Seed Germination of *Stewartia pseudocamellia*

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Stewartia pseudocamellia is a Japanese summer-flowering tree that is cultivated only rarely in American gardens. This *Stewartia* bears 3-inch white flowers in mid-summer, orange-yellow foliage in the fall, and a year-round display of exfoliating pinkish-red bark. Difficulties in both vegetative and sexual techniques of propagation are largely responsible for its limited use. The purpose of our study was to document the seed biology of *Stewartia*, identify dormancy mechanisms, suggest reasons for the decline in viability, and recommend techniques for germination and production of this valuable species.

Desiccation Intolerance. Previous attempts to allow stewartia seed a period of dry after-ripening resulted in a rapid decline in seed viability. This trend led us to examine stewartias in the context of their taxonomic relationship with the tropical and subtropical members that dominate the *Theaceae* family. Seeds from tropical regions tend to lack the tolerance to desiccation that temperate species have acquired. Three days of air drying or 15 min of oven-drying at 80C were sufficient to destroy the embryo, as revealed through tetrazolium testing. To prevent desiccation damage, seeds were harvested when the capsules were green and indehiscent. Viable seed, as revealed though a cut test, appears plump and deep purple in color. The endosperm is oily or waxy and the embryo is white, spatulate, and approximately 3 mm in length. Nonviable seed is brown and shriveled. The internal contents are similarly brown and crumbled.

Stratification. *Stewartia* differs from tropical members of the tea family, in its requirement for cold stratification to break seed dormancy. In the germination studies, all treatment were exposed to 3 months of warm stratification (25C) followed by varying periods of cold stratification (4C). First noticeable signs of germination were observed after 5 months of cold stratification (2%). Six months of cold stratification yielded 19.5%, while 7 months yielded 51%. Emergence of the germinants generally occurred within 72 h of warming. Cold stratification seemed to have an effect on embryo growth; cold-stratified embryos were 25% longer than embryos receiving no chilling. Chilling also had a promotive effect on degrading the inner integument, which appeared stretched and flaking after 6 months of chilling.