

구연 A-3

Sporoderm differentiation in *Hibiscus syriacus* L.

Kim, Mee-Jung and InSun Kim*

Department of Biology Keimyung University, Taegu 704-701, Korea

ABSTRACT

Complete microsporogenesis of *Hibiscus syriacus* L. were carried out employing LM, TEM, and SEM to investigate the pollen ontogeny that undergoes considerable structural differentiation. The process first began with several cell divisions in the anther primordium that produced 3 different tissues of epidermal, archesporial, and connective tissues. Only archesporial tissue involved further differentiation into the tapetum and formation of reproductive cells, namely pollen mother cells (PMC). The tapetum and PMC were closely associated with each other structurally and metabolically by exhibiting numerous plasmodesmata, mitochondria, and many small vacuoles in their dense cytoplasm. A callosic wall began to surround the PMC while meiosis took place in the PMC to produce 4 microspores. When thick callose encircled each microspore as a frame, the sporoderm development initiated from the plasma membrane of a pollen grain in a tetrad. The first formed sporoderm layer was bacules and tectum of sexine that originated from the plasma membrane. After the dissolution of a callose, further development of sporoderm continued in the order of nexine1, nexine2, and intine layer. The nexine layer was thicker (ca. 2-3.5 μ m) than the intine layer whose thickness was about 0.9-1.5 μ m. Upon completion of the sporoderm development, that is after intine formation, spines and apertures of pollen surface ornamentation initiated from the tectum. Spines were dimorphic, about 4-9 μ m and 15-20 μ m in length, and no basal cushion was detected. The mature pollen grains ranged 100-200 μ m in diameter, but their average was about 170 μ m. About 120 spines were observed over the spheroidal pollen surface. Apertures were simple punctures of 2-3 μ m in diameter and about 50 apertures were somewhat helically arranged over the surface. Comparing such features of form and size of the pollen, sporoderm sculpture and structure, and aperture and spine conditions with known evolutionary trends in the genus *Hibiscus*, *Hibiscus syriacus* seemed to possess many advanced features in the sporoderm differentiation.

Keywords microsporogenesis, *Hibiscus syriacus*, ultrastructure, sporoderm differentiation

구연 A-3

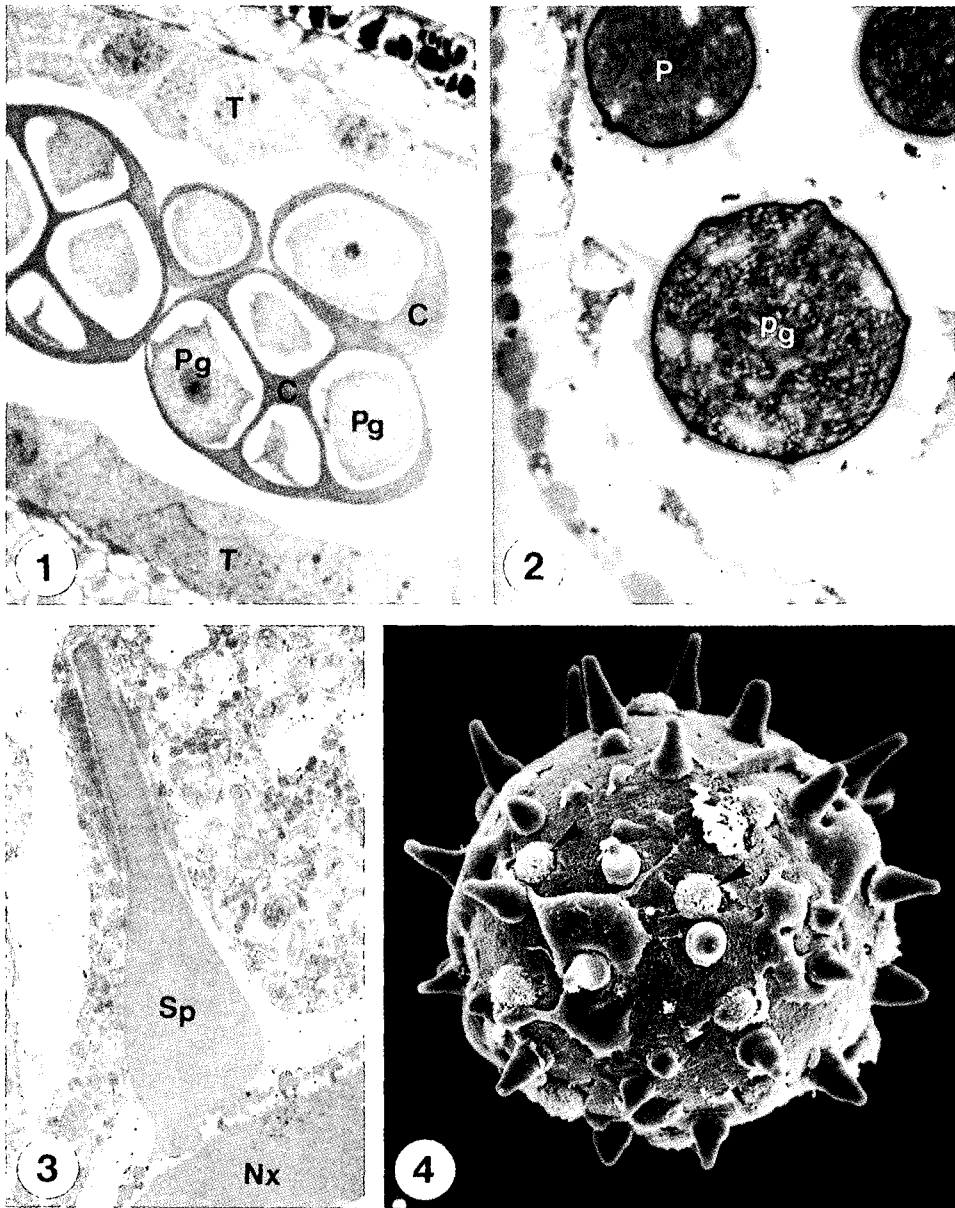


Fig. 1. Included tetrads in a callosic wall (C) separated from the tapetum layer (T). **Fig. 2.** Mature pollen grains (Pg) with distinct spines (Sp) and numerous amyloplasts (P) in the cytoplasm. LM. **Fig. 3.** A well-developed long spine. Nx : Nexine layer TEM. **Fig. 4.** Non-acetolyzed pollen grain secreting sporopollenin through apertures (arrow heads). SEM.