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THE IDENTITY OF CLADONIA LEPIDOTA FRIES

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(Plate 187)

The plant determined by Fries as *C. lepidota* has occupied an interesting as well as an uncertain position almost from the first. The name chosen for it was unfortunate, having been used previously by several authors for an entirely different plant of somewhat doubtful relationship, first described by Acharius[1] as *Cenomyce gonorega* f. *lepidota*.

Fries considered the plant a good species and Tuckerman, who believed that "the interest in the study of Lichens lies in the resolution rather than in the over-estimation of differences" saw nothing in it to indicate a relationship between it and any other and therefore gave to it a specific name in his herbarium before he accepted the one proposed for it by Fries.[2]

Two authorities, however, have assumed a relationship for it and both find it in the typically scarlet-fruited *C. cristatella*. Nylander, whose *C. substraminea* was published in 1860, based his species upon the ochrocarpous form of *C. cristatella* to which he added a specimen of *C. lepidota* sent him by Tuckerman. Wainio[3] referred to *C. cristatella*, as f. *lepidifera*, plants sent him from New Bedford by Henry Willey as *C. lepidota*, considering Fries' "nomen ineptum ob confusionem cum *C. lepidota* Nyl."

Willey did not agree with Wainio's disposition of the plant. Like Tuckerman and Fries he was convinced that it deserved specific

[1] Syn. Meth. Lich. 259. 1814.
[2] *Cladonia lepidota* Fr. ex Tuckerman, Syn. Lich. 1: 249. 1882.
[3] Wainio, Act. Soc. Faun. Fl. Fenn. 10 (Mon. Clad. 2): 446. 1894.

rank as is shown by the labels he attached to specimens in his herbarium. His collection, now in the United States National Herbarium, contains five packets of mounted plants, all from Massachusetts: No. 1, from Essex County; Nos. 2, 3 and 5 from New Bedford; No. 4, from Weymouth. The specimens in packets Nos. 2 and 4 are accompanied by place data only. The others are labeled by Willey with an unpublished specific name based on Wainio's form name. In packet No. 3, in Willey's hand, occurs the note "According to Wain. Monog. Cladon. P. 2, p. 446 *Cl. lepidota* Fr. is f. *lepidifera* Wain. of *Cl. cristatella* var. *ochrocarpia* Tuck. But I do not agree."

To one who is familiar with the plant it is plain that Willey's disagreement was well-founded. *C. cristatella* is typically a scarlet-fruited species. Fries' plant is typically a brown-fruited species. Examples of the var. *ochrocarpia* are to be met with in which the yellowish or pale- to darker-brown apothecia shade into the typical scarlet coloration and there is, therefore, no question concerning Tuckerman's correctness in disposing of that plant as he did. Fries' *C. lepidota* does not show transitional changes of the kind; the apothecia are constantly pale- to darker-yellowish or brownish and there is nothing to indicate its position to be elsewhere than under Sect. *Ochrophaeae* of Wainio's arrangement of the genus. Moreover, there is a difference in chemical reaction. *C. cristatella*, in all states of development, yields no response except, perhaps, a brightening of the individually dominant color to KOH, either alone or in combination with CaCl. The other yields a distinct and immediate yellow reaction to these chemicals combined. Either of these differences is sufficient to separate it from *C. cristatella*.

A study of the plant, however, will show that its specific entity is much more diverse and complicated than was indicated by any of the authorities mentioned; and that various names given it were applied to what is merely one of a group of forms, the whole constituting a distinct and widely distributed species.

C. lepidota Fries is represented in the Tuckerman herbarium by specimens from South Carolina, New Jersey, and Massachusetts. It is also recorded in the Synopsis from Mexico. With the exception of part of those from New Jersey, the plants are characterized by having the tips of the podetia broken into numerous short, subradiate segments which are minutely squamulose and minutely

fruited, the apothecia abundant. The plants from New Jersey, for the most part similar, include others with the podetia more slender and with the tips terminated by solitary, or few, comparatively large apothecia. Similar plants occur in the Willey collections from New Bedford and Weymouth.

This latter mode of development, although so meagerly represented in the two herbaria, is common throughout the plant's range. In this form the plants resemble typical forms of *C. mitrula, C. subcariosa, C. clavulifera,* etc., and even more closely, *C. cristatella* var. *ochrocarpia.* Another distinctive form has the podetia conspicuously obconical. These forms represent, possibly, the normal fertile condition of the species; the divided-tipped plants, perhaps, a less fertile condition.

Any particular type of variation may be well-defined in just-evolving plants and that form may continue through the life of that plant or adult plants may occur in which various types have developed simultaneously. In fact, almost any colony is likely to yield several connecting forms and these may vary from any one to any other; in view of which it is surprising that the Tuckerman and Willey collections show so little variation.

Fries founded *C. lepidota* upon one of the more conspicuous forms of the species; another form has recently been segregated as a species by Merrill. There is excuse for this, for while there is considerable difference in appearance between the sturdy, obconical, large-fruited plants and the slender, elongate, smaller-fruited plants (see Plate No. 187, figs. 2 and 9) there is an even greater difference between these and the divided-tipped, minutely-fruited forms (fig. 15). Yet, as before stated, all will be found to be but variations in development, bound together by the common possession of distinctive characters, as well also as by the general occurrence of a series of connecting states.

The first unpreoccupied specific name clearly applicable to the *Cladonia lepidota* of Fries is (*C.*) *piedmontensis* Merrill, and this name must be adopted for it. An amplified description of the species with a key to its common forms follows.

CLADONIA PIEDMONTENSIS Merrill, Bryologist **27:** p. 22, 1924. *C. substraminea* Nyl. Syn. Lich. p. 204. 1860 (in part); *C. lepidota* Fr. ex Tuck. Syn. 1, p. 249. 1882 (in part); *C. cristatella* f. *lepidifera* Wain. Act. Soc. Faun. Fl. Fenn. **10:** (Mon. Clad. **2**) 446. 1894. Primary squamules small, rounded, flat, entire but becoming some-

what elongate or expanded with rounded or sublinear segments, yellowish to yellowish-green above, white or faintly yellowish beneath, KOH (CaCl) + (above and beneath); podetia yellowish, yellowish-green or yellowish-glaucescent, 20–30(–40) mm. tall, simple or branched, obconical, club-shape or somewhat elongate-cylindrical, the tips somewhat expanded and terminated by medium-size to comparatively large apothecia or with the tips somewhat thickened and divided into numerous short, subradiate, minutely-fruited segments, the apothecia abundant or rarely with the tips rather slender and sterile, corticate, the cortex continuous to areolately dispersed, smooth, rugose or warty, often becoming cracked or flaky and squamule-forming, impellucid, often somewhat pruinose, squamulose or esquamulose, neither sorediate nor granulose; KOH (CaCl) +; axils closed and rarely somewhat abortively cup-forming; apothecia pale-yellowish or yellowish-brown to light- or dark-brown.—The species is most easily distinguished from similarly constructed species by the color or from *C. cristatella* var. *ochrocarpia*, which it resembles in this respect (as well also from all others which it resembles in construction) by its chemical reaction. The divided-tipped form is unique. When growing, the colony of small, rounded, yellowish primary squamules is conspicuous and characteristic. It has been found in Massachusetts and Connecticut, south to Maryland, Virginia, West Virginia, North Carolina, South Carolina, Alabama and, according to Tuckerman, Mexico. It occurs on rich humus, sandy loam or sand and (more rarely) on decaying and decayed wood. The following are common variations.

Podetia none, the apothecia sessile on, or short-stipate from, the surface and margins of the primary squamules.....f. **epiphylla** f. nov.
Podetia normally developed.
  Podetial squamules none or basal.
    Podetia stout, obconical, the apothecia comparatively large, terminal.....f. **obconica** f. nov. (figs 1, 2, 3.)
    Podetia club-shape to clyindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal.
      f. **intermedia** f. nov. (figs. 8, 9, 10).
  Podetial squamules present.
    Podetia stout, obconical, the squamules uniform, the apothecia comparatively large, terminal. (Analogous to f. *obconica*.)
      f. **squamulosa** f. nov. (figs. 4, 5, 6, 7).
    Podetia club-shape or cylindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal. (Analogous to f. *intermedia*).....f. **phyllocoma** f. nov. (figs. 11, 12).
Podetia cylindrical, the apical squamules much reduced and scale-like; tips somewhat expanded and divided into numerous, short, subradiate, minutely-fruited segments, the apothecia abundant.
    f. **lepidifera** (Wain.) Robbins n. comb. (figs. 14, 15, 16, 17, 18).
Podetia densely squamulose throughout, the squamules uniform; tips sterile or sparsely fruited..f. **squamosissima** f. nov. (fig. 13).

The greater part of the specimens in the Tuckerman collection in

the Farlow Herbarium, Harvard University (labeled *C. Oakesii* and *C. lepidota*) and in the Willey Collection in the National Herbarium (labeled *C. lepidifera*) are similar to the form pictured in fig. 15 but both collections also contain a few plants similar to those in fig. 9. The ff. *obconica* and *squamulosa* are somewhat remote from f. *lepidifera* but are connected with it through the ff. *intermedia* and *phyllocoma*. These last have the much-divided fruited segments characteristic of the f. *lepidifera* but with these they also simultaneously develop the larger apothecia, borne on clavate or obconical tips, characteristic of the ff. *obconica* and *squamulosa*. Slender states of f. *obconica* are often almost exact counterparts of *C. cristatella* var. *ochrocarpia*. The f. *squamosissima*, apparently rarer, is densely squamulose and rather sterile.

In southeastern Massachusetts there is to be found a plant often associated with the preceding and which might rather easily be mistaken for one of its forms, particularly when it occurs in an unassociated colony. It may be described as follows:

C. simulata sp. nov.; primary squamules small to medium-size, rarely quite enlarged, the margins entire or with rounded to somewhat linear and often incised segments, greenish to yellowish-green above, white beneath, KOH−, CaCl− (in combination −); podetia yellowish-green or yellowish-glaucescent to glaucescent, 10–30 mm. tall, irregularly cylindrical, often more or less fissured, usually branched, the branches short, lateral or terminal, ascending or occasionally quite horizontal, the sterile apices often naked, corticate, the cortex persistent, especially basally, or often dispersed above and passing into small to minute, subpeltate squamules, neither sorediate nor granulate; KOH −, CaCl − (in combination −); apothecia light- to dark-brown, often blackish, minute to medium-size, clustered or scattered.—TYPE from rich humus and decayed wood, Wareham, Massachusetts. The plant has also been found in North Carolina by Dr. A. W. Evans. The species closely resembles *C. piedmontensis* f. *lepidifera* but is readily distinguished from that plant by its minus chemical reaction. It also suggests a small *C. squamosa* and even more so forms of *C. pityrea* to which it is obviously nearly related. It differs from both these species in color.

Specimens of *C. simulata* and of forms of *C. piedmontensis* have been deposited in the Osborn Botanical Laboratory, Yale University; the Farlow Herbarium, Harvard University; and the United States National Herbarium.

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criticisms; to Dr. C. W. Dodge for assistance in the herbarium and to Dr. William R. Maxon, whose courtesy made possible the examination of Willey's specimens.

ONSET, MASSACHUSETTS.

EXPLANATION OF PLATE 187

CLADONIA PIEDMONTENSIS Merrill. Fig. 1, young plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 2, normally developed plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 3, normally developed plants (f. OBCONICA), Tryon, North Carolina, *A. W. Evans*, December, 1927; fig. 4, young plant (f. SQUAMULOSA), Washington, D. C., *S. F. Blake*, February, 1925; fig. 5, young plants (f. SQUAMULOSA), Prospect Hill, Fairfax County, Virginia, *S. F. Blake*, February, 1925; fig. 6, robust plants (f. SQUAMULOSA), High Point, North Carolina, *W. M. Tyler*, February, 1928; fig. 7, elongate plants (f. SQUAMULOSA), Charlotte, North Carolina, *F. W. Gray*, October 1924, (No. 388, *F. W. G.* in herb. Merrill, in Farlow Herbarium, Harvard University, *C. piedmontensis* Merrill, Bryologist, March, 1924. TYPE.); fig. 8, young plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 9, normally developed plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 10, elongate plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 11, normally developed plants (f. PHYLLOCOMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 12, normally developed plants (f. PHYLLOCOMA), Fairhope, Alabama, *A. W. Evans*, February, 1925 (Herb. Yale Univ. No. 161); fig. 13 (f. SQUAMOSISSIMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 14, young plants (f. LEPIDIFERA), Carver, Mass., *C. A Robbins*, May, 1928; figs. 15 and 16, normally developed plants (f. LEPIDIFERA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 17, robust plants (f. LEPIDIFERA), Washington, D. C., *S. F. Blake*, March, 1925; fig. 18, normally developed plants (f. LEPIDIFERA), Burnt Mills, Maryland, *S. F. Blake*, February, 1926.

POLYGONELLA ARTICULATA (L.) Meisn., forma **atrorubens**, n. f., perianthiis atrorubentibus.—NEW HAMPSHIRE: sandy plains and borders of sandy woods, Nashua, October 3, 1928, *Fernald & Svenson*, no. 896 (TYPE in Gray Herb.).

The perianths of *Polygonella articulata* (generally known on the New England coast as "HEATHER") are ordinarily a delicate rosy-pink or pinkish-white or occasionally white. On the sand plains about Nashua the plant is so striking, on account of its intense dark-red or blackish-red color as to attract immediate attention.—M. L. FERNALD, Gray Herbarium.

SEVENTH REPORT OF THE COMMITTEE ON FLORAL AREAS.

THE present report deals with the first three tribes of the *Gramineae* in the Manual order, *Maydeae*, *Andropogoneae*, and *Paniceae*,