Proceedings of the Iowa Academy of Science

Volume 19 | Annual Issue Article 17

1912

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BEHAVIOR OF POLLEN TUBES IN RICHARDIA AFRICANA.

BY JAMES ELLIS GOW.

During the past year the writer undertook an investigation of the morphology of *Richardia africana*, (the ordinary Calla Lilly, otherwise known as *Calla ethiopica*, or *Zantedeschia africana*), with a view of discovering what might be found relative to its life history, and comparing its life history with that of other Aroids. In at least one respect the results were curious and unexpected.

In the greenhouse, pollination of Richardia is seldom accomplished except by artificial means. Unpollinated material was at first experimented with. In the younger blossoms, the ovule appears as a well defined nucellus, surrounded by one integument which is just beginning to develop. At this stage, the primary archesporial cell is prominent, lying in the middle of the nucellus-tip. It is larger than the surrounding cells, has a better-defined nucleus, and reacts differently to stains, being much more responsive to the Haematoxylin than are the surrounding cells, and taking Safranin or Gentian Violet much less diffusely, the staining of the former especially being largely limited to the chromatin, the network of which seems sharply defined from the first. This cell develops directly into the embryo-sac.

Between the first appearance of the primary archesporial cell, and the final appearance of the embryo-sac, the ovule nearly doubles in size, the nucellus becoming much longer, and the integuments (which have now become two) lengthening out, and overlapping the tip of the nucellus. Some nucelli, at this stage, show a well-defined megaspore, and some show a well-defined embryo-sac, but most of them consist merely of a mass of perfectly sterile tissue, without differentiation of any sort. The ovary continues to swell for a time, and then begins to wither. The cells of the mature nucellus are large, thin-walled, and very much like the endosperm-tissue common in many of the Aroids, but of course are quite a different thing morphologically.

The experiment of fertilization was tried about the middle of January. In the course of a week a few sections were made, but with negative results. Early in February it was observed that the ovaries were swelling rapidly and had reached about double their former size. Upon sectioning the material it was found that all parts of the ovule had grown; the nucellus having nearly doubled in length, and the integuments having kept pace with them. A very few showed indications of containing a badly disorganized embryo-sac, but most of the nucelli were, as before, perfectly sterile. Pollen tubes, however, had penetrated the carpel, and had in many cases approached the tip of the nucellus, and in at least one instance a tube had penetrated the tip of a perfectly sterile nucellus. The tubes were well preserved, stained well with the triple stain (haematoxylin-safranin-orange G), and showed the fertilizing cell and tube-nucleus well in many ways. There was very little shrinkage or distortion. Older material, investigated ten days later, showed a breaking down both of the pollen tubes and the sterile nucelli, but in a few cases the pollen tubes could still be seen penetrating the tips of the now partially disintegrating nucelli.