

Seed morphology in five species of *Biophytum* DC (Oxalidaceae)

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Abstract. Seeds of *Biophytum* viz *B. helenae*, *B. intermedium*, *B. petersianum*, *B. reinwardtii* and *B. sensitivum* are brownish, small (0.87 to 1.63 mm long), tuberculate and show distinct orientations of ridges and furrows and crystalliferous epidermal cells. On the basis of these characters a key is proposed to delimit the five species of *Biophytum*.

Keywords. *Biophytum*; seed morphology; taxonomic significance.

1. Introduction

Biophytum DC (Oxalidaceae) comprises about 70 species distributed in the tropics (Willis 1973). Although its seed characters have been used for taxonomic purposes (Gamble 1957; Veldkamp 1971; Corner 1976), the seed microcharacters have not been studied. We describe the testa characters of five species of *Biophytum*.

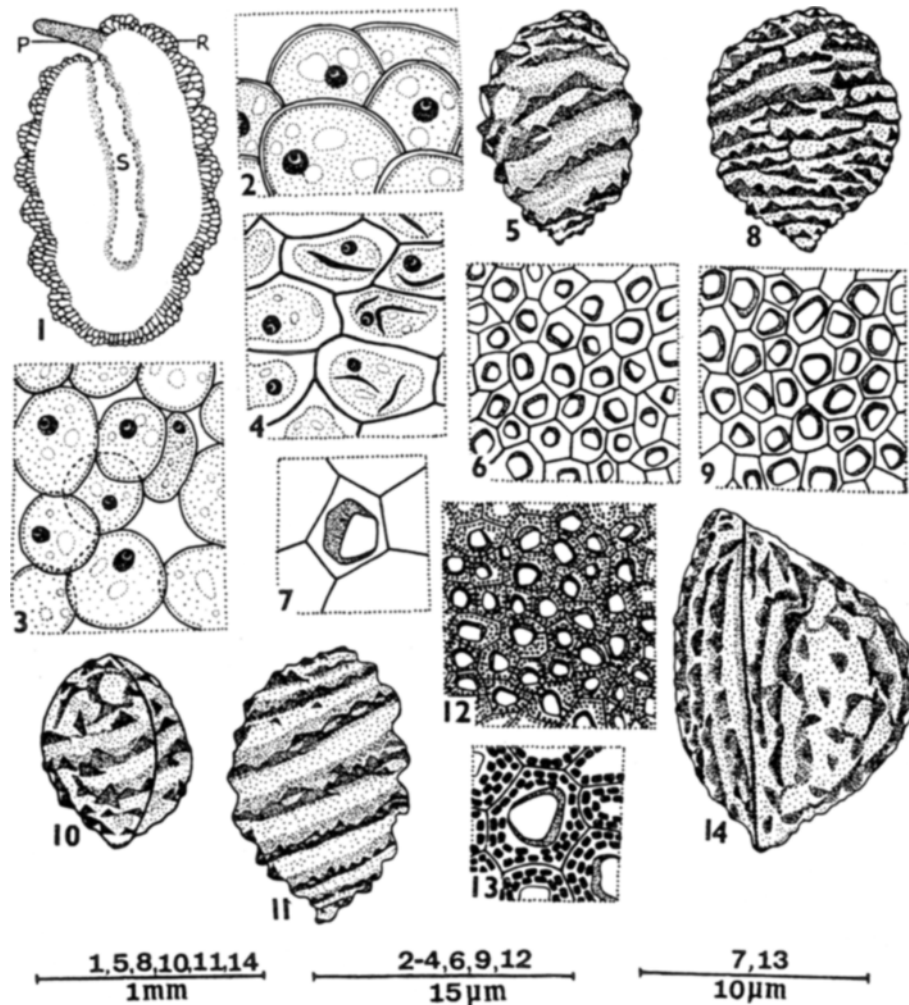
2. Materials and methods

Seeds of *Biophytum helenae* Busc & Musc, *B. intermedium* Wight, *B. petersianum* Klotzch, *B. reinwardtii* Edgw & Hook and *B. sensitivum* L. were locally collected and also obtained from Jardin Botanique, Strasbourg, France. The structure of the pellicle was studied from material collected from the freshly dehisced capsule, and this paper gives the details of the testa from a portion of seed coat separated from the water-soaked seeds and mounted in 1% glycerine. Exomorphic features were studied using a Meopta binocular microscope. Seed length and breadth were measured using ocular and stage micrometers and an average of 25 seeds of each species was considered.

3. Observations and discussion

In the species studied the mature seeds are brownish, 0.87–1.63 mm long and 0.75–1.16 mm broad. They are triangular, ovoid to spherical with the posterior and either blunt or pointed. As in *Averrhoa carambola* (Oxalidaceae), in *Biophytum* the mature seeds are individually enclosed in a pellicle. The pellicle is colourless, fleshy and papillate and presents a wavy outline (figure 1). The outer surface of the pellicle contains papillae which are oval to spherical cells containing a distinct nucleus and rich cytoplasm. The inner surface of the pellicle comprises polygonal cells which contain one or two lenticular to sickle-shaped structures (figures 2–4). At maturity the seed frees itself from the pellicle through an anterior longitudinal slit developed just below the placental projection (figure 1).

We recognise two basic types of mature seeds in the five species studied: (1)



Figures 1-14. 1-4. *Biophytum reinwardtii*, P = placenta, R = ridge, S = longitudinal slit 1. Entire pellicle after the ejection of seed 2. A ridge portion of the pellicle 3, 4. Cells from outer and inner surfaces of the pellicle respectively. Note the characteristic lenticular structures in cells of the inner surface 5-7. *B. helenae* Entire seed, testa part and single cell with prismatic crystal respectively. 8, 9. *B. intermedium* and structure of ridge. 10. *B. petersianum* 11-13. *B. reinwardtii*, testa part and single cell with prismatic crystal respectively. 14. *B. sensitivum*

tuberculate seeds showing scattered tubercles (*B. petersianum* and *B. sensitivum*) and (2) non-tuberculate seeds showing specifically oriented ridges and furrows (*B. helenae*, *B. intermedium* and *B. reinwardtii*). Figures 5-14 are representative illustrations of the two types of seeds. The following key is proposed for the identification of the five species.

Seed tuberculate

Seed triangular, 1.5-1.7 mm long, 1.0-1.2 mm broad, testa dimorphic, epidermal cells crystalliferous, tubercle cells not crystalliferous *B. sensitivum*

- Seed ovoid, <1 mm in both length and breadth but longer than broad, testa monomorphic both epidermal and tubercle cells crystalliferous
 *B. petersianum*
- Seed non-tuberculate
- Seed spherical, ridges and furrows transverse, testa cells crystalliferous
 *B. intermedium*
- Seed ovoid, ridges and furrows spiral, testa cells contain granules and crystals . .
 *B. reinwardtii*
- Seed sub-ovoid, ridges and furrows oblique, testa cells crystalliferous.
 *B. helenae*

The seeds of *Biophytum* are described as arillate (Lawrence 1964; Veldkamp 1971; Willis 1973) but Corner (1976) regards the seeds of Oxalidaceae (except *Dapania* Korth) as non-arillate. Our study supports Corner's observation. Both optical and SEM of the closely related genus *Oxalis* have been found to be of taxonomic value (Bahadur *et al* 1983). This study shows that seed and seed-coat characters in *Biophytum* serve as significant taxonomic traits and merit further investigations.

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