Notes RBG Edinb. 41(1):123–125 (1983)

A NOTE ON THE POLLEN MORPHOLOGY OF DAUPHINEA AND PUNTIA (LABIATAE)

ALAN P. BENNELL

ABSTRACT. The pollen morphology of the two new monotypic genera *Dauphinea* Hedge and *Puntia* Hedge is described, and shown to support their position within the Labiatae. The evidence also supports the placing of *Dauphinea* in the Ocimoideae but that for *Puntia* does not afford any strong indication as to its subfamilial classification.

Although only very limited material was available, a study of the pollen of the two new monotypic genera of Labiatae described by Hedge (1983) was undertaken in the hope of obtaining supplementary evidence for the status of these isolated taxa. Pollen preparations were made from the holotype specimens, acetolysis being carried out according to the standard technique of Erdtman, and the pollen grains subsequently examined under both SEM and light microscope.

Dauphinea brevilabra Hedge (*C.* 12272, holo. E). Fig. 1. A–E.

Pollen grains 6-zonocolpate, prolate–subprolate, 41–46 × 30–36 μm, amb circular. Colpi of unequal length 25–30 × 2–3 μm, occasionally sigmoid giving the grain a slightly twisted appearance in equatorial view. Mesocolpia equal, 17 μm wide. Exine 2.5–3 μm thick, thicker at poles. Tectum partial, reticulate; muri 0.4–0.8 μm wide, duplicolumellate; lumina irregular, 2–4 μm diameter, slightly reduced in the apocolpium. Lumen closed by sunken perforate membrane, unsupported by columellae.

Puntia stenocaulis Hedge (*Gillett, Hemmings & Watson* 22102, holo. E) Fig. 1, F–I.

Pollen grains 6-zonocolpate, oblate–subspheroidal, 31–39 × 45–52 μm, amb circular. Colpi short, 16–18 × 5–6 μm. Mesocolpia unequal, shorter segments 11–12 μm wide, alternating with longer segments 18–20 μm wide. Exine 3–4 μm thick, thicker at poles. Tectum partial, a complex reticulum; primary muri 1 μm wide, simplicolumellate; lumina irregular, 1–3 μm diameter, traversed by narrower undulating secondary muri.

Although a number of pollen morphological investigations have been carried out on particular genera or on geographic groups of taxa belonging to the Labiatae, the pollen of this extensive family, with over 150 genera, remains only partly explored. However, in his authoritative survey of Angiosperm pollen, Erdtman (1972), having assessed some 100 species from 55 genera, was able to conclude that most Labiatae exhibit a characteristic pollen morphology. Thus the 6-zonocolpate form and reticulate exines of both *Dauphinea* and *Puntia* are typical of genera belonging to the Labiatae. However, apart from a general separation within the family into 3-colpate and 6-colpate pollen-types, other pollen characters tend to be of more value in grouping species within genera rather than establishing affinities between genera and tribes.

The pattern of exine sculpturing observed in *Dauphinea brevilabra,* with

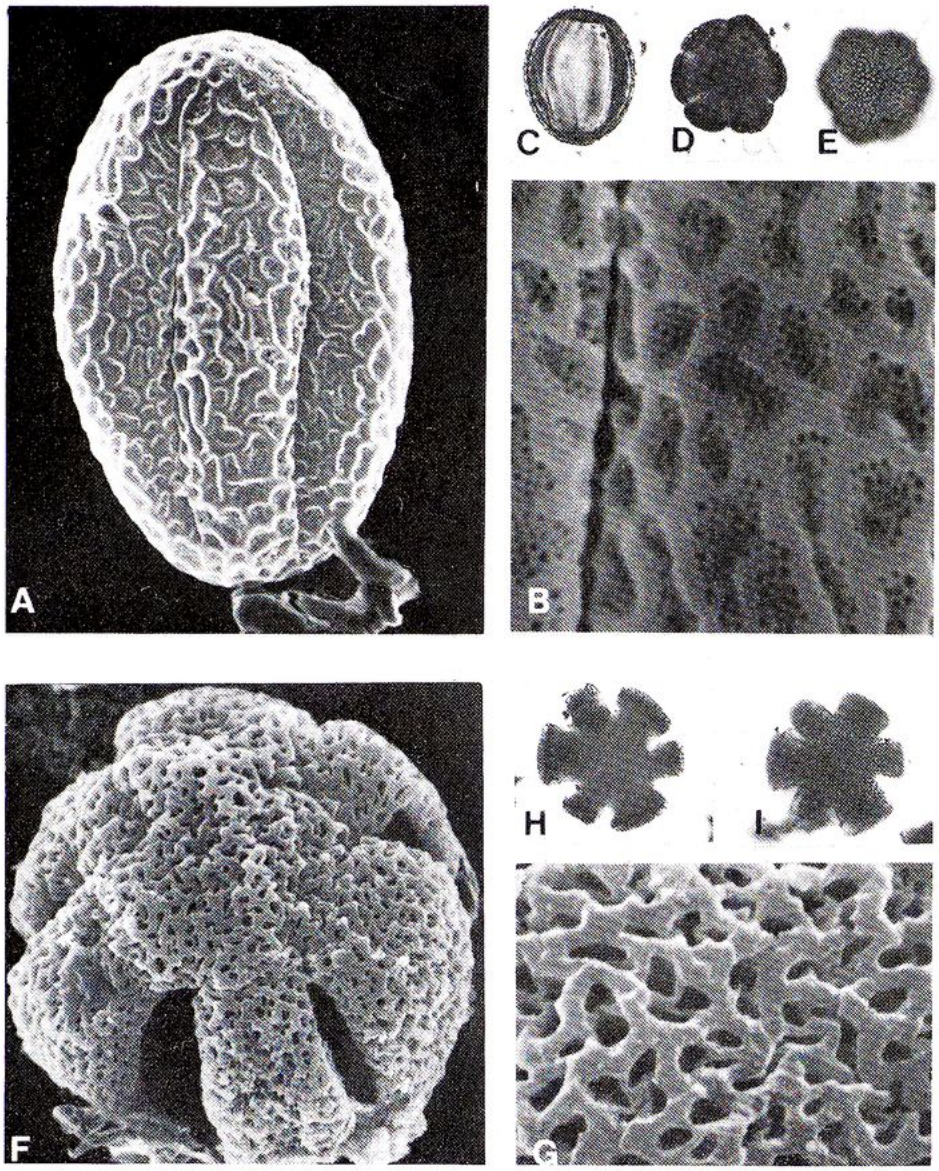

FIG. 1. A–E, *Dauphinea brevilabra* Hedge: A, meridional view, SEM × c. 1600; B, detail of exine sculpturing, SEM × c. 5000; C, meridional view, optical section, LM; D, polar view, optical section, LM; E, polar view, high focus, LM. F–I, *Puntia stenocaulis* Hedge: F, oblique polar view, SEM × c. 1500; G, detail of exine sculpturing, SEM × c. 4200; H, polar view, optical section, LM; I, polar view, high focus LM. (All light micrographs × 380).

its raised reticulum and perforate membranes across the lumina (Fig. 1B) has also been reported in a spectrum of other genera. Henderson et al. (1968) were able to use this character to group species of *Salvia,* and in his limited ultrastructural survey of sample taxa from the major tribes of Labiatae, Nabli (1976) illustrated similar exines in *Ajuga chamaepitys* and *Ocimum basilicum*. It is noteworthy that this similarity of exine structure between *Dauphinea* and *Ocimum* is echoed by the general form of the pollen grains. The prolate shape and distinctive outline (Fig. 1C), with prominent ridge-like muri linked by the concave perforate tectum, is characteristic of the 'Ocimum-Formtypus' defined by Wunderlich (1967) in her general survey of the family. This provides valuable supportive evidence for Hedge's decision to place *Dauphinea* in the Ocimoideae.

The pollen of *Puntia,* of which only 12 grains could be observed, is less easily related to that of other genera. Again Nabli (1976) has illustrated similar patterns of exine sculpturing in such totally diverse taxa as *Thymus vulgaris, Rosmarinus officinalis* and *Origanum vulgare,* but only in *Ballota nigra* do the contorted muri approach those observed in *Puntia stenocaulis* (Fig. 1G). Although *Ballota* is also a member of the Stachyoideae, in which Hedge places *Puntia,* it must be acknowledged that this tribe is exceedingly heterogeneous in its pollen morphology. The 'squashed' oblate shape of the *Puntia* pollen grains is also encountered in a range of other Labiatae, and the unequal mesocolpia feature in a number of other genera including *Salvia* (Henderson et al., 1968). Thus it must be concluded in the case of *Puntia* that no clear affinities within the family can be inferred from pollen morphology.

The author thanks Ian Hedge for initiating the idea of the study.

References

ERDTMAN, G. (1972). *Pollen Morphology and Plant Taxonomy: Angiosperms.* New York.

HEDGE, I. C. (1983). Two new monotypic genera of Labiatae. *Notes RBG Edinb.* 41: 115–121.

HENDERSON, D. M., PRENTICE, H. & HEDGE, I. C. (1968). Pollen Morphology of Salvia and some related genera. *Grana Palynologica* 8: 70–85.

NABLI, M. A. (1976). Étude ultrastructurale comparée de l'exine chez quelques genres de Labiatae, in I. K. FERGUSON & J. MULLER (Eds) *Linn. Soc. Symp.* 1. *The evolutionary significance of the exine*: 499–525. Academic Press. London & New York.

WUNDERLICH, R. (1967). Ein Vorschlag zu einer natürlichen Gliederung der Labiaten auf Grund der Pollenkörper, der Samenentwicklung und des reifen Samens. *Österreich. Bot. Zeitschr.* 114: 384–483.