The boghead alga *Botryococcus* has been observed in coal macerations of eleven Lower and lower Middle Pennsylvanian coal beds and their correlatives in the Illinois Basin: the Reynoldsburg, Breckinridge, Mariah Hill, Tarter, Hermon, Dawson Springs, Delwood, New Burnside, Brush, Murphysboro, and Bancroft (?). Coals. Although *Botryococcus* is rare at most of the 43 sample sites where it was observed, it is abundant at two sites of the Dawson Springs coal and one site each of the Reynoldsburg, Breckinridge, New Burnside and Brush Coals. It is common at two sites of the Delwood Coal and one site of the Tarter and Mariah Hill Coals. *Botryococcus* has been found at more sites (16 sites) of the Delwood Coal than any other coal. Although it is extant, *Botryococcus* has not been observed in the Illinois Basin above the lower Middle Pennsylvanian even though hundreds of samples of the most extensive coal seams in the basin, which occur in the upper Middle Pennsylvanian, have been examined.

The Dawson Springs coal and overlying and underlying strata at one sample site were macerated to compare the abundance of *Botryococcus* with the lithology and composition of the spore assemblages. The alga is most abundant in the coal and overlying coaly shale in which *Lycospora*, produced by large lycopod trees, is most abundant. *Botryococcus* is least abundant in the underclay and the gray shale that overlies the coaly shale in which fern spores are most abundant. *Granasporites medius*, representing the arborescent lycopod *Diaphorodendron*, is most abundant in the gray shale. Sphenopsid spores are abundant in the coal, underclay, and some intervals of gray shale overlying the coal. Coal beds other than the Dawson Springs, in which *Botryococcus* is abundant also contain an abundance of *Lycospora*.

Petrographic analyses of several coal samples demonstrate the abundance of *Botryococcus* in relation to other microscopic constituents in the coal. *Botryococcus* colonies occur abundantly in a few thin layers of the samples. The colonies occur within desmocollinite and in association with thin bituminite-saturated shaley layers along with some small sporinites (*Lycospora*) and some inertodetrinite. These *Botryococcus* and sporinite-bearing layers are interlayered with telocollinite and minor semifusinite or fusinite. A few of the layers contain up to approximately 60 percent *Botryococcus* so that the rock is properly termed a torbanite. Other layers are cannel coal. SEM studies confirm that some colonies of *Botryococcus*, particularly in the Dawson Springs, have not been significantly compressed from their original morphology during coalification.

Since modern *Botryococcus* live in fresh to brackish water environments, the association of abundant algae and *Lycospora* reinforces evidence from earlier paleobotanical studies that coal swamp lycopod trees grew in the wettest parts of the swamps that were flooded, at least part of the time.