

Observations on the Structure of the Seed in the Capparidaceae and Resedaceae.

BY

MATTHEW YOUNG ORR,

Assistant in Laboratory, Royal Botanic Garden, Edinburgh.

With Plate CLXVIII.

THE presence of a specialised layer of distinctively marked elements, completely investing the embryo, is a characteristic feature in the seeds of certain Capparidaceae, and, in dissections of the seed of these genera which have been investigated, it has the appearance of a third seed-coat, internal to the fibrous tegmen.

The configuration of the thickened walls of the elements composing this enveloping sheath has been described elsewhere,* and it has been shown that, apart from its physiological significance, the localisation of the thickening bands on the periclinal or anticlinal walls of the constituent elements is capable of being regarded as a diagnostic feature, distinguishing the seeds of the two tribes of the Capparidaceae.

In the seeds of the Cleomeae the thickening is confined to the periclinal walls of the cells, and is in the form of delicate striations, which, when seen in surface view, produce the effect of finger-prints, such as are made use of in criminology. In the seeds of the Cappareae, on the other hand, the thickening bands are found only on the anticlinal cell walls, and present a totally different appearance when viewed under the microscope. This distinction is suggestive of the possible value of the features of the sheath from a systematic point of view.

Records of the occurrence of similarly constructed tissues in seeds are rare, but it was thought that, if the methods adopted in the investigation of the seeds of the Capparidaceae were applied to the seeds of allied families, details of structure which had hitherto been overlooked might be disclosed, and such features might possibly have some bearing on the phylogeny of the family.

On these lines, an examination of the seeds of representative genera of the Resedaceae was first undertaken, and it was observed that the tissue surrounding the embryo, which has the appearance of a third seed-coat, possessed those special features which characterise the corresponding tissue in the seeds of certain Capparidaceae.

* See p. 249.

[Notes, R.B.G., Edin., No. LX, January 1921.]

The occurrence of a third seed-coat in the seeds of the Resedaceae is mentioned by Baillon * in his description of the seed of *Reseda odorata*, but no anatomical details are given. Mueller † in his monograph of the family, also briefly refers to this tissue, and it is indicated by Harz ‡ in his figure of a cross section of the seed of *Reseda luteola*, but neither of these investigators makes any reference to the peculiar configuration of its periclinal cell walls, which is only visible in surface view.

For a description of the features of this differentiated tissue in the seeds of the Resedaceae, that of *Reseda glauca*, Linn., may be taken as typical of the family.

In dissections of the seed, it appears as a yellow pellicle, which adheres to the inner wall of the tegmen, and completely encloses the embryo. The cells of the outermost layer of this tissue are devoid of living contents, and are approximately .05 mm. long by .025 mm. broad.

In surface view, under the microscope, it is seen that their periclinal walls are clearly marked with numerous fine annular bands of thickening, producing the effect of finger-prints, and having the same appearance, but on a larger scale, as that presented by the corresponding tissue in the seeds of *Polanisia* and other genera belonging to the Cleomeae tribe of the Capparidaceae.

It is thus apparent that the seeds of those species of the Resedaceae and Capparidaceae which have been examined exhibit a striking similarity in their construction, for both families possess this unusual feature of a specialised tissue, forming a third seed-coat, the configuration of which, as seen in the seeds of the Resedaceae, is identical with that found in the Cleomeae among the Capparidaceae.

This anatomical feature has every appearance of an additional link between the two families, and, though it might be regarded as a minor character, its presence is nevertheless suggestive of the close affinity of the Resedaceae to the tribe Cleomeae of the Capparidaceae.

* M. Baillon, Natural History of Plants, vol. iii (1874), p. 296, footnote.

† J. Mueller, Monographie des Résédacées (1857), p. 59.

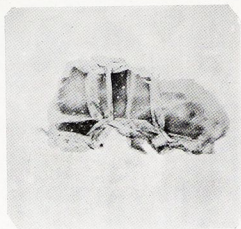
‡ C. D. Harz, Landwirtschaftliche Samenkunde (1885), vol. ii, p. 987.

EXPLANATION OF PLATE CLXVIII.

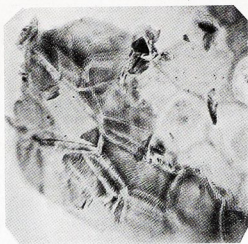
Illustrating Mr. M. Y. Orr's paper on the Structure of the Seed in the Capparidaceae and Resedaceae.

FIG. 1.—Photograph of a portion of the specialised layer surrounding the embryo in the seeds of *Polanisia viscosa*, DC. × about 430.

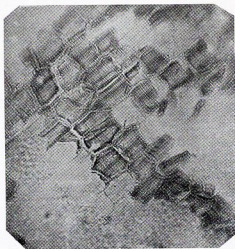
FIGS. 2 and 3.—Photographs of a portion of the corresponding tissue in the seeds of *Reseda glauca*, Linn. × about 430.



3.



2.



1.