THE EXTRAORDINARY FUNICULUS OF ACACIA CONFUSA MERRILL*

THE funiculus is ordinarily a short and simple structure which serves as a stalk for the ovule. As such, it shows little structure and is usually a straight cord, often of very slight length. Because of its simplicity it has largely been neglected. Eames and Mac Daniels (1947) do not mention it, nor does Esau (1953). Netolitzky (1926) discusses the insertion of the funiculus on many seeds but never mentions its vascular structure. Yet it must have sufficient vascular structure to carry the food and water, often large in amount, needed for the growth of the ovule from a minute structure to a comparatively large one, sometimes even a very large one.

In a few species it has been noted that outgrowths of the funiculus have given rise to structures caruncular or arillar, which formerly were supposed to be outgrowths from the seed coats. The Magnolia has an unusual funiculus which stretches when the fruits break open and allow the large seeds to fall. For a time the elongated funiculi support the seeds outside the fruits but they soon part and allow the seeds to drop. The funiculus of this plant stretches by the extension of the spiral thickening of the tracheids Prantl (1894).

Bailey (1925) states that the Acacias frequently have elongated funiculi, and that the funiculus is found "either twice encircling the seed or bent back upon itself." I had not known of this peculiarity when I observed an Acacia (later identified as *Acacia confusa* Merrill), in the plantings of the Federal Experiment Station at Mayaguez, Puerto Rico, which showed brilliant orange threads hanging over it. Examination showed that the ripe pods were breaking open and allowing the seeds to fall. But the fall of the seeds was soon checked by the orange threads which were found to be unusually long funiculi. Some of the seeds remained suspended for days although the greater number became detached within a few hours. Wetting of the structures by rain caused a considerable retraction of the seeds but never enough to pull them back into the fruits. Usually it reduced the distance of the seed from the fruit by about one half. This

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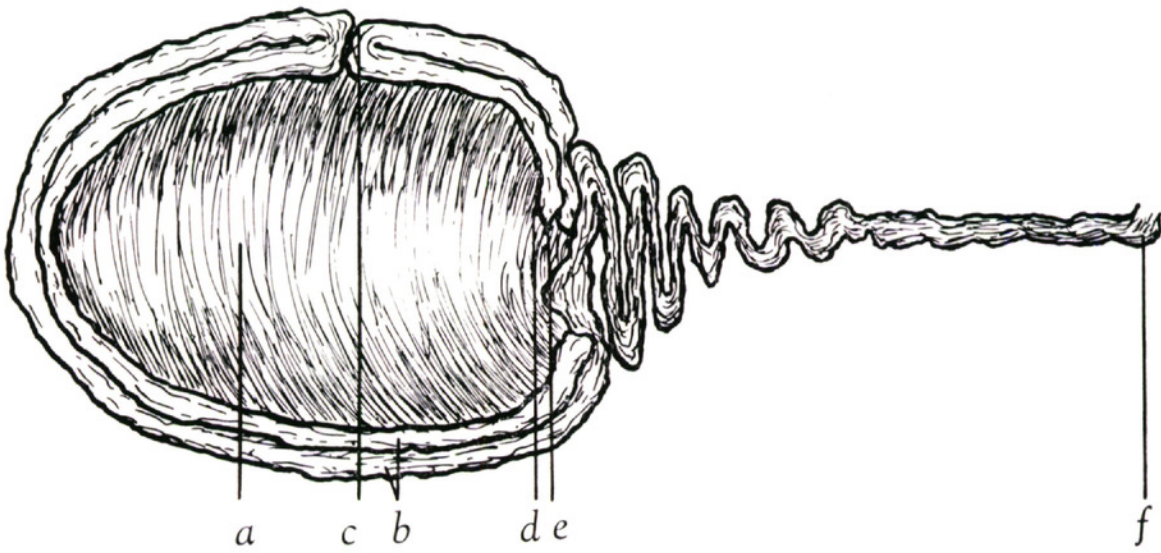

Figure 1. A seed of *Acacia confusa* surrounded by two strands of the funiculus; *a*. seed, *b*. two strands of funiculus, *c*. point at which strands of funiculus fold back upon themselves, *d*. micropyle, *e*. hilum of funiculus, *f*. funiculus near attachment to the placenta.

shortening was brought about by further bending and twisting of the funiculus rather than any shrinking of the funicular cells.

The color which first called my attention to the structures was a very rich, bright orange. Nothing is known of it save that 2 months in 85 per cent lactic acid did not fade or clear it to a noticeable degree.

In the fruit the funiculus is very curiously coiled. Near the placenta several sets of reverse curves are formed and then two layers of funiculus are formed around the seed (Fig. 1a). But strangely enough this does not mean that two coils pass around the seed. A strand of the funiculus goes about three fourths around the seed then folds sharply backward (Fig. 1c) and passes around the seed in the other direction until it meets the fold just described. Now it folds backward and extends to the attachment of the seed. At first I thought to the location of these folds (Fig. 1c) came at the micropyle but it does not, for the micropyle is found at the end of the seed (Fig. 1d). No explanation for this peculiar folding of the funiculus occurs to me.

The strand of the mature funiculus shows a central thread of xylem surrounded by a loose sleeve of parenchymatous cells. The xylem is made up exclusively of spiral tracheids. The parenchymatous cells have thickened walls which contain the

orange color previously mentioned. They are somewhat elongated in the lengthwise direction of the funiculus but otherwise show no noticeable peculiarities.

A careful study of cross and longitudinal sections of the funicular strand reveals no trace of phloem or any structure which could have resulted from degenerating phloem. Unfortunately, I had only mature tissues, and have no proof that phloem was not present at an earlier stage. If so, its absolutely complete disappearance at maturity is remarkable.—CARL D. LARUE; DEPARTMENT OF BOTANY, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.

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CAREX AENEA FERNALD (TYPICAL) IN COOK COUNTY, MINNESOTA.—During the preparation of the final manuscript of "A floristic study of Cook County, northeastern Minnesota," coauthored by the late Fred K. Butters and me and published in RHODORA **55** (1953), the records of *Carex aenea* Fernald (typical) were omitted. Paragraph 2, page 130 of RHODORA **55** should read as follows:—

CAREX AENEA Fernald (typical). Proc. Amer. Acad. Arts & Sci. **37**: 480. 1902. Perigynia ovate-lanceolate, veinless to moderately veined on the ventral face; achenes ovate. LECTOTYPE, M. L. Fernald, June 8, 1901, gravelly bank, Orono, Maine (in Herb. Gray).—*Lakela 3646*, Jul. 4, 1940, along a path on a rocky ridge, Windigo Point, Sea Gull Lake; *Butters, Burns & Hendrickson 103*, Jul. 11, 1938, top of cliff south of Rove Lake; *Burns & Hendrickson 155*, Jul. 17, 1938, side of cliff just south of portage between Clearwater Lake and West Pike Lake; *Burns & Hendrickson 407*, Aug. 7, 1938, on ledge of cliff, east side of Little Caribou Lake; *Burns & Hendrickson 380*, Aug. 5, 1938, on cliff overlooking west side of Canoe Lake; *Burns & Hendrickson 383*, Aug. 5, 1938, on big cliff, Alder Lake; *Butters, Abbe & Abbe 270*, Jul. 4, 1937, top of ridge on south side and toward west end of Mountain Lake; *Butters, Burns &*