

Size and Ornamentation of Some Modern and Fossil Lycopod Spores

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This brief summary of the external features of the spores of a few representative genera of lycopods, both fossil and recent, is only an introduction to the problem involved in the determination of spores found isolated in shale and coal.

The genera dealt with in this paper include the extinct forms *Lepidostrobus* (the cone of *Lepidodendron*) and *Sigillariostrobus* (the cone of *Sigillaria*), and the modern forms *Lycopodium*, *Isoetes*, and *Selaginella*.

The megaspores of *Isoetes* vary in size from 250 to 900 microns. The exospore is siliceous and the color gray to white, except in *I. melanospora* where the spores are black. All of the megaspores have triradial ridges which terminate at an equatorial ridge dividing the spore into four faces—the three upper faces and a lower or basal face. The sculpturing consists of spines, small tubercles, or reticulations, and may be similar on all faces or different on the basal face. These characters are constant in a given species, and serve as the best means of their classification. The slightly elongate microspores vary in length from 20 to 40 microns. They are smoothish, or are marked by papillae or small spines, and rarely have a winged crest. The color is usually ashy, fawn, or cinnamon-brown.

Selaginella also is heterosporous. The megaspores (Figs. 4, 5) have annular wings, while *Isoetes* megaspores (Figs. 6, 7) are wingless. The spore-body varies in diameter from 240 to 460 microns, with wings 30 to 90 microns wide. *Selaginella apus* megaspores are ornamented by reticulate ridges, while those of *S. caulescens* bear a few spines. *S. apus* microspores are 21-35 microns in diameter, are slightly rough, and have a triradial slit.

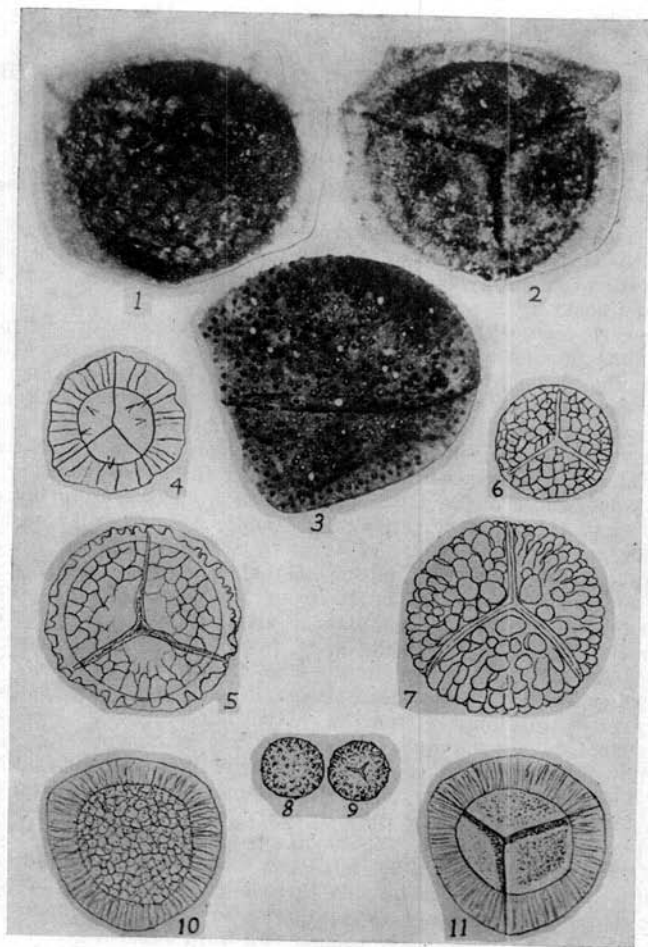
With the exception of the little known *Phylloglossum*, *Lycopodium* is the only homosporous lycopod. The spores compare in size with the microspores of *Isoetes* and *Selaginella*, but show distinctly the triradial ridge and equator as in the megaspores of these two genera. The color is sulphur-yellow, and they measure 26-34 microns in diameter. The surface is usually reticulate, or occasionally ornamented with tubercles.

The megaspores of modern lycopods seldom reach a diameter of 900 microns, while those of *Sigillariostrobus* are 1,000 to 2,250 microns in diameter. The author has found in the No. 6 coal of Illinois, megaspores measuring as much as 3,100 microns in diameter, which are most likely lycopodiaceous.

The megaspore of *Sigillariostrobus ciliatus* (Figs. 8-9) compares favorably with the large megaspore shown in Fig. 3. Several similarities may be seen between the spore of Figs. 1-2 and that of *Selaginella apus* (Fig. 5). This same spore (Figs. 1-2) compares favorably with *Triletes triangulatus* type II of Zerndt (Figs. 10-11), and compares even more closely with Scott's description of the megaspore of *Selaginellites suissei*.

A close analogy may be seen between the spores of *Isoetes* and those of *Lepidostrobus*. The megaspores of *L. Veltheimianus* are 800 microns in

diameter and are covered by long stout spines. The microspores of this species and of *L. oldhamius* are often found in tetrads and are 20 microns in diameter, slightly smaller than the average *Isoetes* microspores.



Figs. 1-2, Winged megaspore x 54, with reticulate markings on basal face; 3, Megaspore x 18, covered with short spines; 4, *Selaginella caulescens* megaspore x 43; 5, *Selaginella apus* megaspore x 58; 6, *Isoetes englemanni* megaspore x 32; 7, *Isoetes malinverniana* megaspore x 36; 8-9, *Sigillariostrobus ciliatus*, echinulate megaspore x 5; 10-11, *Triletes triangulatus* II megaspore x 36.
1-2, 3, by L. C. McCabe, from No. 6 coal of Illinois; 4, after Bennie and Kidston; 6, 7, after Motelay and Vendryes; 8-9, after Scott; and 10-11, after Zerndt.