

THE FRUIT STRUCTURE AND THE ORGANOGENESIS  
PROCESSES AT ITS LEVEL IN *AUSTROCYLINDROPUNTIA SALMIANA*  
VAR. *SPEGAZZINII* (CACTACEAE)

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**Abstract:** *Austrocyllindropuntia salmiana* (Parm.) Backbg. var. *spgazzinii* (Web.) Backbg., is a bush over 2-m height, rich sprouting, native from North of Argentina (Salta). Branch is cylindrical, green-bluish performed from; flower until 2 cm in diameter, yellow; fruit red-carnal at maturity. At the mature fruit level, takes place the organogenesis process, conducting to the forming of a new plantlet. In paper are described the fruit structure, the organogenesis process at its level, the structure of a new young plantlet, neoformed from fruit. The process of a new plant organogenesis, is similar with the organogenesis process of a new article, being in strong relation with a leading fascicle.

**Keywords.** *Austrocyllindropuntia salmiana* var. *spgazzinii*; fruit structure; organogenesis processes.

### Introduction

In *Cactaceae* species was analyzed the stem structure in different species (Sajeva & Mauseth 1991; Mauseth & Sajeva 1992; Mauseth 1993; Corneanu 2001; Corneanu & al. 1996, 2001, a/o), as well as the ultrastructure features of the stem (Mauseth 1981; Wittler & Mauseth 1984; Corneanu & al. 2000, a/o). In *Austrocyllindropuntia salmiana* var. *spgazzinii*, at the fruit level take place the organogenesis process, which conduct at a new plant formation (Copăcescu 2001). This process is very rarely in vegetal kingdom. In this paper is described the fruit structure, as well as the organogenesis processes from this level which conduct at a new plantlet formation.

### Materials and method

*Austrocyllindropuntia salmiana* (Parm.) Backbg. is a bush over 2-m height, rich sprouting. Branch of 1.5 cm in diameter, present a red shade and are formed from cylindrical articles of 1.5-cm in diameter. Thorns over 1.5 cm in length, whitish; flower over 3.5 cm in diameter, light yellow; fruit red-carnal. Native from Brasilia, Argentina and Bolivia. Were described two varieties: *albiflora* and *spgazzinii* (Backberger 1977; Copăcescu 2001).

*A. salmiana* var. *spgazzinii* presents cylindrical branch, green-bluish; flower until 2-cm in diameter, yellow; fruit initially green-bluish, red-carnal at maturity (Fig. 1). Native from North of Argentina (Salta).

The investigations were performed at a mature fruit from a plant obtained from seeds harvested from the native area. Biological material (fruit fragments) was included in

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paraffin, seriated sectioned in different fruit planes and was stained with ferric hematoxylin. There was analyzed the fruit structure, as well as the organogenesis processes at its level.

## Results and discussions

### 1. The fruit structure and organogenesis processes at its level

The fruit epidermis is made from a layer of polygonal cells, slightly elongated, covered with a cuticle (Fig. 2). In some epidermis cells there are silicium crystals. Subepidermis is formed from 2-3 layers of polygonal cells, of different size, with the thickened walls, and full with a synthesis substance (Fig. 2).

The fundamental parenchyma is formed from big, polygonal cells, with small spaces between them and with cytoplasm disposed parietal. There are present big spaces, full with a synthesis substance. The leading fascicles disposed in the fundamental parenchyma, present xylem toward inner and libber vessels towards outer, in an equally quantity (Fig. 3).

The organogenic region is placed in a small depression on the fruit surface, in connection with a leading fascicle and near a lacuna space (Fig. 4). The subepidermis cells undergo an intense mitotic activity, resulting a cells population disposed on many rows. The cells from the outer layers become elongated with thickened walls. The cells from the periphery of the organogenic region are secondary structured as filiform, pluricellular formations, with straight walls and cytoplasm parietal disposed. The cells from the middle region, be formed a cytoplasm mass of mammellon shape (Fig. 5). In the cells from the fundamental parenchyma, near by the new formed structure, are presenting numerous chloroplasts, having an intense synthetic activity. In the median region, at the basis of the new structure, to be penetrate a leading libber-ligneous fascicle. Some cells are elongated, their walls be sclerenchymatized take place an organogenesis process of the thorns (Fig. 6). The mitotic activity to be continued, after be formed a spherical-ovoid protuberance (Fig. 7). The process of a new plant organogenesis is similar with the process of a new article organogenesis, being in strong relation with a leading vessel (Corneanu & al. 2001).

### 2. The structure of a new young plantlet, neoformed from fruit

A young plantlet, neoformed from fruit, in *Austrocyliodropuntia salmiana* var. *spgazzinii*, presents at outer an unistratified epidermis covered with a thick cuticle. It is formed from polygonal cells, of medium size, with cytoplasm rich in chloroplasts and other cellular organites, and a central nucleus (Fig. 8).

The subepiderm (cortical parenchyma) is made from two slightly flattened cells, of medium size, straight neighbored, with a parietal cytoplasm rich in chloroplasts.

The assimilatory parenchyma is constitute from big, polygonal cells, with spaces between them, a parietal cytoplasm with numerous chloroplasts and a nucleus placed at the periphery of the cell. In the fundamental parenchyma, there are vacuolar spaces. In the cells situated towards the central cylinder, as a result of an intense photosynthetic activity in chloroplasts, there are starch grains.

Endoderm is slightly evidenced, unilayer. The central cylinder is formed from parenchyma and leading fascicles. Medulla parenchyma is made from polygonal, parenchymatic cells, between them being present numerous starch grains disposed in aggregate. There are present, also, lacuna spaces, fill with a synthesis substance.

## Conclusions

The fruit structure was described, as well as the organogenesis process at its level in *Austrocyliodropuntia salmiana* var. *spgazzinii*, which conduct to a new plantlet formation. The process of a new plant organogenesis is similarly with the organogenesis process of a new article, being in strong relation with a leading fascicle.

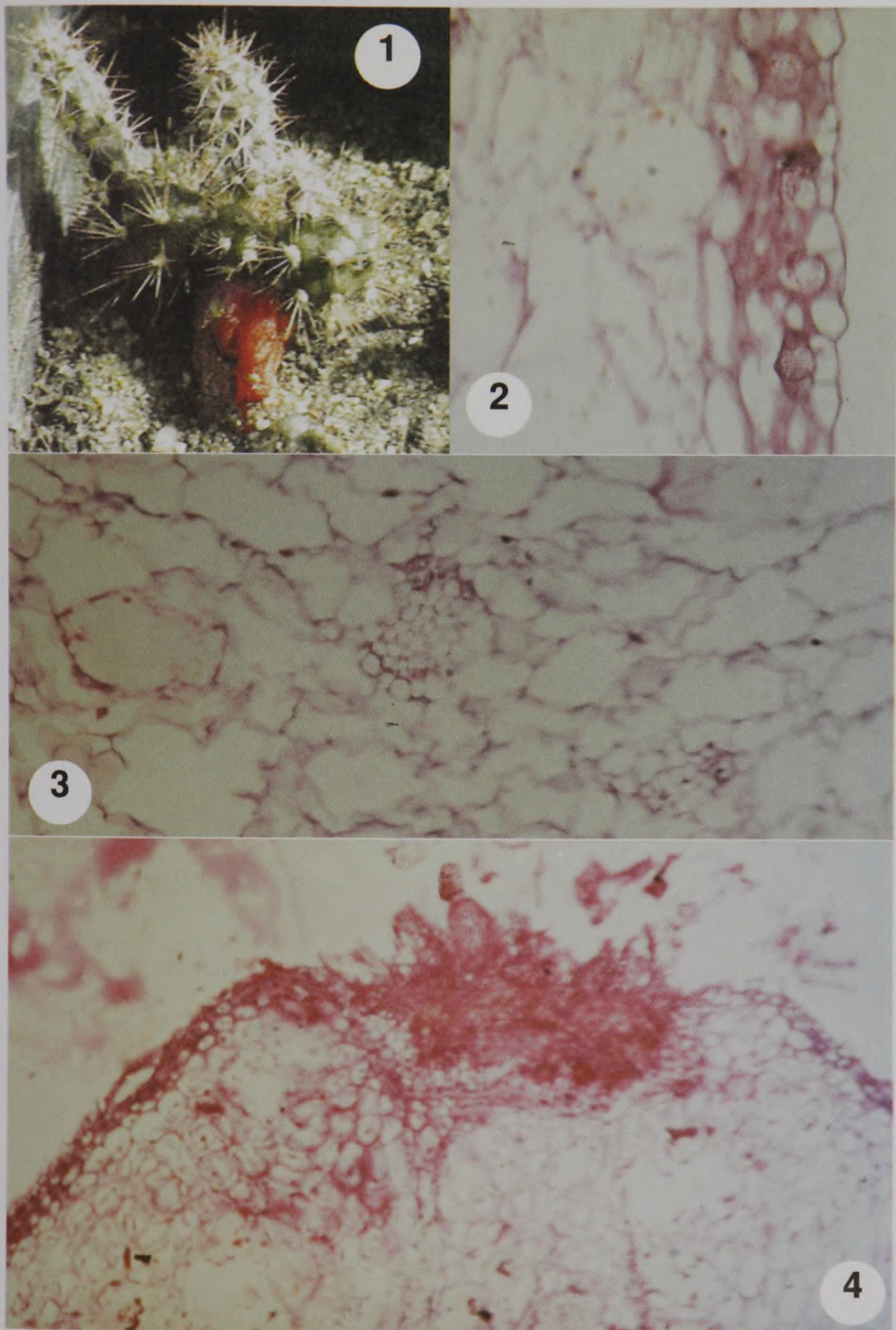


Plate I. Fig. 1 *Austrocylindropuntia salmiana* var. *spgazzinii*, plant (original from S.V. Copăcescu collection). Fig. 2 Fruit structure in *Austrocylindropuntia salmiana* var. *spgazzinii*. Fig. 3 Leading fascicle in the fundamental parenchyma of the fruit. Fig. 4 A small depression with organogenesis process, on the fruit surface.

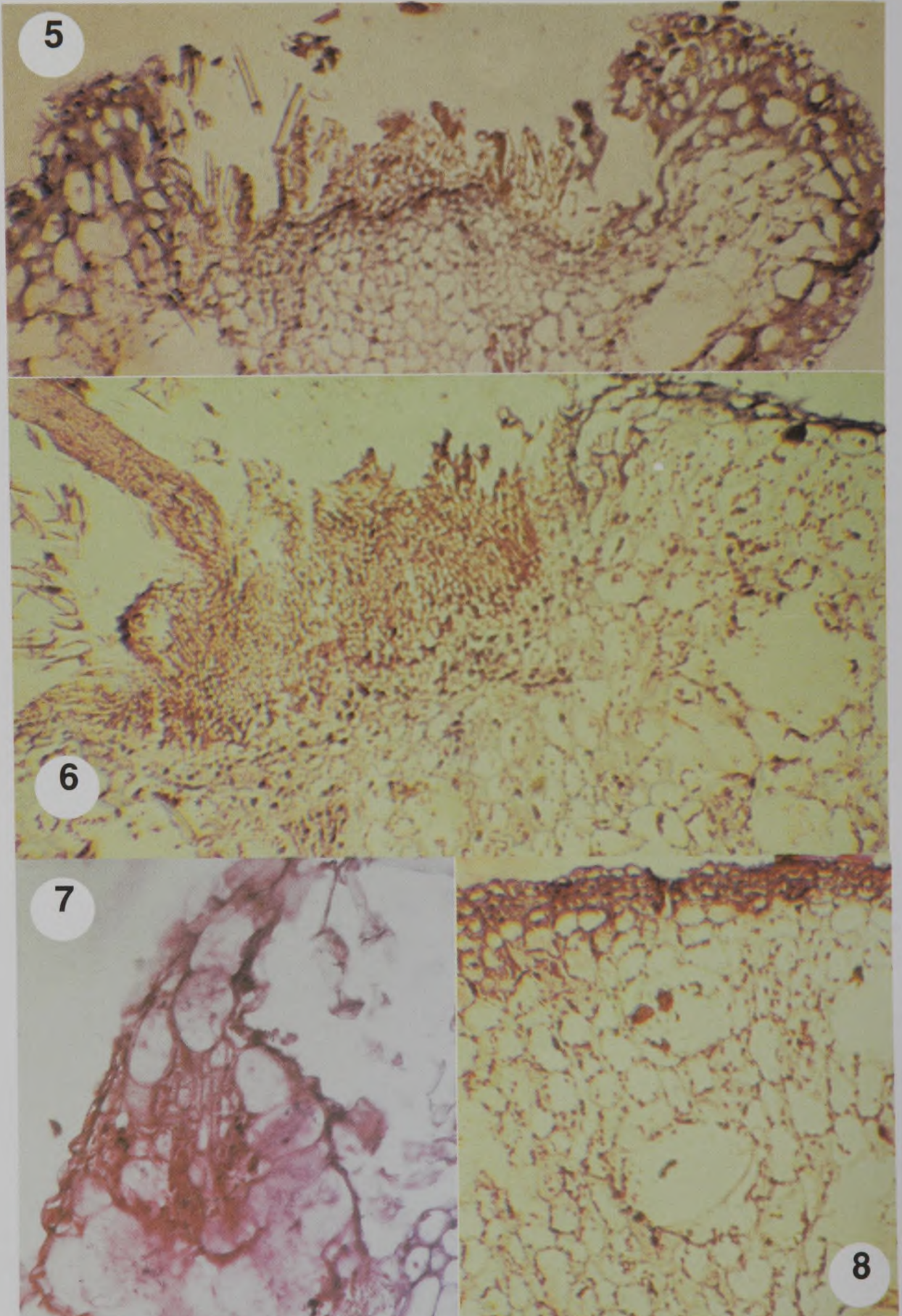


Plate II. Fig. 5 The organogenesis process: a structure of a mamilla shape. Fig. 6 An advanced stage of the organogenesis process of a new plantlet. Fig. 7 A very young plantlet neofomed at the fruit level. Fig. 8 The structure of a new plantlet neofomed at the fruit level.

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## STRUCTURA FRUCTULUI ȘI PROCESELE DE ORGANOGENEZĂ DE LA NIVELUL SĂU LA *AUSTROCYLLINDROPUNTIA SALMIANA* VAR. *SPEGAZZINII* (CACTACEAE)

**Rezumat:** *Austrocyllindropuntia salmiana* var. *spiegazzinii* are forma unei tufe de peste 2-m înălțime, bogat lăstărită, nativă din nordul Argentinei (Salta). Ramurile sunt cilindrice, verde-albăstrui, alcătuite din articule cilindrice; floarea până la 2 cm în diametru, galbenă; fructul roșu-carnal la maturitate. La nivelul fructului matur, au loc procese de organogeneză care conduc la formarea unei noi plantule. În lucrare sunt descrise structura fructului, procesele de organogeneză de la nivelul său, precum și structura plantulei neoformate din fruct. Procesul de organogeneză al unei noi plantule, este similar cu procesul de organogeneză al unui nou articol, fiind în strânsă legătură cu un fascicul conducător.