A SECOND REPORT OF THE PROTHALLIA OF LYCOPODIUM INUNDATUM IN NORTH AMERICA[1]

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Gametophytes of *Lycopodium inundatum* L., first recorded for North America in 1972 (Bruce, 1972) from two localities in Michigan, were found growing at the edges of shallow wet depressions along the margins of a sandy access road on the shore of an inactive and flooded sandpit (Figs. 1, 2) in Somersworth, Strafford Co., New Hampshire. The mature sporophytes of *L. inundatum* var. *inundatum* (compare Gillespie, 1962) are abundant along the shoreline, often forming dense mats (Fig. 3).

Samples of sandy soil containing the smallest visible sporophytes were collected in October and examined according to Bruce's technique. Some of the young sporophytes were still attached to living gametophytes, as adjudged by the green color, turgidity, and characteristic lobing of the latter. Gametophytes were also found which had not yet produced sporophytes.

Gametophytes ranged in size from less than one mm. in diameter for one which bore no sporophyte, up to about three mm. in diameter among those bearing sporophytes. Included in the latter category were one gametophyte bearing a sporophyte which had produced about ten microphylls, and two gametophytes each bearing two young sporophytes (Fig. 4). In contrast, however, some very young sporophytes were found to have no attached gametophytes, the latter apparently having rotted away, even though the sporophytes bore only one or two microphylls. This condition appeared particularly prevalent where the soil particles were overgrown with moss protonemata and algae.

In addition to variation in size discussed by Bruce, variations in occurrence and condition, as well as in form (Bold, 1973), of the gametophyte in relation to differences in the

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microhabitat suggest the need for microecological studies in the field and laboratory. These would complement laboratory study of the culture and development of gametophytes of other species (Freeberg, 1962; Freeberg and Wetmore, 1957) and of the embryogeny of the sporophyte of *Lycopodium inundatum* (Bruce, 1972).

The fact that spores of *Lycopodium inundatum* germinate readily and produce green photosynthetic gametophytes which live on the surface of the soil is of potential value to biology teachers (Bierhorst, 1964) in areas where the species occurs in New England (Fig. 5; for circumpolar range map see Hultén, 1968, p. 26), for the gametophytes might be grown on artificially denuded patches of soil next to the sporophytes. Although gametophytes of mosses and ferns are readily available and commonly used for study in biology classes, few students ever see the live, fleshy gametophytes of *Lycopodium*. It is possible that careful searching in suitable locations near colonies of mature sporophytes would produce numerous live gametophytes for class use.

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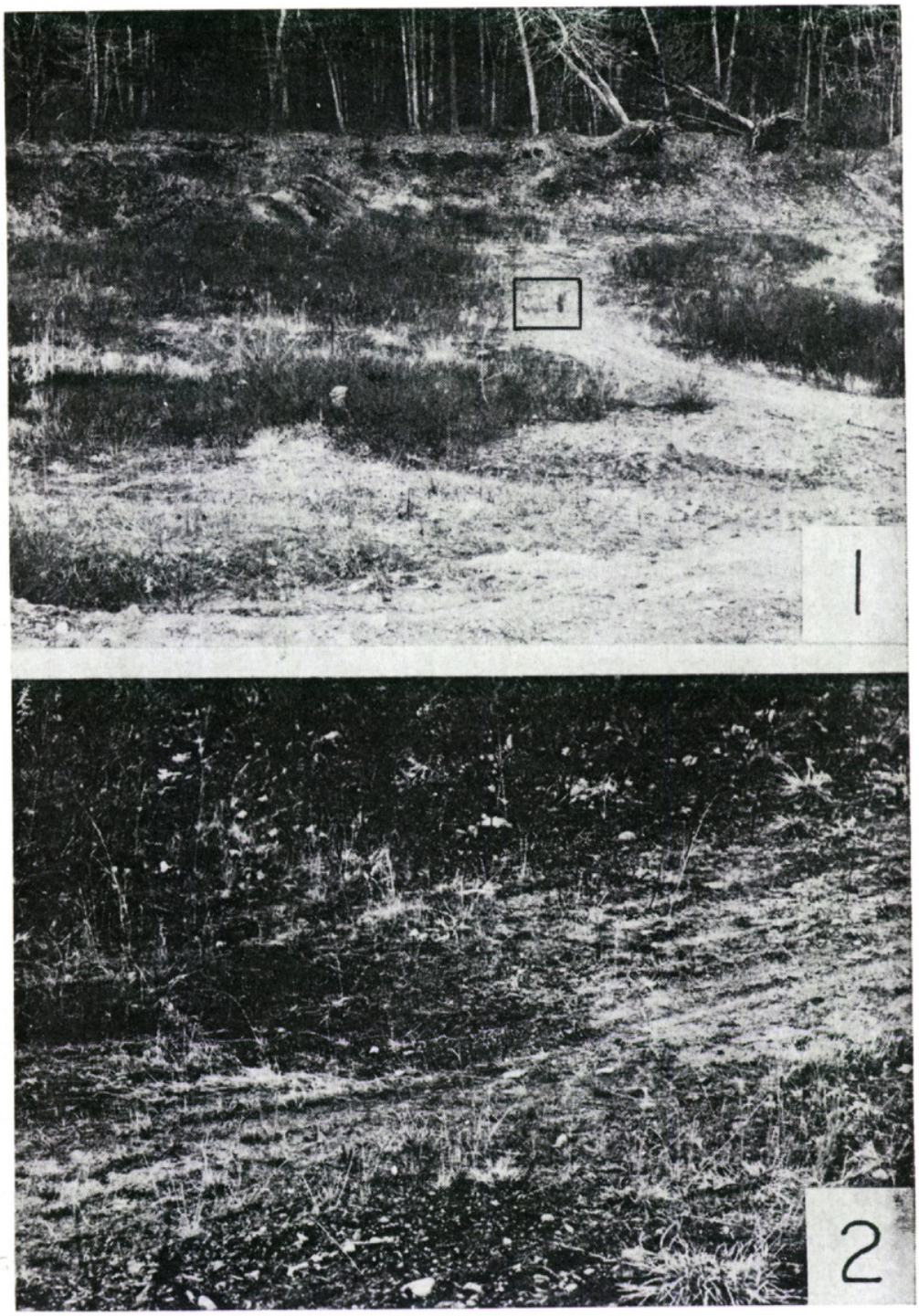

Figure 1. Typical macrohabitat with abundant mature sporophytes along brook (to left) and pond (to right) of access road (center). Note area of Fig. 2 (box).

Figure 2. Microhabitat of gametophytes at edges of depression (left of center) darkened by growth of moss protonemata and algae.

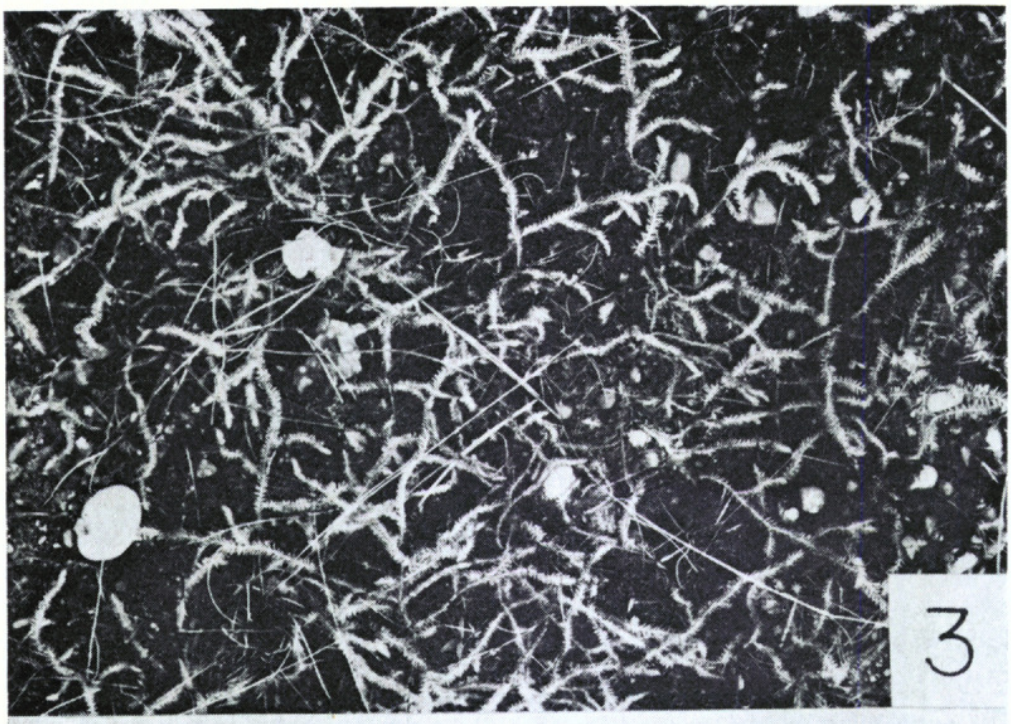

Figure 3. Vertical view of dense mat of mature sporophytes (each branch less than one cm. thick).

Figure 4. Gametophyte bearing two young sporophytes (upper right dark area was green and minutely lobed, the remainder of the gametophyte was colorless).

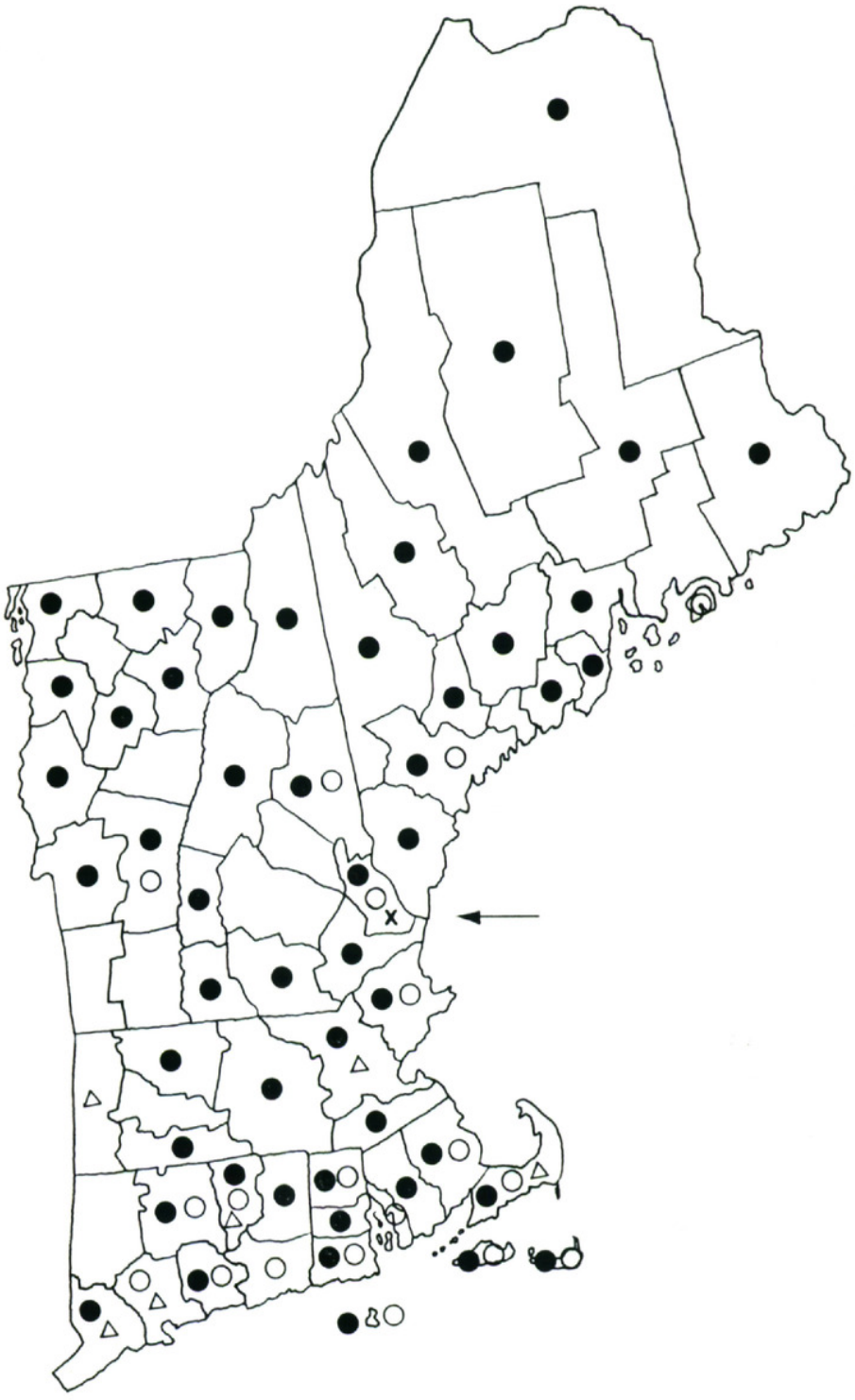

Figure 5. County distribution of *Lycopodium inundatum* varieties in New England (plotted from Seymour, 1969): var. *inundatum* (dots), var. *Bigelovii* Tuckerm. (circles), and var. *robustum* R. J. Eat. (triangles). Note site of gametophytes (x) discussed here.