile to long-pedunculate; bracts variable in size; flowers cymose, in pairs at each dichotomy, much congested. *Calyx* 5-lobed or 5-partite. *Corolla* with almost straight or distinctly arcuate tube; lobes 5, almost regular, or more or less bilabiate, the upper lip of 2 lobes and the laterals spreading, or the two upper and two lateral lobes forming the upper lip; corolla red, with or without black lines on the lobes and yellow in the throat; inside of the tube with five patches or a continuous ring of hairs towards its base. *Fertile stamens* two or four didynamous; filaments exserted; anthers joined in pairs by their tips, if four then those of the shorter stamens sometimes smaller, thecae parallel, dehiscing longitudinally. *Disc* annular to cupulate, fleshy. *Ovary* linear passing into the style; placentae bilamellate, inrolled, ovuliferous only near the margins; stigma divided vertically into two lateral lamellae. *Fruit* elongate cylindric,

dehiscent. Seeds with a filiform appendage at each end, one brown, the other hyaline; seed attached at the base of, or near the top of the hyaline appendage.

Distribution: throughout Malesia from the Cameron Highlands in the Malay Peninsula to New Guinea. Endemic to this area.
Type species: **Agalmyla parasitica** (Lam.) O Kuntze (The correct name for *A. staminea* (Vahl) Blume).

New Combinations

Agalmyla borneensis (Schlechter) B. L. Burtt, **comb. nov.**

Syn.: *Dichrotrichum borneense* Schlechter (1919, p. 213).
Cyrtandra dolichocarpa Kraenzlin (1927, p. 102, f. 2)—non A. Gray (1862).

Agalmyla bracteata (Stapf) B. L. Burtt, **comb. nov.**

Syn.: *Dichrotrichum bracteatum* Stapf (1894, p. 213).

Agalmyla clarkei (Elmer) B. L. Burtt, **comb. nov.**

Syn.: *Dichrotrichum clarkei* Elmer (1910, p. 954).
D. praelongum Kraenzlin (1913, p. 170)—fide Merrill.
Tetradema praelongum (Kraenzlin) Schlechter (1920, p. 361).
T. clarkei (Elmer) Merrill (1923, p. 453).

Agalmyla johannis-winkleri (Kraenzlin) B. L. Burtt, **comb. nov.**

Syn.: *Dichrotrichum johannis-winkleri* Kraenzlin (1927, p. 84).

Agalmyla rubra (Merrill) B. L. Burtt, **comb. nov.**

Syn.: *Trichosporum rubrum* Merrill (1906, p. 227).
Tetradema rubrum (Merrill) Schlechter (1920, p. 358).

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