

C203Hesperidium Pericarp Differentiation in *Citrus sinensis* (L.) Osbeck

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The exocarp, yellow tissue flavedo, consisted of small, compact collenchyma cells which contain chromoplasts characterized by numerous, large osmiophilic globules and only few internal membranes. In some cells, the thickness of wall was not uniform even along the side of one cell, but 3-5 primary pit fields were developed in the secondary walls. However, two plasmodesmata interconnected laterally in the center of the cell walls were often encountered. There also has been discontinuities of cell walls at the corners of each cell where adjoining cells met. Multi-vesicular structures were also present in the vacuole. The epidermis exhibited very small, thick-walled cells. They included essential oil cavities and single membrane-bounded granular crystal-containing cells. A few stomata were scattered in the epidermis. The mesocarp, white tissue albedo, consisted of loosely connected, colorless parenchyma cells which had spongy nature. Huge air spaces were filled between these very irregular cells. It was not possible to draw boundaries of cells in the mesocarp. Vascular tissue, mostly tracheary elements, occurred here. The endocarp was composed of multicellular-structured juice sacs. Epidermis of the juice sac was covered with wax secretions enclosed large, highly vacuolated cells containing the juicy substances.

C204Cuticle Micromorphology of Leaves of *Pinus* (Pinaceae) in East and Southeast Asia

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Cuticle micromorphology of 21 species of *Pinus* in East and Southeast Asia was studied with scanning electron microscopy. The outer and inner surface of cuticles as well as the needle morphology was examined. Possible cuticle features which could be distinguished by their size, shape, and surface texture, as well as by the number of subsidiary cells, the rows of epidermal cells within a stomatal band, the number of cells between stomates in stomatal rows, and by the developmental patterns of cuticular flanges are described in detail. Most of these cuticle features have not been sufficiently substantiated by previous reports. Some of the inner cuticular features in particular, such as the texture of periclinal walls, the shape of the top of the anticlinal walls, the comparative size of the lateral and polar subsidiary cells, and the development of the groove near bristles, are diagnostic characters for dividing subgenera. The relationship between cuticle features and taxa is discussed. Certain taxa which are currently classified in more than one way were examined, with cuticular features providing additional evidence for the taxonomy of the genus.