

FINE STRUCTURE OF THE POLLEN OF *ANTHEMIS NOBILIS* L. (ANTHEMIDEAE-COMPOSITAE)

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In searching for a pollen form ancestral to that of the tribe Ambrosieae, Wodehouse considered *Antbemis nobilis* (Anthemideae), in addition to a number of other taxa (1). He concluded that the pollen morphology of *A. nobilis* was too remote to serve as a prototype. During our early electron microscopic investigations of Anthemideae and Ambrosieae (2, 3), pollen of *A. nobilis* was not available, but we attempted an evaluation of Wodehouse's conclusions from observations of pollen of allied taxa. Now that pollen of *A. nobilis* is available, this evaluation becomes definitive.

Pollen of *Antbemis nobilis* was removed from herbarium sheets (University of Texas, accession numbers 159800, 159801, 159802) and acetolyzed (4). Slides for light microscopic analyses were made by mounting pollen in glycerine jelly and affixing cover slips. Observations and photomicrographs were made by transmitted light with a Leitz Ortholux microscope equipped with an Orthomat camera. Electron microscopic processing consisted of staining with OsO₄, graded alcohol dehydration, and embedding in epoxy resin (5). Sectioning was accomplished with diamond knives; section stains were uranyl acetate and lead citrate. Observations and electron micrographs were made with a Philips-200 electron microscope.

Light microscopy of *A. nobilis* pollen (Figs. 1 and 2) shows it to be spheroidal and markedly three-lobed (tricolporate) in optical view. Acute spinules protrude from a coarsely granular exine surface. Maximum diameter is approximately 26 μ ; spinule length is approximately 4 μ .

As observed with electron microscopic techniques, the pollen wall is differentiated into two layers: ectexine and endexine (Fig. 3). The ectexine consists of spinules which contain randomly disposed channels. Supporting the spinules is a narrow, per-

forate tectum, formed by a series of short, narrow, solid columellae. These columellae are fused basally and form an internal tectum. In turn, the internal tectum is supported by broad, long columellae; these columellae terminate basally to form a thick foot layer. Beneath and immediately appressed to the foot layer is the endexine. The endexine is slightly lamellate and is approximately the same thickness as the foot layer.

Light microscopic observations of *A. nobilis* agree with those of Wodehouse (1). The ultrastructural morphology is typical of that described for a large segment of the Anthemideae (2, 3), and shows little similarity to the Ambrosieae. It is interesting to note, however, that the pollen of *A. nobilis* does have some ultrastructural characters in common with *Parthenice mollis* Gray, a species suggested as prototypic to the Ambrosieae (1, 6).

This subject (2), as well as recent work which suggests remote morphological homologies between Anthemideae and Heliantheae-Ambrosieae pollen, has been discussed elsewhere (7).

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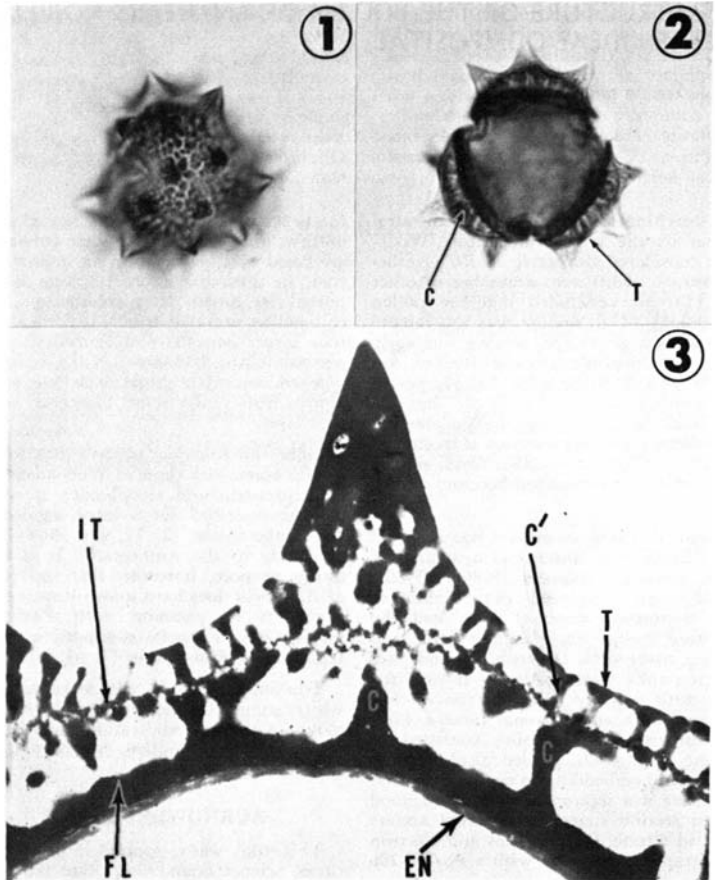


Figure Legend

FIGURES 1-3. *Antbemis mobilis* L. — FIG. 1. Photomicrograph of polar surface. Note coarsely granular exine surface. X 3,200. FIG. 2. Photomicrograph of median — optical view. Long columellae (C) are prominent and the tectum (T) appears to consist of two layers. X 3,200. FIG. 3. Electron micrograph of mesocolpial surface. The narrow endexine (EN) is overlaid by a thick foot layer (FL) from which thick columellae (C) protrude (cf FIG. 2). A thin internal tectum (IT) caps the columellae and supports a series of short columellae (C) which in turn are capped by a thin external tectum (T). X 19,000.