

DUABANGA TAYLORII JAYAWEERA (SONNERATIACEAE) A PUTATIVE HYBRID

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SUMMARY

The differentiating characters of *Duabanga grandiflora* (Roxb. ex DC.) Walp., *D. moluccana* Bl., and *D. taylorii* Jayaweera are given. Most characters of *D. taylorii* appear to be intermediate between those of the other two species; a few characters represent combinations of those of the two other species; one character is not shared by the other species.

From this evidence it is supposed that *D. taylorii* is a hybrid.

This suggestion is sustained by the history of the specimens on which *D. taylorii* is based.

An attempt to count chromosomes of *D. taylorii* and *D. grandiflora* failed, probably due to the unsuitability of the fixative for this purpose.

INTRODUCTION

In 1951 Backer & van Steenis revised the *Sonneratiaceae*, distinguishing in the genus *Duabanga* two species, viz. *D. grandiflora* (Roxb. ex DC.) Walp. and *D. moluccana* Bl.

In 1967, Jayaweera published a revision of the genus *Duabanga*, in which he distinguished, besides these two species, a new one, *D. taylorii* Jayaweera. This species was based on specimens growing in the Royal Botanic Garden at Peradeniya, Ceylon. These specimens were grown from seed, introduced in c. 1853, probably from the Botanic Gardens at Bogor, Java.

This drew the attention of Dr. van Steenis who put forward that the new species might be a hybrid between the two species already known, as according to the Catalogue of Hortus Bogoriensis by Teysmann & Binnendijk (1866: 241) both were cultivated in the Bogor Botanic Gardens at that time. Therefore he suggested to me to study this case in detail.

REVALUATION OF THE CHARACTERS

In the table the differentiating characters of the three species of *Duabanga* are listed. Most of the characters of *D. taylorii* (in indumentum, pedicel, calyx, corolla, stamens, and ovary) appear to be intermediate between those of the other two species.

A few characters, viz. in the anthers and in the ripe fruit, are not 'simply' intermediate and need further attention. In *D. grandiflora* the anthers are somewhat longer than in *D. moluccana* and in *D. taylorii*. The thecae in *D. moluccana* are recurved over one end of the anther as in *D. taylorii* (fig. 1b' & 1c'); in *D. grandiflora* the thecae are somewhat bent at both ends (fig. 1a'). In *D. moluccana* the thecae are longer than in *D. taylorii* which in turn has longer thecae than *D. grandiflora*. Thus, the anthers of *D. taylorii* have the shape of those in *D. moluccana*, but the size of its thecae is intermediate between those of the other two species.

In *D. taylorii* the fruit is ovoid as in *D. grandiflora*, whereas *D. moluccana* has ellipsoid fruits, but that of *D. taylorii* is distinctly smaller than those of the other two species (fig. 1b, 1a, and 1c resp.).

TABLE I	<i>D. grandiflora</i>	<i>D. taylorii</i>	<i>D. moluccana</i>
Indument	plant glabrous	all parts tomentose when young, glabrescent	all parts tomentose when young, glabrescent, except the rachis
Pedicels	in anthesis c. 20 mm	in anthesis c. 12 mm	in anthesis c. 8 mm
Calyx	6-8 lobes, to c. 25 x 13 mm	4(-7) lobes, to c. 20 x 18 mm	4 lobes, to c. 16 x 10 mm
Corolla	6-8 petals, to c. 44 x 27 mm	4(-7) petals, to c. 27 x 21 mm	4 petals, to c. 18 x 11 mm
Stamens	more than 50, in 1 whorl [■]	24-45, in 1 whorl	12, in 1 whorl
Anthers	10-11 mm long	8-10 mm long	8-10 mm long
Thecae	± curved at both ends, 12-13 mm long	recurved over one end, 12-14 mm long	recurved to halfway over one end, 13-15 mm long
Ovary	5-8-celled	4(-7)-celled	4-celled
Fruit	ovoid, up to c. 42 mm	broad-ovoid, up to c. 25 mm	ellipsoid, up to c. 37 mm

■) In literature (see bibliography) *D. grandiflora* is described as having the stamens in two whorls. I cannot confirm this and find them in one whorl, the line of insertion being occasionally somewhat zigzag.

CHROMOSOMES

An attempt was made to count the chromosomes in *D. taylorii* and in *D. grandiflora*. The method applied was that of Muller & Hou-Liu (1966). Unfortunately, the material at my disposal was fixed in FAPA which is hardly suitable for the counting of chromosomes. The anthers were stained in Fe-aceto-carmin as well as in aceto-orcein (the best fixative for these staining methods is Carnoy's solution: alcohol abs. and acetic acid in 3: 1 vol. parts).

Flower buds of *D. taylorii* with a length of 12-13 mm contained stamens with pollen-mothercells in metaphase II. The chromosomes were distinguishable but indistinct and very hard to count; in each cell the number was somewhere between $n = 10$ and $n = 15$.

Of *D. grandiflora* 13 mm long flower buds contained stamens in the same stage. Nuclear spindles were distinct, chromosomes were indistinguishable.

J. L. Thomas (1962) counted the chromosomes of *D. grandiflora* and observed $n = 24$.

From *D. moluccana* no fixed material was at my disposal; evidence on the number of chromosomes could not be found in literature.

DISCUSSION

Most of the characters of *D. taylorii* are intermediate between those of *D. grandiflora* and *D. moluccana*. A few characters, viz. in the anthers and in the fruit, look like combinations of characters of *D. grandiflora* and *D. moluccana*; the size of the fruit of *D. taylorii* is different. *D. taylorii* is very variable in the number of the flower parts, as demonstrated by Jayaweera (1967). Furthermore, there is the peculiar fact that *D. taylorii* has never been found in the wild state but is only known from four trees in the Peradeniya Botanic Garden, probably grown from an import from Bogor. However, it has never been grown in the Botanic Gardens at Bogor as far as known from the voucher specimens. As was usual in the Bogor Botanic Gardens species of the same family and genus were located close together in the compartments and parcels. In the 1930 Catalogue by Dakkus (Bull. Jard. Bot. Btzg III, Suppl. 1: 119) *D. moluccana* was in parcel VII. D sub no 44 and *D. grandiflora* in VII. D sub no 43, 39, and 64 (as *D. sonneratioides*), so that hybridisation could occur easily.

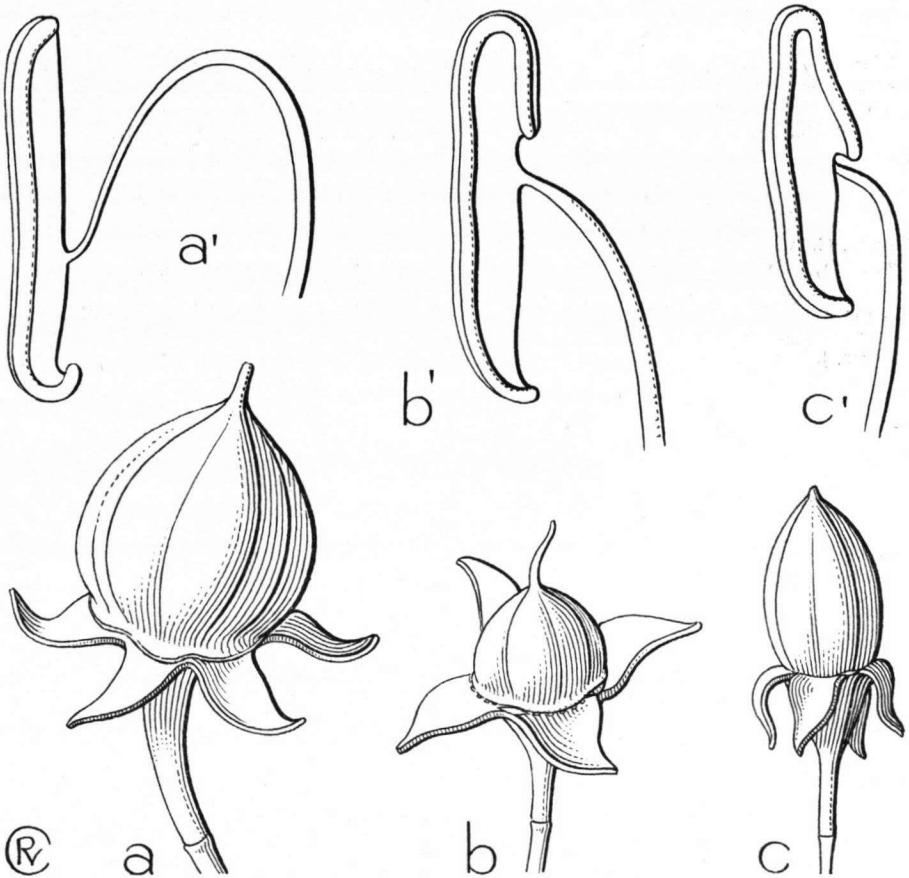


Fig. 1. Anthers. a'. *D. grandiflora*, $\times 5$ (Kerr 1032, L); b'. *D. taylorii*, $\times 5$ (Jayaweera 2497, L); c'. *D. moluccana*, $\times 4$ (PNH 19883, L). — Fruits. a. *D. grandiflora* (Bloembergen s.n., L); b. *D. taylorii* (Jayaweera 2951, PDA); c. *D. moluccana* (Kostermans 468, L), all nat. size.

All these arguments seem to fit in with the opinion that *D. taylorii* is a primary hybrid.

Further investigation, preferably to be executed at Bogor, should include (i) hybridisation of *D. grandiflora* and *D. moluccana* to check the fertility and to raise seedlings, (ii) in case hybrid seedlings are obtained a comparison of the karyology of the parents, of the seedlings, and of *D. taylorii*.

As a corollary, a conclusive proof of the hypothesis would have some taxonomic consequence. According to Jayaweera (in litt.) the seed of *D. taylorii* is for c. 95 % fertile; it is not known to me whether this was produced after selfing or cross-pollination. Whatever may be the case, this would show that *D. moluccana* and *D. grandiflora* are not such 'good species' as formerly assumed, but might be better regarded as disjunct, replacing subspecies. Good species may certainly be capable to hybridize, but then should show reduced fertility, both male and female; this is not realized in *D. taylorii* which has perfectly good pollen and seed.

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