

Chapter 31

Evolutionary Aside 31.1--Endosperm Origins

Going back almost 100 years, plant biologists thought the ancestral, angiosperm female gametophyte had eight nuclei and seven cells, with two polar nuclei in a central cell uniting with a sperm to form a triploid endosperm. As the root of the angiosperm tree was resolved (see figure 31.8), the female gametophytes of *Amborella* and members of the water lily (Nymphales) and star anise (Austrobaileyales) clades were carefully studied. Light and transmission electron microscgraphs revealed that water lily and star anise female gametophytes had only four cells and four nuclei. Only a single, haploid cell unites with the sperm to make a diploid endosperm. *Amborella*, however, has a diploid central cell and its endosperm is triploid. It is still not possible to conclusively demonstrate what the ancestral state was.

You may be wondering why it took researchers so long to look at female gametophytes under a microscope and realize that the triploid endosperm ancestral model might not be correct. The reason is until about 10 years ago, evolutionary biologists thought a very different group of plants were the closest living relatives of the original angiosperm. Research efforts were focused on those species rather than *Amborella* and the water lilies. Making sense of the diversity of life depends on having accurate evolutionary hypotheses.