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ON THE PAPILLATE COTYLEDONARY SURFACE OF *SCLERIA FOLIOSA* HOCHST. EX A. RICH. (CYPERACEAE)

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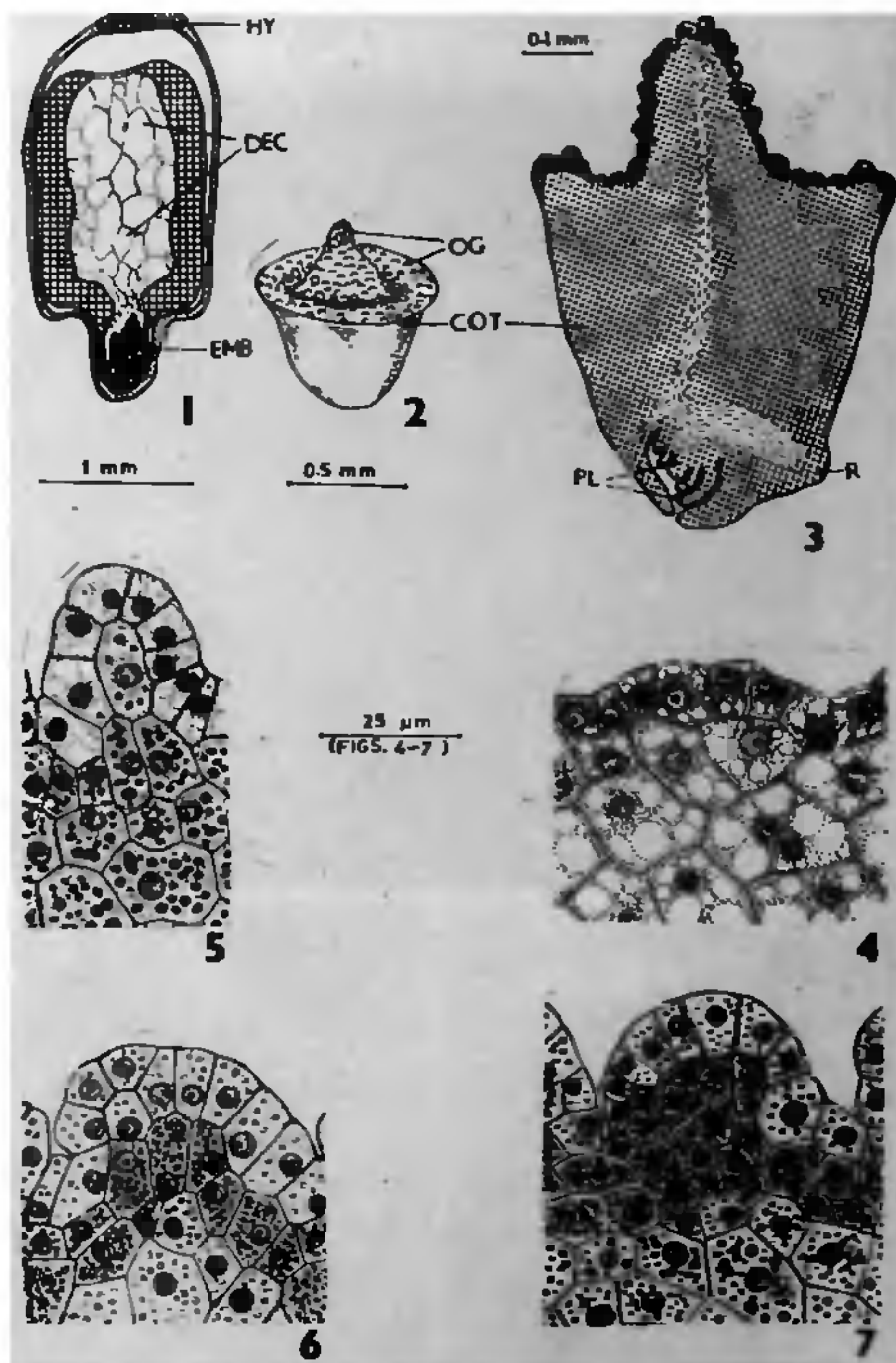
In the majority of angiosperms so far investigated, the cotyledon maintains a uniform surface contour. However, in *Zea mays*¹ and *Cyperus alternifolius*² it exhibits unevenness. In *Scleria foliosa*, the embryo may bear a highly papillate cotyledonary surface which differs in many respects from that of the species mentioned above. This is the first report of such a structure and ontogeny, and organisation of this papillate region is described here.

A mature seed of *S. foliosa* shows two distinct regions in longisection; a basal knob-like embryotega, in which the embryo is lodged and an upper region filled with endosperm rich in food reserves. The embryo consumes the endosperm lying immediately around it and that of the central region of the seed. Subsequently, a continuous supply of nutritive materials is provided by the peripheral endosperm (figure 1).

The mature embryo has a terminal cotyledon, a sublateral radicle and a plumule conforming to the *Schoenus* type³. There are two procambial strands: one in the plumule-radicle axis and the other in the plumule-cotyledon axis, the latter extending up to the base of the cotyledonary sheath (figure 3).

The cotyledon constitutes the major portion of the embryo. As it grows, its distal region gradually increases in girth and acquires a characteristic umbonate apex which functions as the absorptive region. At the final stages of maturation, numerous papillar outgrowths are initiated at the surface of the absorptive

zone (figure 2). These are dome-shaped and vary in size. Each of them is composed of an irregular core of parenchymatous cells covered by the epidermis (figure 7). To begin with, the epidermal cells are densely cytoplasmic. At the time of initiation of the papillae, the cells of the epidermis as well as those of one or two sub-epidermal layers enlarge in places. As a consequence, elevated areas arise at those sites of the cotyledonary surface (figure 4). Whereas the sub-epidermal layers undergo both anticlinal and periclinal divisions forming the central core of the papillae, the epidermis shows predominantly anticlinal divisions to keep pace with the increase in volume of the internal tissue.



Figures 1-7. Stages of development of cotyledonary outgrowths of *S. foliosa*. All are longisections except figure 2 which is a whole mount. 1. Seed with embryo showing papillate cotyledonary surface and endosperm with depleted cells. 2 & 3. Embryos showing papillar outgrowths. 4-7. Stages in the development of a single papilla.

[COT, cotyledon; DEC, depleted endosperm cells; EMB, embryo; HY, hypostase; OG, outgrowths; PL, plumule; R, radicle]

Histologically, two regions are discernible at the absorptive zone of the cotyledon. The outer part is highly lobed and consists of lightly stained cells having fine granular contents, without much of ergastic materials. The inner region includes one to four sub-epidermal layers, the cells of which acquire relatively denser contents than those of the outer part (figures 4-7).

The cotyledon is known to take over the nutritive function from the suspensor which ultimately breaks down. Contrary to the predominantly uniform cotyledonary surface among angiosperms, *S. foliosa* revealed the papillate nature of the absorptive surface of the cotyledon, this increases the surface area of the cotyledon lying in contact with the endosperm, thereby increasing its absorptive efficiency. Furthermore, the glandular appearance of the cells of papillae, the embedding of lobated umbonate apex into the endosperm and early depletion of food contents in the central region of the latter indicate the aggressiveness of the cotyledon in terms of haustorial activity.

In contrast, *S. alata*², *S. stocksiana*³ and *S. hebecarpa*⁵ have revealed non-papillate nature of the cotyledon. However, the mature embryo in *S. lithosperma* and *S. pergracilis* is in accordance with *S. foliosa*. Papillate cotyledons may also occur in the species studied earlier, if reexamined, using mature embryos. The presence of papillate cotyledon would then provide an additional diagnostic feature of taxonomic value in this family.

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CHROMOSOME INTERLOCKING IN SOME SPECIES OF GENUS *CROTALARIA* L.

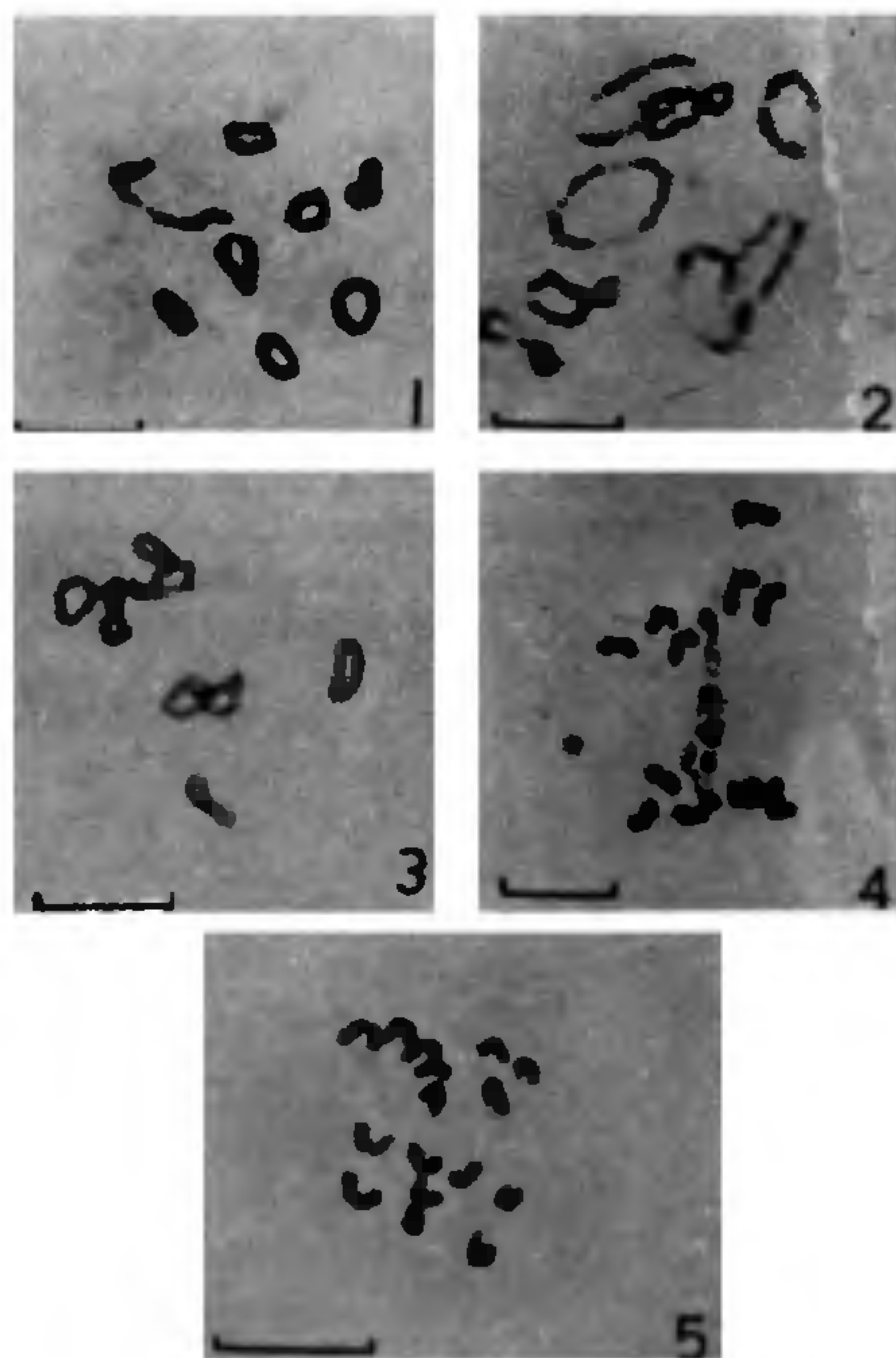
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CHROMOSOME interlocking is known in very few plant species¹. Notable examples are *Dendrocoelum*², *Viviparous*³ and *Allium*³. In some cases it persists even up

to metaphase. Although known in very few taxa, chromosome interlocking has been used as cytological evidence for crossing over¹.

The phenomenon is hitherto unknown in legumes. The present note records it for three species of *Crotalaria*, a large genus of over 550 species. The three taxa, *C. retusa* L., *C. spectabilis* Roth. and *C. laburnifolia* L. belong to sections *Crotalaria* and *Chrysocalycinae* of the genus⁴.

Bivalent interlocking is very common in *C. retusa*. Most of the plants screened for meiosis had some interlocked associations in pollen mother cells. The phenomenon is comparatively less frequent in *C. spectabilis*; only about 30% of the test sample contained the interlocked associations. In *C. laburnifolia* chromosomes interlocking is a mere freak taking place once in a while.



Figures 1-5. 1. A PMC of *C. retusa* at prometaphase bearing 8II. 2. A PMC of *C. retusa* bearing 8II; four of them involved in two interlocked associations. 3. A PMC of *C. retusa* showing 8II of which five are involved in two interlocked associations. 4. A PMC of *C. retusa* showing delayed disjunction of two interlocked bivalents. 5. Anaphase I in *C. retusa* showing distribution of 8 chromosomes to either pole.