SHORTER NOTES

The Gametophyte of Lycopodiella prostrata.—As part of an extended study on mycorrhizal and photosynthetic gametophytes of the Lycopodiaceae, spores of Lycopodiella prostrata (Harper) Cranfill, a species with an undescribed gametophyte, were cultured. The spores were obtained from plants collected in Cook County, Georgia and a voucher was deposited at VSU (Carter #14616). The conditions, techniques, and nutrient medium used were those of Whittier and Renzaglia (Amer. Fern J. 95:153–159. 2005). The system of classification followed in this report is that of Øllgaard (Opera Bot. 92:153–178. 1987).

There are five gametophyte types in Lycopodium (s.l.). Four of the five are mycorrhizal with the following shapes – carrot-shaped, disk-shaped, uniaxial strap-shape, and branched cylindrical. The last type, which has been reported for Lycopodiella, is photosynthetic with a solid, more or less cylindrical base topped with photosynthetic lobes. This study was carried out to determine if the gametophyte of L. prostrata is this type.

Spore germination was slow. The earliest germination occurred two months after sowing spores in illuminated cultures, and at one year, 61 spores out of 10,000 (0.6%) had germinated. Spores cultured in the dark for one year did not germinate; however, spores from these dark cultures remained viable and 142 of them out of 10,000 (1.4%) germinated after moving them into the light for seven months.

Although spores of the mycorrhizal species of Huperzia and Lycopodium germinate slowly and at low percentages (Whittier, Amer. Fern J. 88:106–113. 1998), it is generally believed that Lycopodiella spores germinate rapidly and at high percentages (Whittier, Amer. Fern J. 88:106–113. 1998). This is not completely true because spores from some Lycopodiella species germinate slowly (Whittier, Amer. Fern J. 88:106–113. 1998).

Cell divisions in various planes formed a small mass of gametophyte tissue that remained partially contained by the spore coat. At about six weeks of growth, the young gametophyte escaped from the spore coat. At this time a small, dark green, ellipsoidal mass of cells formed – the young primary tubercle (Fig. 1A). Once the main body of the tubercle had a width of 150 μm or more, the first photosynthetic lobe developed at its apical end (Figs. 1B, 1C). Further enlargement of the tubercle resulted in a larger apical region where additional photosynthetic lobes formed. The lobes were erect, narrow, and strap-shaped with tapering distal ends.

The early mature gametophytes had a short, solid, more or less cylindrical base topped with numerous photosynthetic lobes. As the gametophytes aged, more lobes formed, and the previously formed lobes were displaced to the sides of the larger base. Gametophytes at this stage are illustrated in Figs. 1D and 1E.

The gametangia usually formed at the junction of the photosynthetic lobe and the gametophyte base. Both archegonia and antheridia developed on the