

1954

The Endosperm as a Barrier to Intersectional Hybridization in Iris

Lee W. Lenz

Follow this and additional works at: <https://scholarship.claremont.edu/aliso>



Part of the [Botany Commons](#)

Recommended Citation

Lenz, Lee W. (1954) "The Endosperm as a Barrier to Intersectional Hybridization in Iris," *Aliso: A Journal of Systematic and Floristic Botany*. Vol. 3: Iss. 1, Article 7.

Available at: <https://scholarship.claremont.edu/aliso/vol3/iss1/7>

THE ENDOSPERM AS A BARRIER TO INTERSECTIONAL HYBRIDIZATION IN IRIS

LEE W. LENZ

Many interspecific as well as intersectional hybrids are possible in iris although a large number of pollinations may be required in order to obtain a single viable seed. Cooper and Brink (1942) and (1944) have shown that one cause of hybrid seed collapse may be the failure of the endosperm to develop normally, with the result that the embryo perishes due to lack of nutrients. Randolph (1945), Dahl (1949), and others have used the embryo culture technique for growing mature iris embryos in order to overcome the slow and irregular germination which occurs otherwise. At the Rancho Santa Ana Botanic Garden embryo culture is a routine procedure for the handling of seeds of rare species and for important crosses. Werckmeister (1936) reported growing malformed embryos from mature capsules in certain iris crosses.

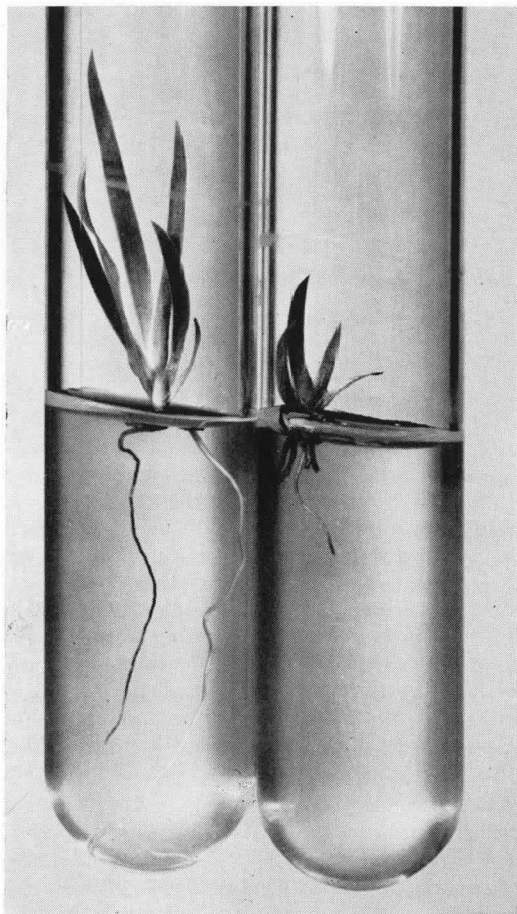
In the iris breeding program being carried on here, it has been our experience that capsules produced in many intersectional crosses may contain ovules of varying degrees of normality as regards size and appearance. However, upon drying, the seeds collapse and in most instances would be classified as aborted. Nevertheless, occasionally one of the larger seeds will germinate and produce a viable seedling, the embryo in this case apparently having passed the threshold limit of germinability in its development. In order to determine the cause for the failure of seeds in crosses involving diploid tall-bearded iris (♀) and the crested-iris, *I. tectorum* (♂), capsules were harvested when approximately half mature and the young seeds were dissected. It was discovered that in nearly all of the seeds the central cavity which at this stage of development should contain a rather firm white endosperm, contained either a thin colorless liquid, or was devoid of any substance. Upon probing it was possible to find in almost every ovule a rather normal looking though flaccid embryo. In order to determine whether these embryos could be grown on into seedlings *in vitro*, sixty-day old capsules were harvested, the surface was sterilized with alcohol, and the embryos were excised aseptically and placed on a nutrient agar. Figure 1 shows two seedlings grown from seeds which were completely devoid of any endosperm at the time of excision. Capsules allowed to remain on the plant did not produce a single viable seed.

In a cross between *I. missouriensis* (♀) and *I. Munzii* (♂), members of the subsections *longipetalae* and *californicae* respectively, a similar endosperm condition was encountered. However, in this cross it was not possible to grow the young embryos on into seedlings presumably because the nutrient agar did not meet the requirements of the embryos at that early stage of development. It would, therefore, appear that endosperm failure may be of considerable importance in the failure of seeds in wide iris crosses.

Work is being carried on at the present time to determine how early the embryos can be removed from the seeds and grown successfully on nutrient agar. Experience thus far has indicated that a growth factor, or factors, may be necessary in order to culture very young embryos successfully *in vitro*.

LITERATURE CITED

- Cooper, D. C. and R. A. Brink. 1942. The endosperm as a barrier to interspecific hybridization in flowering plants. *Sci.* 95: 75-76.
- . 1944. Collapse of the seed following the mating *Hordeum jubatum* \times *Secale cereale*. *Genetics* 29: 370-390.
- Dahl, A. O., R. Schreiner, and G. S. Joachim. 1949. Culture of *Iris* *in vitro*. *Bull. Am. Iris Soc.* No. 114: 99-101.
- Randolph, L. F. 1945. Embryo culture of *Iris* seeds. *Plants and Gardens* 1: 241-246.
- Werckmeister, P. 1936. Über Herstellung und künstliche Aufzucht von Bastarden der Gattung *Iris*. *Gartenbauwiss.* 10: 500-520.



I. 'Dogrose' \times *I. tectorum*