

ON THE OCCURRENCE OF A GYNOPHORE IN *DRABA* SP. FROM KASHMIR, WITH REMARKS ON THE PHYLOGENY OF THE GYNOPHORE IN THE CRUCIFERÆ

THE presence of a gynophore in *Draba* sp. is not peculiar to the Cruciferæ, but a prolongation of the axis at the base of the ovary is recorded by Schulz (1919, 1935) in about a dozen different tribes of this family, viz., Brassicæ, Cremolobæ, Romanschulzieæ, Streptanthæ, Sisymbrieæ, Mathioleæ, Arabideæ, Lunariæ, Stanleyæ, Hesperideæ, etc. A short or a long gynophore is described in *Brassica elongata*, *Diploaxis harra*, *D. tenuifolia* (Schulz, 1919, p. 105), *Cremolobus*, *Lunaria*, *Macropodium*, *Stanleya*, *Thelypodium* and *Warea* (Schulz, 1936, p. 241). Although a gynophore is already known in Drabæ, so far as the author is aware, it is not previously recorded in *Draba muralis* L. or *D. nemoralis* L. Dr. Stewart told me that our plant is not a normal healthy specimen but it is diseased. The present record is, therefore, an abnormal case and the abnormality is probably a result of hypertrophy caused by the disease.



FIG. 1

FIG. 2

Fig. 1 is a half-natural size photograph of a floral branch of *Draba* sp., which according to accompanying notes on the sheet, was col-

lected by J. R. Drummond on June 30 in 1902 from the Kashmir Valley; it was found growing in a flax field near Shopyon at an altitude of 6,000 feet. This plant, together with several other specimens, was sent to India after an incomplete identification at Kew and bears the number 13956 Ex. Herb. Kew. It was made available to me through the courtesy of Dr. R. R. Stewart, who received for identification several incompletely determined specimens from Drummond's Kashmir collections from Principal J. C. Luthra of the Punjab Agricultural College, Lyallpur, to whom this specimen was returned after study. On an enquiry kindly made at my request by Dr. Stewart from Kew the above identity of the plant was confirmed.

In Fig. 1, especially near the apical parts of the inflorescence axes, there are seen several flower-buds which show distinct gynophores; however, they are not so well marked in fruits. The flower-buds and fruits on dissection showed a structure typical of the genus *Draba*, and although on account of the absence of leaves and for want of exact information regarding the habit of the plant it is not possible to identify the specimen with more certainty, it shows a great resemblance to *Draba muralis* Linn. or *D. nemoralis* L. This identification was kindly confirmed by Dr. Stewart and our figured specimen is a branch of either of the two species bearing abnormal flowers.

In a natural size photograph of a part of the specimen (Fig. 2) the nature of the raceme is clearly seen; and several fruits (marked with arrows) are seen to possess at bases of the siliques small stalks which are undoubtedly of the nature of gynophores.

It is interesting to note that a short or a long gynophore is recorded in as many as 12 out of the 19 tribes into which this family is divided. In the more primitive tribes of the family, e.g., Stanleyæ, Romanschulzieæ, Streptanthæ, Cremolobæ, etc., the gynophore is well developed and occurs more commonly, but in the intermediate forms, viz., Brassicæ, Lunariæ, etc., a short gynophore is found in a few genera. In Sisymbrieæ, Mathioleæ, Arabideæ, Hesperideæ, etc., which are the higher tribes of the family the gynophore gets very much reduced in size and completely disappears in most cases. In Drabæ, which is believed to be one of the most highly developed tribes of the Cruciferæ, a very short gynophore may be present in primitive genera, but it is so far previously not recorded in the genus *Draba*.

The present abnormal occurrence of a gynophore in *Draba*, which, according to Schulz (1936, p. 266), is one of the most highly evolved genera of the Cruciferæ, seems to throw important light on the phylogeny of the gynophore in this family. Although abnormalities, as a class, are generally treacherous guides to affinities, very often they provide interesting evidence regarding the phylogeny of certain organs and throw important light on their phylogenetical significance.

From the above facts regarding the occurrence of a gynophore in the Cruciferæ it may

be concluded that this organ is a primitive structure found in the lower tribes of the family, but in the more specialized forms, where it is either altogether absent or occurs only as a very short stalk at the base of the ovary, it has undergone suppression. The occurrence of a gynophore as an abnormality in one of the most highly evolved genera of the family is evidently a reversion to ancestral character found normally in the primitive members of the Cruciferae; this reversion has probably taken place as a result of hypertrophy caused by the disease.

Further support for the conclusion that absence of the gynophore is an advanced character is found in the Capparidaceae, a family with well-acknowledged affinities towards the Cruciferae and one regarded as more akin to ancestral forms from which both the families have arisen. In some species of *Cleome*, notably *C. monophylla* and *C. Stocksiana*, the ovary is either sessile or it may bear a very small stalk at its base. In *Cleome viscosa* the ovary, as a rule, is sessile, but occasionally one comes across a rudimentary stalk at its base. In the primitive tribes of the Capparidaceae the gynophore is not only well developed but is of a very common occurrence.

In the end I wish to record my most grateful thanks to Professor B. Sahni, sc.D., F.R.S., and my friend, Dr. V. Puri, D.Sc., of the Meerut College, for helpful suggestions and expert advice. I am also thankful to Dr. R. R. Stewart, Principal, Gordon College, Rawalpindi, who went through this note and kindly confirmed the identification of the specimen.

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October 22, 1945.

\* Schulz, O. E., *Cruciferae in Engler's Pflanzenreich*, 1919, 5, 105, and *Cruciferae in Engler-Prantl Natürliche Pflanzenfamilien*. 1936, Band 17B, 244-266.