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AGRICULTURAL RESEARCH
NORTHEASTERN REGION
BELTSVILLE AGRICULTURAL RESEARCH CENTER
BELTSVILLE, MARYLAND 20705

July 16, 1980

SUBJECT: Claopodium crispifolium (Hook.) R. & C. (Thuidiaceae)

TO: POSI File

SYNONYMS: Hypnum crispifolium Hook.
Hypnum ramulosum Hampe

DESCRIPTION: Prostrate (pleurocarpus), pinnately-branched, in thin intertangled spreading mats or forming thick carpets, yellowish-green or golden-brown above and reddish-brown below. Stems 5-8 cm. long. Leaves imbricate or close together and crispate-incurved when dry, broadly ovate near base, auriculate-subclasping and decurrent, abruptly long acuminate, 1.8 mm. long and 0.7 mm. wide.

DISTRIBUTION & ECOLOGY: California to British Columbia (Alaska?) and Idaho. On tree roots, soil, stones and rock faces of cliffs, usually below 2,500 feet, but up to 3,600 feet; redwood, mixed evergreen and Douglas fir forests.

Original sample was collected on a large rock in a north-facing ravine within a mixed evergreen forest at 1,600-2,000 feet (just inside Six Rivers National Forest, 5 miles west of Willow Creek, Hwy. 299, Humboldt County, California). No additional Claopodium was found within the immediate vicinity. Associated mosses on this one rock included: Hypnum subimponens, Leucolepsis acanthoneura, and Plagiomnium venustum. Also present were a fern, Polypodium glycyrrhiza and species of flowering plants Saxifraga and Sedum.

The re-collection was obtained about 3 miles from the original site at 1,000 feet (Boise Campground). Claopodium was of local occurrence in another north-west facing ravine on rocks. The forest was rather dense and primarily of Californica laurel (Umbellularia californica). Also a dense understory of poison oak (Toxicodendron diversiloba) could not be avoided. Common associates on rock include: the bryophytes Anacolia menziesii, Metaneckera menziesii, Hypnum subimponens, Plagiomnium venustum, Isothecium stoloniferum, Isothecium cristatum, and the fern Polypodium glycyrrhiza. Additionally, species of moss Trachybryum, Dicranum, Homalothecium and flowering plants Saxifraga and Sedum were occasionally present.

In many micro-habitats where one might expect Claopodium crispifolium, Hypnum subimponens was encountered. Well-shaded rocks, as in north-facing ravines, seem to be a prime requirement for this Claopodium. Although Hypnum subimponens is often present, it seems to tolerate less shade.

Claopodium was occasionally seen on disentegrated rock and base of trees where again one finds Hypnum subimponens. Carpets of Claopodium here are very thin or poorly developed. Further up the trees Dendroalsia abietina and Antitrichia californica are common.

Claopodium crispifolium is sometimes intermixed with other mosses, particularly Hypnum subimponens and Plagiomnium venustum. These are close ecological associates. Carpets of Claopodium sometimes include scattered individuals of Trachybryum, Homalothecium or Brachythecium.

COMMENTS: The original sample was collected in April 1979 and reported as high priority in January 1980. This led to a telephone call to Dr. Norris upon which he reported Claopodium carispifolium as a common moss at the base of maple trees within the redwood forest zone. The ecological differences here led me to suggest that we obtain and submit another small sample for screening before undertaking a large re-collection.

In the field, Dr. Norris discovered it was impractical to collect Claopodium on maple roots. He then went to the original site (as described on a duplicate specimen sent to him May 1979) and collected 1/2 pound from the same rock (PR-53070). After 4 hours of searching, he found additional Claopodium at Boise Campground which is about 3 miles from the original site. Here, he estimated that about 1,000 pounds were available. Based on a 10-pound sample, he believed to have sent us as compared to the actual weight of 3-1/2 pounds (PR-53069), I reduced his 1,000 pound estimate accordingly and indicated to Dr. Suffness that we could easily supply 300 pounds.

In May 1980, Dr. Suffness reported that our new samples from the original rock (PR-53070) showed little activity, but a second sample obtained at a new location repeated the PS activity found in the original sample (PR-53069).

When I arrived at the targeted re-collection site, I reduced Dr. Norris' estimate further, to possibly 100 pounds. Before then, he had realized his estimates were exaggerated when I acknowledged receiving 3-1/2 pounds and 1/2-pound samples instead of 10 or more pounds.

I devoted one full day to searching for additional Claopodium, from east of Berry Summit to 15 miles east and north of Willow Creek (on highways to Weaverville and Hoopa). The first six hours of searching over a wide geographical area yielded almost nothing.

I then decided to return to Boise Campground for a closer evaluation on the amount available which 50 pounds now seemed difficult. The ravines Dr. Norris had led me to were south of the campground area. I then decided to further focus more on this area by working north towards the original site. After crossing and dipping over several slopes with no Claopodium, I finally encountered one large rock with a reasonable amount that actually looked similar to the kind of rock where I had collected the original sample. I followed this ravine up (from the river), climbing over and under large boulders and through dense poison oak. For the first 100 meters or so, Claopodium was frequent and in the next 100 meters it was abundant. After 400 meters up the ravine Claopodium became difficult to find.

It required another 3-1/2 days to obtain 110 pounds of Claopodium crispifolium from the site described on Page 2. The actual picking involved little effort and time. Most of the work was in hauling the material out of the brush to the vehicle, a distance of 1/2 mile. Light rain made the work harder since the wet moss weighed considerably more than 110 pounds dry weight.

Dr. Norris has located additional sites for Claopodium since my return to Beltsville, and feels he can supply the additional 200 pounds if needed. These additional sites are not near the original, but I suspect that where one finds Claopodium practical to collect, it will closely duplicate the original material from an ecological standpoint.

There is a question as to why a new sample from the original rock did not repeat the same PS activity. When Norris collected his sample, he indicated that the remaining material was rather scanty and not as thick as he found at a new location. I examined his samples before sending them to RALTECH, and I would agree the smaller amount was loose knit where the sample from the new location was a well-developed carpet. The material I originally collected was also a well-developed carpet. The original rock still contains about 1/2 pound Claopodium pure and much more mixed with Plagiomnium venustum.

Norris also indicated seeing a "white fungus" on the better developed growth of Claopodium (new location). I recalled seeing white mycelia threads at both the original and new sites on the rhizoids of not only Claopodium, but also on Hypnum, Leucolepsis and Anacolia. Fruiting bodies were not seen by either of us. But there were puff ball like remnants (suggesting Gastromycetes) under the carpets, but I did not examine these too closely because they did not appear to be in the moss. The white mycelia threads reminded me more of a Basidiomycete-type fungus. Some of this was included in the re-collection, but as in both the small and large samples, the weight of this white mycelia is nil.

Dr. Suffness has expressed some concern on a fungal association, particularly if this involves a representative of the lower fungi. It is my feeling that we are dealing either with a mycorrhizal association involving higher fungi such as in the Basidiomycetes or none at all. Some important facts to keep in mind are:

- Bryophytes possess a strong chemical resistance against fungal attack or decay. (Norris, personal communication).

- Plagiomnium venustum, a close ecological associate to Claopodium crispifolium, showed KB activity and lower T/C values in PS activity.

- Hypnum subimponens, also a close associate to both Claopodium and Plagiomnium above, showed no activity.

- Claopodium samples collected at two different sites and at different times of the season showed similar PS activity.

The most common contaminant in Claopodium and other mosses here is rhizomes of Polypodium glycyrrhiza. A sample of this (PR-53691) was sent to RALTECH.

The genus Claopodium includes 3 other species, two of which will be sampled this summer. All occur in western North America.

FRACTIONATOR: Cassady.

COMMON NAMES & USES:

REFERENCES:

Conrad, H.S. 1956. How to Know The Mosses and Liverworts. WM. C. Brown Company Publishers, Iowa; p. 105.

Grout, A.J. 1932. Moss Flora of North America. Hafner Publishing Co. Inc. (Reprint); Vol. 3: 180-182.

Spjut, R.W. 1971. Mosses of the Marble Mountain Wilderness Area, Siskiyou County, California. MA Thesis, Humboldt State University; p. 38.

NOTE: Literature is limited at this time. For nomenclature and classification one should review Crum, H., W.C. Steere and L.E. Anderson, 1965. A List of Mosses of North America. The Bryologist 68: 378-432.

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