ENDOSPERM STUDIES IN PEANUTS[1]

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Certain interspecific crosses in the genus *Arachis* fail as a result of embryo abortion (1, 2, 3). It is likely that these abortions are due, to a large extent, to irregular endosperm behavior (4). The causes for these abortions need to be better understood in order that appropriate preventive methods may be developed for utilization in breeding programs of the cultivated peanut, *Arachis hypogaea* L. However, few investigations have been made on the nature and extent of endosperm development in cultivated peanuts (1, 5-9). Apparently, studies of endosperm ontogeny would be of assistance in our understanding of the mechanisms that favor or discourage intraspecific and interspecific hybridization in the genus *Arachis*. The utilization of "resistant" genetic material from wild *Arachis* species could be a tremendous asset in improving cultivated peanuts which are devoid of genetic resistance to many important diseases and insects.

We are searching for endosperm "markers" which are unknown at present in peanuts. It is anticipated that they would aid in the identification of certain crosses if sufficient amounts of endosperm are present in the seed for the proper assessment of its genetic composition. Endosperm "markers" have proven useful in maize (10). There is disagreement as to the presence of endosperm in mature peanut seeds (8, 9). However, investigators (8, 9) agree on the presence of free-nuclear and cellular endosperm in immature seeds. Since endosperm development is dependent on fertilization, and since the gametes which form the endosperm are subject to the same genetic and evolutionary influences as zygotic gametes, we see no reason why differences in endosperm would not be detectable, in some stages, in diverse peanut germ plasm. Thus far, we have found that starch grains are conspicuous constituents of immature peanut endosperm. We are studying these particles and other food reserves to determine if genetically controlled differences may exist in various sources of peanut germ plasm.

We are also interested in the prospects of heterofertilization (*i.e.*, fertilization of the egg and the polar nuclei by sperm from different pollen grains) studies in peanuts. These studies would be similar to those of Sprague (11) in maize and Gorbet (12) in grain sorghum. Such studies are also dependent on the presence of endosperm "markers" or labeling techniques.

We are studying the chemical composition, development and behavior of endosperm on a wide range of peanut accessions and hybrids to elucidate some of the above-mentioned factors.

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