

Occurrence of vessels in *H. zeylanica* can either have a phylogenetic significance or can be correlated to the xeric habitat. Presence of vessels in Angiosperms and Gymnosperms, is considered to be an advanced feature. *Pteridium* and *Marsilea* are also advanced genera of ferns but their occurrence in unspecialised genera like *Woodia* and *Notholaena* suggests that they have developed sporadically in Pteridophytes and have little phylogenetic significance in the group. Thus, the contention of White⁶ that occurrence of vessels in Pteridophytes does not necessarily indicate a high level of advancement, gets further support from the present work. *Ophioglossum*, which is said to be highly evolved in Ophioglossales, does not show vessels. Some of the vessel bearing Pteridophytes (i.e., species of *Woodia*, *Pteridium*, *Equisetum*) are certainly plants of dry habitats but their absence from typical xerophytic ferns like *Cheilanthes*, *Ceterach*, and *Actinopteris* and their presence in certain mesophytic plants like *Selaginella* does not warrant such a conclusion.

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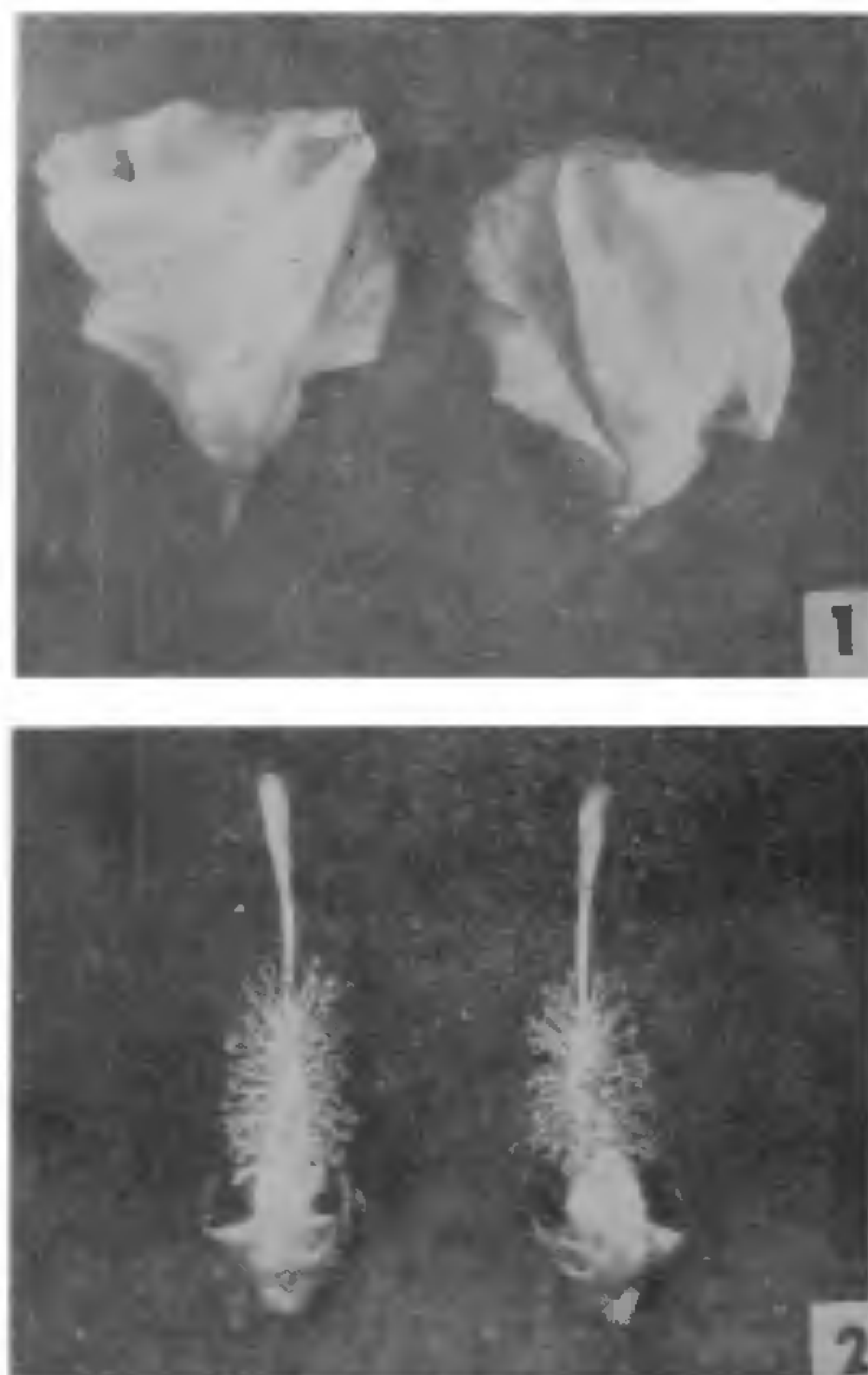
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ISOMERISM IN FLOWERS OF *AZANZA LAMPAS* DALZ. (MALVACEAE)

THE aestivation of the corolla in species of Malvaceae^{1,2}, Bombacaceae³, Euphorbiaceae⁴, Caricaceae⁵ and Papilionaceae⁶ is distinctly twisted either to left or right in bud. In most cases this condition persists even after the opening of the flower. It has⁷ been reported that many species of Malvaceae, show the petals twisted in clockwise (left-handed or levo-rotatory) and counter clock-wise (right-handed or dextro-rotatory) fashion^{1,2}. This left- and right-handedness in any plant organ is referred to as bioisomery⁷. Bioisomerism or isomerism is known to occur in different plant organs^{5,8}. The present communication

deals with isomerism in corolla of *Azanza lampas* Dalz.

The flowers of *A. lampas* are pentamerous and the five twisted petals are free to the base, where they are attached to the monodelphous staminal tube. The individual petals are asymmetrical—a character perhaps correlated with the twisted aestivation. The petals are yellow with basal red eye and are twisted to left or right in the bud as well as in the open flower (Fig. 1). The gynoecium is pentacarpellary, superior, the stigma twisting to left or right (Fig. 2). The fruit is a capsule with 3–5 seeds in each locule.



FIGS. 1–2. Fig. 1 (left to right). Flowers showing left-handed and right-handed twisting. Fig. 2 (left to right). Staminal column with stigma—showing right- and left-handed twisting of stigma.

Numerical data regarding the handedness of corolla in 15 plants were collected on plants grown in Botanical Gardens, M.S. University, Baroda. The data are presented in Table I and shown in Fig. 1. It may be seen from the table that out of 15 plants examined 10 show excess of left-handed flowers, while the rest show more of right-handed flowers. *A. lampas* like other Malvaceae species² also show more of left-handed flowers. On the whole, the left-handed flowers account for 53.78% of the total flowers examined as compared with the right-handed flowers (46.22%). The χ^2 (5 d.f.) value is 2.503, which is insignificant.

TABLE I

Plant Number	Flowers with right-handed corolla	Flowers with left-handed corolla	χ^2 (for 1 : 1 deviation)
1	23	27	0.320
2	08	07	0.070
3	14	21	1.400
4	19	13	1.120
5	17	15	0.130
6	11	15	0.620
7	12	16	0.570
8	19	14	0.760
9	17	21	0.420
10	14	10	0.660
11	05	12	2.880
12	12	19	1.580
13	07	08	0.060
14	11	16	0.920
15	12	20	2.000
Total	201	234	2.503

The stigma lobes like corolla lobes also show handedness as reported in *Carica*⁵. In *A. lampas* the left-handed flowers have right-handed twisting and vice versa (Fig. 2). These observations are different from those on *Bombax ceiba* and *Thespesia populnea*¹, wherein twisting of stigma lobes is in accordance with the contortion of petals.

In *A. lampas* the comparison of the size of the pollen grains (122.40 μ and 121.10 μ in left- and right-handed flowers) and pollen viability (98.30% and 99.16% in left- and right-handed flowers) do not show any significant variation in left- and right-handed flowers. These observations differ from earlier reports on *Bombacaceae*⁶.

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MORPHOLOGY OF POLLINIAL APPARATUS IN SECAMONOIDEAE, ASCLEPIADACEAE AND ITS SYSTEMATIC VALUE

THE Asclepiadaceae has two subfamilies, Secamonoideae and Asclepiadoideae¹; the former is differentiated by its anthers possessing four locules while the latter has only two. The contents of each locule develop into a pollinium. Frye², Gager³, Richharia⁴ and Safwat⁵ have studied the structure of pollinia in several species of *Secamone*. However, information on the Indian Secamonoideae, represented by three genera *Genianthus* Hook. f., *Secamone* R. Br. and *Toxocarpus* Wt. & Arn., is meagre, especially with regard to the structure of pollinia, caudicles and corpuscles. The present study is an attempt to fill the palynological gap and also to evaluate its taxonomic implications.

The materials, *Genianthus laurifolius* (Roxb.) Hook. f. and *Secamone emetica* (Retz.) R. Br. ex. Schult., for the investigation, were collected and fixed in acetic-alcohol (1:3) and later preserved in 70% alcohol. The flowers of *Toxocarpus kleinii* Wt. & Arn. were secured from the herbarium. The pollinial apparatus was released directly from flowers preserved in 70% alcohol in the former two species. In the third, the flowers were resuscitated by slowly boiling in water with a few drops of teepol, and then releasing the pollinial apparatus intact. In all cases, the pollinial material was treated in 5% KOH for about 5–10 minutes and washed in distilled water before mounting in polyglyce AB. The length and breadth of pollinia and corpusculum were measured in mounts from ten flowers and the averages are presented in Table I. All measurements in the table are in μ m.

The floral parts in the subfamily are very small. Each flower has 20 pollinia; the pollinial pairs of the adjacent anther locules of the neighbouring anthers are connected together by a caudicle, which in turn is connected to the corpusculum. The pollinial apparatus in all the species studied has a non-cellular corpusculum and caudicle and cellular pollinia. The orientation of pollinia in all the species studied is erect; the vertical axes of the flower and pollinia are parallel and the free ends of the pollinia face upwards.