life Aspects of Lycopodium clavatum

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Background and general aspects of life

Overall the lycopodiums are not a very well known group of plants to the average botanical student. Most often they are merely Recognised and passed over. Usually some one must have the urge and enthusiasm to get down on their knees and delve back into history to a prehistoric scene to understand lycopodiums to their fullest. Lycopodiums are truly an ancient plant in all aspects. In looks, you can practically see the monstrous plants that thrived millions of years ago and died so graciously to provide us with our present day coal reserves. In Reproduction, they certainly have not changed from their past means of primitive generation, yet today there is much evidence of variation within the species and even genus, and this variation never seems to be a settled matter.

Lycopodium is such a plant as to exhibit active hybridization of species due to their life aspects of thriving in disturbed areas and forming a gene community that will no doubt intermingal with other species of lycopodium. To add to the botanist's confussion, lycopods are easily affected by their environmental surroundings. The plants morphology will change with changes in its environment, such as one plant growing in the sun and also in the shade will show a lax aspect in the shade and a more upright posture in the sun. Things of this sort may clearly bring about the looks that could stimulate one into thinking "hybrid"? unfortunatly lycopodium clavatum is effected with such characteristics. Fortunatly though, the hybrid complex of clavatum is not one of such intensity to warrent great confussion as are several other lycopodium hybrid complexes such as; obscurum and dendroideum (Beitel 1974) In clavatum it is a matter of overlap of the northern taxon and it's southern counterpart. To the far north of canada the variety monostachyon becomes the dominent taxon. It is characterised by having only one strobilus per peduncle, a shorter peduncle and more appressed leaves. The question of whether var. Monostachyon should be considered a species, variety, or just a form becomes apparent and important when its range overlapps with the typical form at its southern boarder in Northern minnasota, michigan & New England and the two remain distinct. unfortunatly I was not able to locate any plants that indicated any such variations as var. monostachyon does, as characters that are of the hybrid are extremly subtle. So the matter of varieties or hybrids remains one to be looked at.

The breakdown of the classification of lycopodium clavatum begins Roughly with the division Pteridophyta and divides into the class lycopodiinae and thus into

the order lycopodiales seperating from the order selagineilales. From here it is placed in the family lycopodiaceae, they are then divided into the renown genus of lycopodium, seperated from other genera such as Isoetes, stylites and selaginella which are all heterosporous.

The genus lycopodium is characterised as being perinial, homosporous, vascular plants, moss like in appearance and with Alternation of generations. They have slender stems - some prostrate some erect and basically branching dichotomously. The sporophyte generation or the green part above ground is the dominant phase. lycopods are unique in the plant world in having xylem and phloem within both the stem and the root. They have spirrally arranged sessile microphylls or minute leaves and reniform sporangia in the microphyll axils. Often sporophylls are reduced to form a strobili which may be peduncled or not. Some species do not form strobili but instead form sporangia on upper surface of leaves near the top of a branch. Their main means of propigation is by runners, often leaping forward. As the plant grows forward the former old growth dies out. Some may produce bulbets which form at the base of the upper leaves, fall to the ground upon ripening and start anew. All however reproduce by spores. These spores will grow to subterranian levels and are <u>termed</u> the gametophyte generation. The spores may begin to germinate within a few days after being shed, but they may also take up to three - eight years to germinate. It may also take from eight months - six to 15 years for the gametophyte to develope sexual organs or sporophyte generations. this is Alternation of generations.

lycopodiums may be low terrestrial dwellers as is usually the case in North America or they may be epiphytic in jungle or tropical situations. They are found on every continent except antarctica from the tropics to treeline and above. one habitat they do avoid though is a desert habitat. overall there are more than 100 species of lycopodium found in the world with 12 being found in the eastern united states.

more specifically lycopodium clavatum ("clava" meaning ~~foot~~ club) or another definition says that it is Greek for wolf foot, in regards to it thriving in barren places (Doubleday), has many common names ranging from running clubmoss, common clubmoss, staghorn clubmoss, wolfsclaw clubmoss to Robinhoods hatband and forks and Knifes. Many species are referred to as ground pines, presumably from their resemblance of leaves to cedar, hemlock and pine. A brief definition of the species clavatum is as follows. It has horizontal stems, creeping and sometimes leaping over obstacles, at surface or barely under the ground, rooting at irregular intervals. Stem produces branches that are erect or slightly arching. these branches may fork up to 7 times almost always dichotomously. leaves are yellowish green and of all the same

length so that the branch outline is cylindrical in appearance. They are arranged in rows and densly packed and not scale like at all more needle like and linear. The most distinguishing character of the plant I think is the appearance of a bristly, colorless hair approximatly three mm long at the tip of each leaf. This character is recognizable from some distance away. The new growth leaves are silvery green and the old are dark green. The reproductive organs are produced on long scaly peduncle. There can be up to 7 strobili, and one up to 7cm long. These strobili can be produced on any erect branch and will mature during August or Sept. Lycopodium Clavatum is found from labrador to Alaska south to North Carolina and Washington. It is a circumboreal plant. (Lawrence 1951). An overall habitat preference has been derived from several references (underwood 1908, Wherry 1961, Gleason/Cronquist 1963) and the consensus is that Lycopodium clavatum generally prefers fairly dry and open areas, preferably in an opening or edge to a mixed coniferous/deciduous woods. In soil that is slightly to moderately sandy or gravelly and non-calcerious or acidic. I will know discuss my findings and compare a few things to the site description above.

Overall I found Lycopodium Clavatum growing quite commonly in norther michigan. Here is a discussion and description of certain areas spread out throughout northern michigan in which I found the plant. On a trip to the upper pennisula I found Clavatum growing in a "borrow pit" between Rt 28 and a swampy woods 1.7 miles southwest of Hulberts corners, chippawa co. michigan. It was a particularly sandy site and was quite moist. The plant itself was growing on the edge of the swampy woods and the pit under some Picea Mariana (black spruce). Interestingly it was growing in association with four different types of lycopodium; L. annotatum, L. sabinifolium, L. tristachyum and L. selago. This must have been a perfect habitat for lycopods. and for hybrids amongst all the gene pools of colonies of lycopodium species. This site was typical of the site for lycopodium described above. I also found it growing just east of cheboygen in an area called grass bay. Here it was in in quite different habitat. Its associates where typical of a thuja swamp or wetland. some were Coptis trifolia, Cornus Canadensis, Petasites palmatus, Frientulus borealis, Botrychium Virginianum and as it always seems to be in association with; Lycopodium Annotinum. There were many fallen and decaying logs and this habitat seems to be quite fitting for Lycopodium clavatum in northern michigan as I also found it extensively throughout reese's swamp growing quite profusely. In one site I in reses I found a small patch under cedar and hemlock trees growing on a decaying log. This seemed typical for

a growth pattern for Clavatum to creep and crawl with long runners as this plant did some of the typical associates in recess swamp were Pteridium aquilenum Mianthemum canadense and cornus canadensis. And as usual in this type of association lycopodium Annotinum was only 15 ft away. Along the trail to carp creek is where I found some of the nicest patches of Clavatum in the swamp. Halfway to hurt lake on the south side of the creek I found a large mat of Clavatum and also found it scattered along the trail further down. In some instances the plant was practically covered by the foilage of trientalis and Pteridium. Aralia nudicalis cornus and lycopodium obscurum were with five feet of these patches. The most notible thing about this area was that it was along an open, fairly heavily used trail, which supports the aformantion destription of habitat preferance for lycopodium Clavatum.

I only noted two instances of clavatum being a plant of open areas and sandy spots, hardly ever did I see it in a particularly dry habitat, what I think lycopodium clavatum's strategy is, is to take advantage of areas that are not particularly good for other plants. such as the burrow pit site. lycopodium definatly fits a niche in the successional schems of things definatly as a introductory species. It is an important and integral part of the series of plants occupying a wide range of habitats throughout the succussional process.

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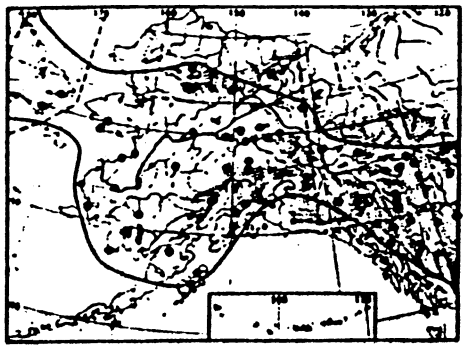

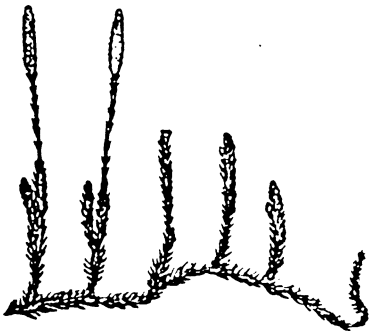

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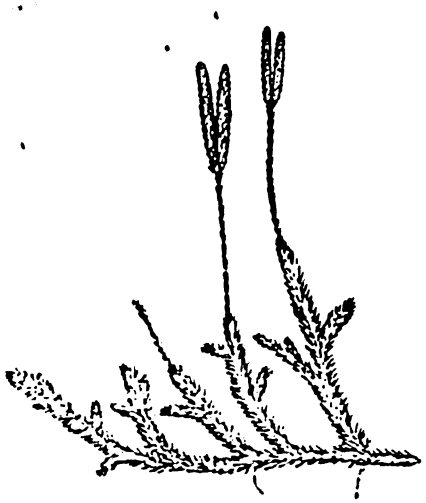
9. Lycopòdium clavàtum L.
subsp. monostáchyon (Grev. & Hook.) Sel.

Lycopodium clavatum var. *monostachyon* Grev. & Hook.; *L. clavatum* var. *lagopus* Laest.

Differs from subsp. *clavatum* in having solitary, sometimes very short-peduncled spikes.

Described from Smoking River, lat 56°N, in Rocky Mountains.



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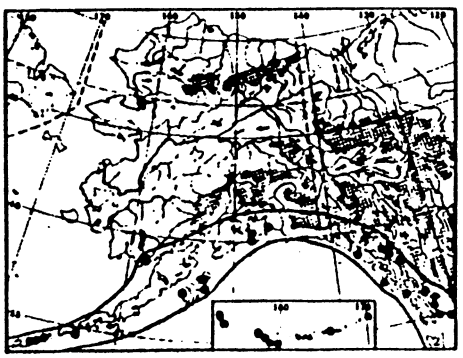

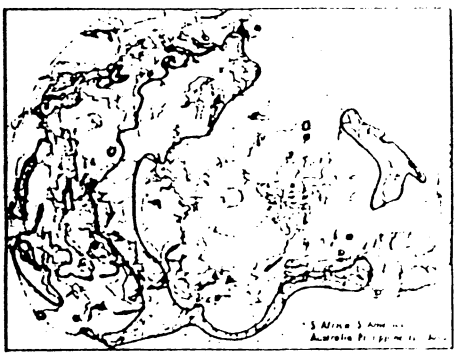

8. Lycopòdium clavàtum L. Common Club Moss
subsp. clavàtum

Stem long, densely covered with more or less appressed leaves, creeping on ground, with ascending branches repeatedly forking with age, branches terminated by a usually long peduncle covered with short bracts and bearing 2–3 spikes; at least the lower spore-bearing leaves tipped with a soft, hairlike bristle, best observed on young leaves at tops of branches.

Woods and rocky places in lowlands, ascending to lower alpine region, mostly on acid soil. Described from Europe.

Var. **integérrimum** Spring (common in British Columbia) differs in having leaves lacking bristles.