SEM STUDIES ON SEED MORPHOLOGY IN THE GENUS *IPHIGENIA* KUNTH (LILIACEAE)

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Abstract

Exomorphic seed characters and spermoderm patterns of *Iphigenia pallida* Baker, *I. magnifica* Ansari & Rolla Rao and *I. stellata* Blatter have been studied under SEM. These species widely occur in Western Ghats. Seeds vary in shape, size, colour, texture and nature of raphe. Viscin threads reticulum with square to polygonal patterns of spermoderm provide basis for identification.

Introduction

The genus *Iphigenia* has six species in Western Ghats. Barring a few characters, such as perianth colour, raphe, fruit shape, overall structure of plant, most of the other characters of six species of *Iphigenia* are overlapping (Ansari & Rao, 1973, 1978; Rama *et al.*, 1983). Out of six species, *I. pallida* Baker, *I. magnifica* Ansari & Rolla Rao and *I. stellata* Blatter widely occur in the Western Ghats. Earlier SEM studies provided palynological distinction between various species of *Iphigenia* (Hegde & Lugade, 1986). In the present paper scanning electron microscopic studies of exomorphic characters of seeds in these species has been given.

Material and methods

Mature and dry seeds were examined under a binocular stereoscope. For SEM studies, seeds were cut by a razor blade. The sections, after mounting on the stubs with a colloidal silver solution, were coated with a thin carbon films in vacuum coating unit and were later coated with gold. The mounted stubs were rotated while being coated. The spermoderm, raphe, endosperm and embryo patterns of seeds were viewed under Cambridge Stereoscan—150 Scanning Electron Microscope at the National Chemical Laboratory, Pune. To maintain uniformity central portion of lateral sides of seeds were photographed for spermoderm pattern.

Description

Iphigenia pallida—Seeds 30-40 per capsule and are light to deep brown in colour. Their shapes are ellipsoidal to ovoid with accentric ulsioroid, 2×1.5 mm. An elongated mass of raphe is projecting from one side. Tissue of the raphe is wound-like minutely lobed, provided with viscin-like reticulation of threads. Some seed surfaces glisten under reflected light showing minute wrinkles. Under SEM viscin thread reticulum is copiously seen covering seed surface from the raphe's surface (Pl. 1, fig. 1). Superficial cells of raphe are longitudinally elongated, tubular to hexagonal (Pl. 1, fig. 2). The epidermal cells on lateral sides of seeds are polygonal with depressed walls and projecting lumina (Pl. 1, fig. 3). The embryo is elongated and occupies a narrow space in the endosperm. The endosperm cells are polygonal (Pl. 1, fig. 6) arrayed in radiating files round the embryo (Pl. 1, figs. 4-6). They are packed with oval to globose starch grains (Pl. 1, fig. 6).

I. magnifica—Seeds many per capsule and are light to deep brown in colour. They are ovoid to globose in shape with accentric, ulsioroid, 3×2.5 mm. An elongated band of raphe projecting from one side, tissue of the raphe light brown, wound and inflated with irregular folds. Seed surface has minute wrinkles and granular deposits. The cells of raphe are projecting with striatious viscin (Pl. 1, figs. 7, 8). Epidermal cells on the

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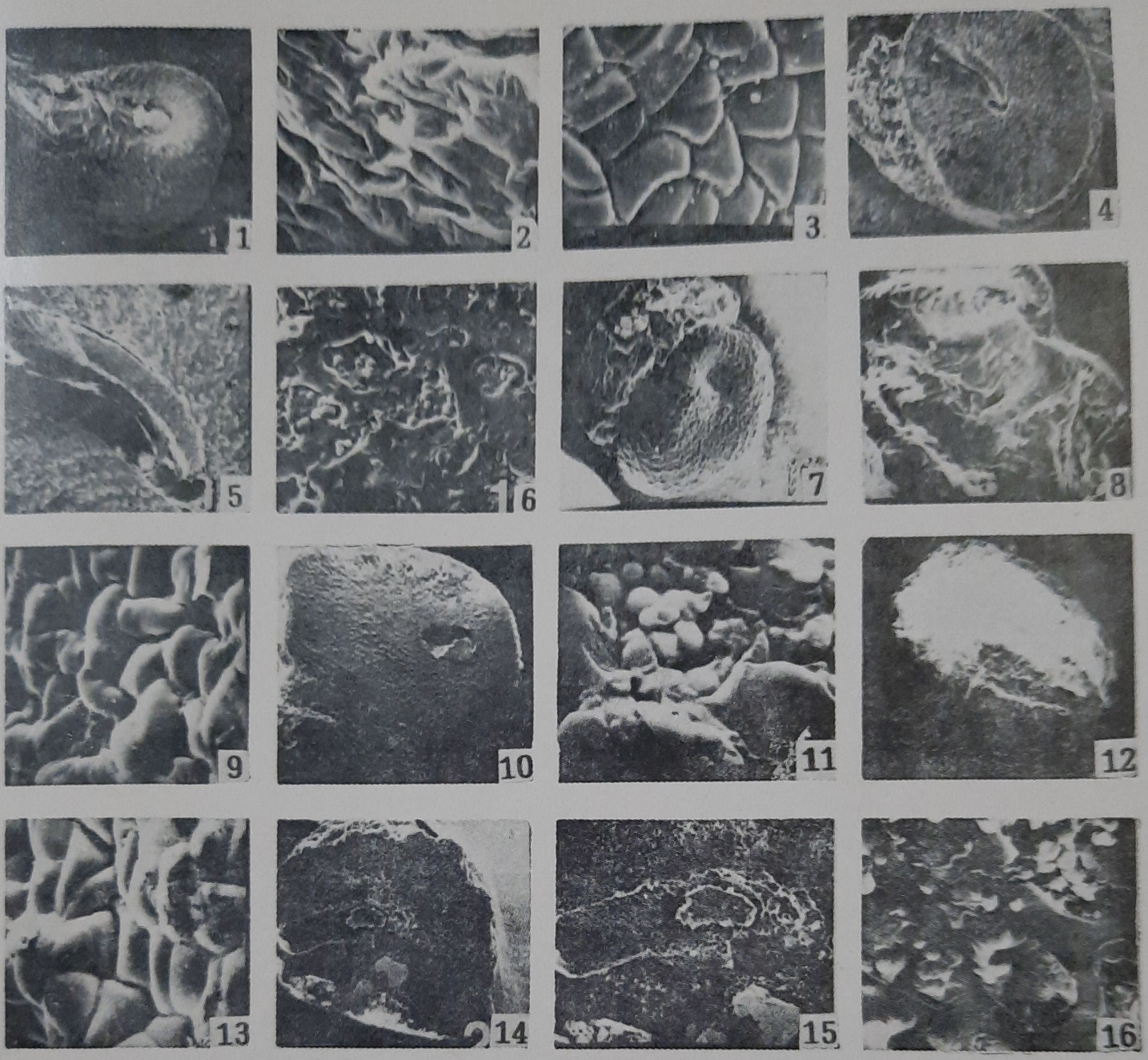
lateral surface of seed have highly depressed walls and projecting square to reticulate lumina (Pl. 1, fig. 9). Embryo occupying a part of the seed. The endosperm cells are filled with starch grains (Pl. 1, figs. 10, 11).

I. stellata—Seeds 20-30 per capsule and are polymorphic in shape with 2×0.5 mm size and deep brown to black in colour. The larger ones are globose and brown to black in colour and the smaller ones are variously angled and brown. Raphe is considerably smaller, thread-like and ulsioroidate, globose protruding. The seed surface has minute wrinkles. Under SEM, seed surface looks deeply covered with loose reticulate flap of viscin threads (Pl. 1, fig. 12). Cells on lateral side of seeds are more or less polygonal with walls depressed and not projecting (Pl. 1, fig. 13). Embryo cylindrical, occupying small part of the seed. The endosperm cells are polygonal to oval filled with starch grains (Pl. 1, figs. 14-16).

Table 1—Summary of seed morphological features in *Iphigenia* Kunth.

Characters	*I. pallida* Baker	*I. magnifica* Ansari & Rolla Rao	*I. stellata* Blatter
1	2	3	4
Number and seeds per capsule	30-40	Many	29-30
Colour	Light to deep brown.	Light to deep brown.	Deep brown to black.
Shape	Ellipsoidal to ovoid with accentric ulsioroid	Globose with accentric ulsioroid.	Polymorphic (larger ones globose and smaller ones variously angled).
Size	2×1.5 mm.	3×2.5mm.	2×0.5 mm.
Nature of raphe	(a) Elongated mass of raphe projecting from one side.	Conspicuous band of raphe.	Thread like, smaller Ulsioroidate white raphe protruding on fresh seeds. Raphe not conspicuous on dried seeds.
	(b) Tissue of raphe wound like, minutely lobed with viscin like reticulation of threads copiously seen.	Tissue of raphe wound like and inflated with irregulat folds. Seed surface appears to be covered with copious reticulation.	Seed surface looked deeply covered with loose reticulate flap of viscin threads.
	(c) Cells of raphe longitudinally elongated tubular to hexagonal with raised walls and depressed lumina.	Cells of raphe are projecting with striatious viscin.	—
Seed ornamentation	Epidermal cells of lateral side of seeds are polygonal with depressed walls and projecting lumina.	Epidermal cells of lateral side of seed surface are with projecting square to reticulaate lumina with highly depressed walls.	Epidermal cells are more or less polygonal with depressed walls and lumina not projecting.
Embryo	Cylindrical flat.	Occupies small part of the seed.	Cylindrical.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Thus, the shape, size, colour, surface ornamentation of the seeds and raphe are suggestive of heterogenous nature of the genus *Iphigenia*.

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Explanation of Plate

Plate 1

1-6: I. SEM Photomicrograph of *Iphigenia pallida* Baker Seeds :
1. Entire seed showing elongated mass of raphe projecting from one side.
2. Raphe enlarged.
3. Central portion of lateral side of seed enlarged.
4, 5. Seed showing embryo.
6. Seed showing endosperm.

7-11: I. SEM Photomicrographs of *I. magnifica* Ansari & Rolla Rao Seeds.
7. Entire seed showing a band of raphe.
8. Wound-like raphe.
9. Central portions of lateral side of seed enlarged.
10. Seed showing embryo.
11. Seed showing endosperm.

12-16: I. SEM Photomicrographs of *I. stellata* Blatter seeds :
12. Entire seed showing thread-like raphe.
13. Central portions of lateral side of seed enlarged.
14, 15. Seed showing embryo.
16. Seed showing endosperm.