evidence of enhanced mutation rates or distorted segregation; crosses have not led us to suspect the presence of chromosomal aberrations, but searches have not been made specifically for these. Accordingly, we consider the ascription of a phenomenon similar to hybrid dysgenesis as an explanation for our observations to be premature, although not excluded by the data in this report. Several facets of incompatibility in *Mormoniella* are being investigated actively at the present time.

### References


1. BREGLIANO, J.-C. and M. G. KIDWELL. Hybrid dysgenesis determinants. *In* Mobile Genetic Elements. J. A. Shapiro, Ed. Academic Press, NY. p. 363–410. 1983.
2. EHRMAN, L. Apparent cytoplasmic sterility in *Drosophila paulistorum*. *PNAS* 49:155–157. 1963.
3. LAVEN, H. Crossing experiments with *Culex* strains. *Evolution* 5:370–375. 1951.
4. SAUL, G. B., 2ND. An analysis of non-reciprocal cross incompatibility in *Mormoniella vitripennis* (Walker). *Z. Vererbungslehre* 92:28–33. 1961.
5. ——, P. W. WHITING, S. W. SAUL, and C. A. HEIDNER. Wild-type and mutant stocks of *Mormoniella*. *Genetics* 52:1317–1327. 1965.
6. WHITING, A. R. The biology of the parasitic wasp *Mormoniella vitripennis* [=*Nasonia brevicornis*] (Walker). *Quart. Rev. Biol.* 42:333–406. 1967.
7. WHITING, P. W. Spontaneous eye color mutation in *Mormoniella*. *Proc. Penn. Acad. Sci.* 30:226–246. 1956.


The Journal of Heredity 77:213. 1986.

# In vitro ovule culture of a seedless persimmon

**Russell C. Weigel and Karen W. Hughes**

*ABSTRACT:* Ovules of a seedless persimmon were excised from the developing fruit when the fruit were approximately 2.5 cm in diameter and cultured in vitro. Approximately 10 percent of the ovules germinated and formed plantlets in vitro dicating that the cause of seed failure is after a fertilization event.

A LOCAL spontaneous variant of persimmon, *Diospyros virginiana* L. is seedless. The biological mechanism for failure of seed development is not known; however, the results of in vitro ovule culture indicate that the seedless trait is probably due to aborted seed development, possibly as a result of an incompatibility between the ovule and the developing fruit, or to an embryo/endosperm incompatibility. Attempts to propagate the tree by shoot cuttings taken at various times throughout the year have been unsuccessful.

### Materials and Methods

Young fruit from the tree were collected in late July. The fruit were approximately 2.5 cm in diameter (Figure 1*A*). The fruit were surface sterilized as follows: 1) immersion in 70 percent ETOH for 1 minute; 2) several washes with sterile distilled water; 3) immersion in NaOCl for 10 minutes; and 4) several washes with sterile distilled water. Ovules 0.2 cm to 0.8 cm long were aseptically removed and transferred to a medium containing Murashige and Skoog salts[3], B5 vitamins[1], 600 mg/l asparagine, 200 mg/l casein hydrolysate, 600 mg/l proline and 0.8 percent agar in 25 × 150 mm test tubes. All amino acids were added to the autoclaved medium by filter sterilization. The ovule cultures were placed in an incubator at 25°C with 16 hours of light. Light was provided by cool white fluorescent tubes at 5 watts/M$^2$. After 3 months, developing plants were transfered to woody plant medium[2] with 0.6 percent agar.

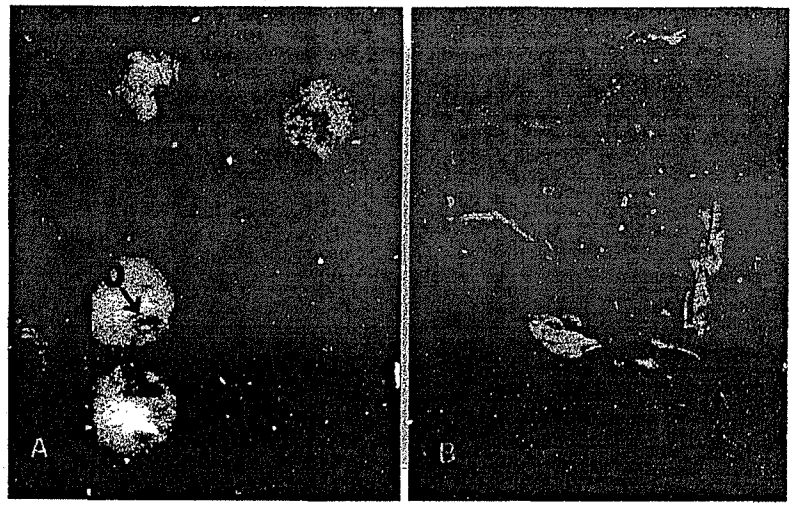


**FIGURE 1** *A* shows persimmon fruit used for initiation of cultures. The lower fruit has been dissected; an ovule (O) is visible. *B*—persimmon plant produced by ovule culture. The plant was transferred to soil and continued to develop.

### Results and Discussion

Of the 22 ovules that were cultured in vitro, only three ovules developed organs after three months in culture. Of these, one ovule produced a small shoot and a 6 cm-long root. Two ovules produced 1 cm-long shoots but no roots. The remaining ovules appeared to be dead. The medium around the inviable ovules and to a lesser degree around the viable ovules was darkened indicating possible leaching of toxic plant secondary products into the medium. All three cultures were transferred to woody plant medium. Two of the three cultures continued to grow and each developed shoots and roots approximately 6 cm-long within 10 weeks (Figure 1*B*). The third culture had normal root development but an abnormal shoot. This plant later died. Remaining plants were transferred to soil and placed on a misting bench to promote hardening and are growing well.

The nature of the seedless trait is unknown; however, it is clear from these experiments that some ovules can be rescued by in vitro ovule culture, indicating that embryo/endosperm or ovule/fruit incompatibility may be involved. The techniques described above should allow the in vitro culture of ovules from nonsterile persimmons and from crosses between different persimmon types that show embryo–endosperm incompatibilities.

### References


1. GAMBORG, O. L., R. A. MILLER, and K. OJIMA. Nutrient requirements of suspension cultures of soybean root cells. *Exp. Cell Res.* 50:151–158. 1968.
2. LLOYD, G. and B. MCCOWN. Commercially feasible micropropagation of mountain laurel, *Kalmia latifolia*, by use of shoot-tip culture. *Proc. Int. Plant Prop. Soc.* 30:421–427. 1980.
3. MURASHIGE, T. and F. SKOOG. A revised medium for rapid growth and bioassays with tobacco tissue cultures. *Physiol. Plant.* 15:473–497. 1962.


The authors are adjunct associate professor, and professor, respectively, in the Department of Botany, University of Tennessee, Knoxville, TN 37996.