Detailed morphological studies supported by field observations and experimental cultivation suggest that the status of *C. acaule* as a distinct species is doubtful and it may be only a variant of *C. laxum* as hinted by J. D. Hooker in the *Flora of British India*. In *C. acaule*, very few flowers are produced on a sessile corymbose inflorescence hidden beneath the sheathing base of the leaves whereas in *C. laxum* the scape is filiform and flexuous with lax flowers. However, *C. laxum* also exhibits the typical inflorescence of *C. acaule* when exposed to xerophytic conditions and under cultivation both types of inflorescences occur in one and the same plant. This is further supported by both species having $x = 8$. Incidentally, the reporting of $2n = 28$ for *C. attenuatum* by Naik[1] is a misidentification for *C. comosum*, a cultivar (personal communication).

Summing up, barring *C. malabaricum* Baker, *C. breviscapum* Dalz., *C. attenuatum* Baker and *C. undulatum* Wall, the remaining 12 species fall under two series. The series with $x = 8$ is exclusively composed of diploids (5 species) whereas different ranges of polyploidy are seen in $x = 7$ series. The complete absence of polyploids and the greater number of diploids under $x = 8$ series (as against the wide range of polyploids and only one diploid under the $x = 7$ series), the tendency to eliminate one unoriented lagging bivalent in *C. laxum*, coupled with the primitive karyotype in the $x = 8$ series[1] indicate that the basic number of $x = 7$ is advanced and derived from $x = 8$.

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POLLEN GRAINS IN THE STYLAR CANAL OF *MORINGA CONCANENSIS* NIMMO

THE flowers of *Moringa concanensis*, a chloroembryophyte, are protandrous and have five fertile stamens of unequal height and the anthers dehisce longitudinally forming a 'head'. Abundant pollenkitt is found around the pollen grains which adhere in lumps (Figs. 3, 4). Its presence may also be responsible for the adherence of Ubisch bodies to the pollen grains even after pollination (Figs. 1, 3–5), a feature hitherto unrecorded.

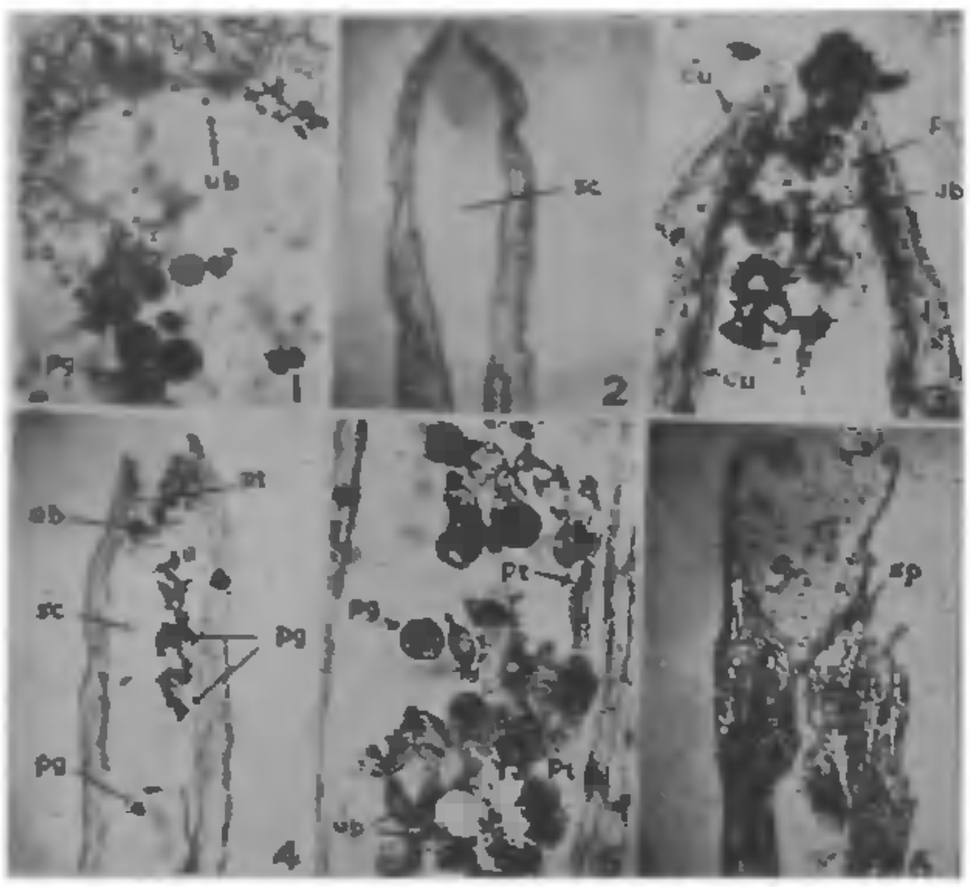
The style and stigma remain below the anthers upto the time of anthesis. The style, however, elongates at a later stage and the stigma comes to lie at a higher level. To start with, the stylar canal, which opens to the exterior, is narrow at the apex (Fig. 2), but attains its maximum development as the gynoecium matures and a clear circular aperture could be observed in the region of the stigma, which is described as truncate (Gamble[2], 1925; Hutchinson[3], 1960; Lawrence[4], 1960), but a critical examination reveals it to be subdentate. After anthesis the pollen falls on the stigma of some of the flowers and as the style slowly elongates pushing its way between the anthers, the pollen mass is gently pressed on the stigmatic surface and consequently it is forced into the stylar canal. Some of the pollen grains slowly descend down on their own weight. Despite careful observations made on 20 plants, no insect agent bringing about pollination could be found. Further, no trace of any 'pollination drop' secreted by the stigma could be detected even after examining hundreds of flowers.

The stigmatic surface is slightly glandular and the outer epidermis is cutinised (Fig. 3). The cells of the transmitting tissue of the stylar canal are elongate and slightly cutinised (Fig. 3). In one section as many as 28 pollen grains could be seen in the stylar canal and some of them had germinated (Figs. 4, 5). Since some preparations showed germinating pollen grains in the anther itself (Fig. 1), too much importance cannot be attached to the place of germination of the pollen grains.

Although there have been some reports on the occurrence of intracarpellary pollen grains in angiosperms, the precise mechanism responsible for this phenomenon has not been satisfactorily explained (Eames[1], 1961, p. 203; Maheshwari[5], 1960, p. 11). It becomes obvious that in *Moringa concanensis*, it is brought about by mechanical forces.

In some preparations, the cells of the stylar canal elongated radially, became meristematic and

plugged the passage of the stylar canal (Fig. 6). Such a feature is unknown in angiosperms, although an analogous situation is known in *Gnetum*, where the plugging tissue of the micropylar canal is integumentary in origin but without the meristematic activity of the cells.



FIGS. 1–6. *Moringa concanensis* Nimmo. Fig. 1. T.S. part of dehiscing anther lobe showing abundant Ubisch bodies clinging to the pollen grains, × 1,150. Fig. 2. L.S. part of style showing the stylar canal, × 320. Fig. 3. L.S. apical part of style showing pollen grains and Ubisch bodies, × 1,150. Fig, 4. L.S. part of the style showing pollen grains at various distances, Ubisch bodies and germinated pollen grain, × 320. Fig. 5. L.S. part of the stylar canal showing 23 out of 28 pollen grains (see text). Note the germinated pollen grains and Ubisch bodies, × 1,150. Fig. 6. L.S. style showing the sub-apical plug, × 320.

(*cu*, cuticle; *gpg*, germinating pollen grain; *pg*, pollen grain; *pt*, pollen tube; *sc*, stylar canal; *ub*, ubisch bodies; *sp*, stylar plug.)

A detailed account of the life-history of *Moringa concanensis* will be published elsewhere.

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QUANTITATIVE ESTIMATION OF THE TOTAL CARBOHYDRATES, PROTEINS AND NUCLEIC ACID CONTENTS IN THE THORACIC GANGLION OF *POTAMON MAGNUM MAGNUM* (PRETZMAN)

THE present investigation deals with the quantitative estimation of the total carbohydrate, protein and nucleic acid contents in the thoracic ganglion of *Potamon magnum magnum*. Very little work has been done in this field and most of our information was obtained from the histochemical studies. It has been shown by Otsu[1] and Otsu and Sonobe[2] (electrophoresis and paper chromatography) that certain chromactivating substances extracted from the thoracic ganglion of the crab, *Eriocheir japonicus* contain cystine and further suggested that these substances are polypeptides containing 10 to 13 amino acid residues, including cystine rich S–S bonds. The existence of chromatophorotropins in the thoracic ganglion of crustaceans has been demonstrated by Smith[3], Enami[4] and Brown[5,6].

The thoracic ganglion was obtained in all the four seasons. Total carbohydrates, proteins and nucleic acids were quantitatively determined by standard methods[7–10].

The results are summarized in Table I.

TABLE I

Material detected	mg/gm fresh weight			
	Summer	Autumn	Winter	Spring
Carbohydrates	0·595	0·577	0·534	0·589
Proteins	0·911	0·915	0·934	0·928
Nucleic acid	0·412	0·466	0·567	0·427

It shows that proteins constitute the major part of the thoracic ganglion. In winter, the ganglionic mass contains more of protein and nucleic acid than in other seasons while the amount of carbohydrates is maximum in summer.

It is difficult to interpret the presence of more material in winter than in other seasons, but it is logical to assume that during active period the demand