# DISTALLY LOBED INTEGUMENTS IN SOME ANGIOSPERM OVULES

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In this treatise 'De l'Ovule' Warming (1878) remarked that although the borders of the integuments grow uniformly, very rarely a division into lobes can be observed. He mentioned *Symplocarpus foetida* (inner integument four-lobed), *Lagarosiphon schweinfurthii* (outer integument four- or five-lobed) and *Juglans regia* (two-lobed). Moreover he cited the report by some authors of an occasional occurrence of lobed integuments in a few more plants.

More recently Leroy (1955) described bilobed single integuments in *Juglans* and *Platycarya*. Boesewinkel and Bouman (1967) demonstrated that these lobes arise as two separate primordia in *Pterocarya* and *Juglans*.

## Scyphostegia borneensis Stapf

Until I met with this phenomenon myself I had no knowledge of its existence. I cannot remember of ever having it seen described in any text-book. I noticed it in *Scyphostegia borneensis*, a peculiar endemic from Borneo (van Heel, 1967). Here a figure from that paper is reproduced (fig. 1), showing the lobedness of the distal part of the outer integument around the exostome. There are five lobes, a median one on the raphe side and two pairs of lateral ones. They are unequal, the middle lateral ones being the shortest (the most reduced). Systematically, *Scyphostegia borneensis* constitutes a family of its own, basally in the *Parietales*, with some affinity to the *Flacourtiaceae*.

## Caloncoba welwitschii (Oliv.) Gilg

In the course of my arilloïds research I came across another case of distally lobed outer integuments in the above mentioned plant, note well a plant which by taxonomists is placed basally in the *Flacourtiaceae*.

The material was *W. J. de Wilde 2007* from Cameroun, 1964. It contained some post-flowering pistils which were crammed with anatropous ovules on five parietal placentae. In younger pistils the ovules did not yet show lobedness of the integuments. Old ovules or young seeds were absent in this material. Owing to the extreme crowding many ovules show deformations, the outer integument may even grow like a sucker over the top of a neighbouring ovule. So the lobedness is best shown in the larger ovules that are placed more freely near the top or the base of a placenta. The lobes are short and narrow. Their inequality could be related to the anatropy of the ovule. There is a distinct and shorter lobe medianly on the far side and there are two lateral ones. The knob between exostome and funicle — the alleged distal integument part on the raphe side — may be either unlobed or bilobed. If it is bilobed five lobes result (fig. 2b), in a position alternate with that described for *Scyphostegia borneensis*. However, I discovered one ovule showing the *Scyphostegia* arrangement (fig. 2 left).

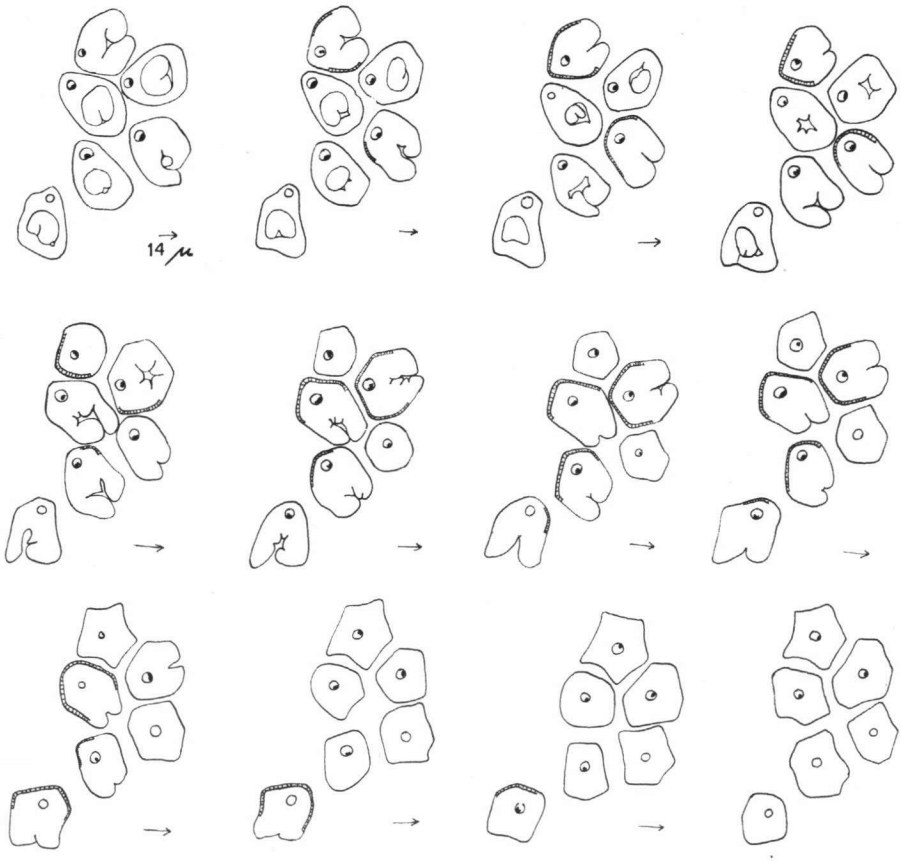


Fig. 1. Series of downward cross sections through 6 young ovules at micropylar level in *Scyphostegia borneensis* Stapf (17×).

## Sterculia alexandri Harv.

In material from the Botanic Gardens of Kirstenbos, which I used for my *Malvales* studies, I noticed that the outer integuments terminated in a much separate narrow lobe on the far side. Moreover, there were two rounded lateral lobes, giving a total of three lobes to which must be added the usual integumental knob on the raphe side. Thus the conspicuous lobe on the far side would correspond with a similar but less separate lobe in *Caloncoba welwitschii*.

## CONCLUSION

The admittedly ephemeral but nevertheless distinctly lobed edge in outer integuments may be considered of sufficient importance to be reported here and so to draw the attention of morphologists, for it may well be that it has occasionally been overlooked.

The distal lobedness may indicate a possible multiple structure of the integument. It

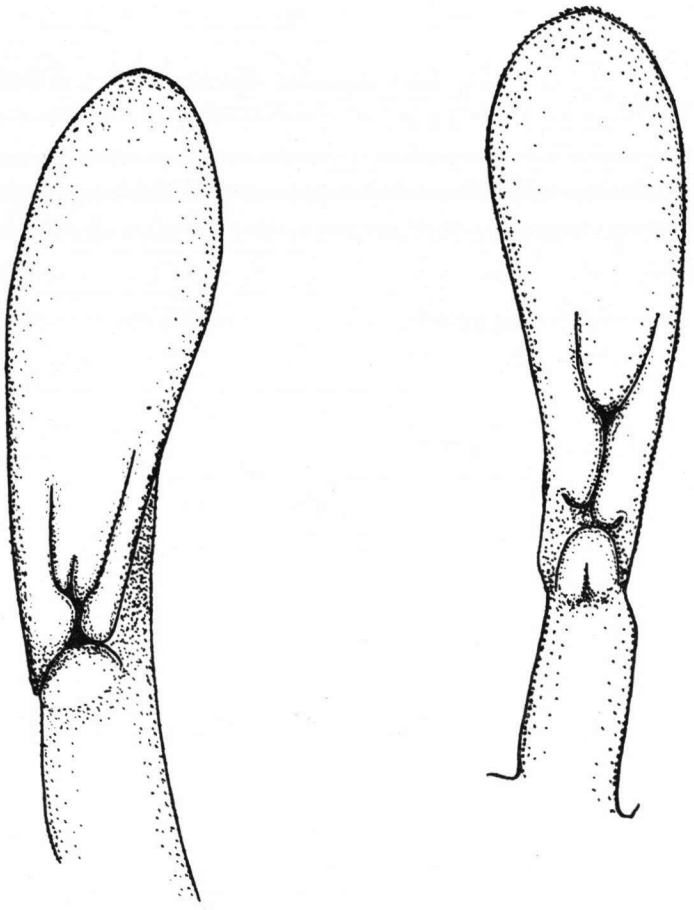

Fig. 2. Micropylar view on ovules of *Caloncoba welwitschii* (Oliv.) Gilg (100×).

probably means that formerly the 'integument' consisted of a number of freer parts which were united by congenital fusion later on. However, as I pointed out earlier (van Heel, 1969), to be sure of congenital fusion different ontogenies and vascular bundle patterns should be compared. Therefore it would be fortunate if somebody might discover lobedness in integuments that possess vascular bundles — of which there are many (cf. Kühn, 1928) — with a positive relation between location of lobes and position of vascular bundles.

De Haan (1920) reached the conclusion that in Pteridosperms and Gymnosperms the integuments were originally composed of units, the nature of which is as yet uncertain. Here the lobing does correspond to vascular bundles. Andrews (1963), Smith (1964), and Long (1966) demonstrated series of Pteridosperm seeds in which the lobing of the single integument became increasingly obscure through 'fusion'. In this paper we may face an analogy with Pteridosperm seeds; one is even tempted to speak of the pistil of *Scyphostegia borneensis* as of a supercupule.

Recognizing the possibility of a different homology for the integuments in different taxonomic groups, I conclude that the distal lobing as described here may present a trace in Angiosperms of the original multiple structure of the outer integuments. The search is for more facts.

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