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The Cladoniae of New Jersey—Supplement<sup>1</sup>

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In 1935 the writer published a report on the *Cladoniae* of New Jersey (25)<sup>2</sup> and listed 39 species (including numerous forms) for the state. This report gave the results of exploration down to the close of 1934. The present paper gives the results of exploration during the years 1935, 1936, and 1937 and includes a few records of earlier date, which have come to light since the publication of the report.

The most intensive exploration for *Cladoniae* has been carried on by Mr. Raymond H. Torrey, who has sent in material from a long series of new stations. His careful field studies have been supplemented by the work of other botanists, several of whom have supplied specimens of more than usual interest. In the following list the records based on Mr. Torrey's material are indicated by dates only. All other records are cited with both dates and collectors' names. These collectors, in addition to those mentioned in the original report (25, p. 84), include the following: S. A. Cain, A. Cohn, R. Darrow, F. Drouet, G. B. Kaiser, G. E. Nichols, and S. F. Wright.

The supplement follows the arrangement of the report. It lists, not only the specimens actually studied by the writer, but also those mentioned in the reports of field trips of the Torrey Botanical Club, in so far as these have been published in *Torreyia*. Species and forms which are not listed in the original report are marked by asterisks (\*), even if they have already been noted in *Torreyia*. Most of the records are based on specimens in the herbarium of Yale University.

The supplement adds seven species to the *Cladoniae* of New Jersey, thus raising the total number to 46. Two of these species,

<sup>1</sup> Contribution from the Osborn Botanical Laboratory.

<sup>2</sup> The numbers in bold-face type refer to the titles given in the original report and to the additional titles listed at the close of the present supplement.



*C. leporina* Fr. and *C. turgida* (Ehrh.) Hoffm., have already been reported from the state but were excluded from the report on account of the lack of corroborative specimens. It is an especial satisfaction to be able to reinstate these species as members of the New Jersey flora. The five species new to the state are *C. impexa* Harm., *C. scabriuscula* (Del.) Leight., *C. brevis* Sandst., *C. mateocyatha* Robbins, and *C. conista* (Ach.) Robbins.

### Subgenus 1. CLADINA

1. CLADONIA RANGIFERINA (L.) Web. (25, p. 84). MORRIS: Green Pond (1937). OCEAN: Lakewood (see Dillmann, 23). SUSSEX: Kittatiny Mountain (*Cain*, 1935) and near Sussex (*Cain*, 1935.)

1a. CLADONIA RANGIFERINA f. CRISPATA Coem. (25, p. 85). SUSSEX: Montague (1937).

1c. CLADONIA RANGIFERINA f. PROLIFERA Flot. (25, p. 85). MORRIS: Green Pond (1937).

1d.\* CLADONIA RANGIFERINA f. SETIGERA Oxner (6, p. 36). MORRIS: Green Pond (1937). SUSSEX: Kittatiny Mountain (1936).

2. CLADONIA SYLVATICA (L.) Hoffm. (25, p. 85). ATLANTIC: Elihu's Brook (1936). BURLINGTON: Martha (1937). MORRIS: Green Pond (1937). OCEAN: Bamber (*Drouet*, 1937), near Collier's Mills (1935), Island Beach (1936), and Lakehurst (see Torrey, 31). SUSSEX: Montague (1937).

2a. CLADONIA SYLVATICA f. PYGMAEA Sandst. (25, p. 85). SUSSEX: Montague (1937).

2c.\* CLADONIA SYLVATICA f. SETIGERA Oxner (26, p. 7). ATLANTIC: Weymouth (1936).

3. CLADONIA MITIS Sandst. (25, p. 86). CAPE MAY: Cape May Point (1935) and Steelmanton (1935). OCEAN: Island Beach (1936). UNION: Seeley's Glen, Watchung Mountains (*Mrs. Anderson*, 1934, not previously reported).

3b. CLADONIA MITIS f. PROLIFERA Sandst. (25, p. 86). BURLINGTON: Martha (1937). CAPE MAY: Cape May Point (1935). OCEAN: near Collier's Mills (1935). UNION: Seeley's Glen, Watchung Mountains (*Mrs. Anderson*, 1934, not previously reported).



4. *CLADONIA TENUIS* (Floerke) Harm. (25, p. 86). ATLANTIC: Green Bank State Forest (1936) and Weymouth (1936). BERGEN: near Ridgewood (see Torrey, 30). BURLINGTON: Chatsworth (*Darrow*, 1935) and Martha (1937). CAPE MAY: Cape May Point (1935) and near Fishing Creek (1935). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935). OCEAN: Collier's Mills (1935) and Island Beach (1936). PASSAIC: Ringwood Mines (1935). SUSSEX: Kittatiny Mountain (1936).

4a. *CLADONIA TENUIS* f. *SETIGERA* (25, p. 87). ATLANTIC: Elihu's Brook (1936). CAPE MAY: Belle Plain State Forest (1935), Cape May Point (1935), and Steelmanton (1935). PASSAIC: Ringwood Mines (1935). SUSSEX: Kittatiny Mountain (1936).

4A.\* *CLADONIA IMPEXA* Harm. (4, p. 386). The discovery of *C. impexa* in New Jersey is of unusual interest. Although the species is widely distributed in Europe, its range in the United States is still incompletely known, and many of the specimens which have been referred to it represent *C. sylvatica* or *C. tenuis* instead. This is the case, for example, with the specimens from Connecticut, listed by the writer in 1930 (see 26, p. 16). Aside from the stations given below *C. impexa* is known in the United States only from Maine, New Hampshire, and Massachusetts. In the Cape Cod region, where it was first discovered by Mr. Robbins, it occurs in considerable abundance.

One of the most important distinctions between *C. impexa* and its immediate allies is of a chemical nature. In *C. sylvatica* and *C. tenuis*, for example, the bitter fumarprotocetraric acid is present, whereas in *C. impexa* this acid is completely lacking. The earlier writers depended upon a difference in taste in separating *C. impexa* from *C. tenuis*, but the application of paraphenylenediamine, as recommended by Asahina, makes the taste-test superfluous (see Torrey, 28, and Evans, 26, p. 25). If fumarprotocetraric is present, as in *C. sylvatica* and *C. tenuis*, this reagent gives an orange-red or brick-red color; if the acid is absent, as in *C. impexa*, the reaction is usually entirely negative. In giving a negative reaction with paraphenylenediamine *C. impexa* agrees with *C. mitis*, but the latter species is at once distinguished by differences in the branching of the podetia. The New Jersey material of *C. impexa* is referable to the following form:—



4Aa.\* CLADONIA IMPEXA f. SUBPELLUCIDA Harm. Lich. France 233. 1907. OCEAN: Forked River (*Cohn*, 1937, det. Sandstede). According to Harmand this form represents the typical development of the species. It is characterized by the translucent appearance of the main axis and larger branches; by the fact that the principal axils are usually closed; and by the straight or slightly curved terminal branchlets. The synonymy of f. *subpellucida* is not definitely settled, and some writers prefer for it the name *C. impexa* f. *laxiuscula* (Del.) Sandst. (see 4, p. 387).

### Subgenus 2. PYCNOTHELIA

5a. CLADONIA PAPILLARIA (Ehrh.) Hoffm. f. MOLARIFORMIS (Hoffm.) Schaer. (25, p. 87). ATLANTIC: Elihu's Brook (1936) and Port Republic (1936). CAPE MAY: Cape May Point (1935), near Fishing Creek (1935), and Steelmanton (1935). OCEAN: Jackson's Mills (1936). SOMERSET: near Somerville (*Wright*, 1935) and Warrenville (*Mrs. Anderson*, 1934, not previously reported).

5c. CLADONIA PAPILLARIA f. PAPILLOSA Fr. (25, p. 87). BURLINGTON: Martha (1937). CAPE MAY: near Fishing Creek (1935) and Steelmanton (1935). OCEAN: Barnegat (*Darrow*, 1935).

### Subgenus 3. CENOMYCE

#### Section 1. COCCIFERAE

##### Subsection 1. SUBGLAUDESCENTES

7. CLADONIA BACILLARIS (Ach.) Nyl. (25, p. 88). ATLANTIC: Elihu's Brook (1936) and Green Bank State Forest (1936). OCEAN: Island Beach (1936) and Lakewood (*Mrs. Harris*, 1908, not previously reported). PASSAIC: Ringwood Mines (1935). SUSSEX: Wawayanda cedar swamp (see Thomson, 27).

8. CLADONIA MACILENTA Hoffm. (25, p. 88). OCEAN: near Lakewood (see Dillmann, 23).

8a. CLADONIA MACILENTA f. STYRACELLA (Ach.) Vainio (25, p. 88), MONMOUTH: Navesink (1936).

9b. CLADONIA DIDYMA (Fée) Vainio f. SUBULATA Sandst. (25, p. 89). BURLINGTON: Quaker Bridge (1936).



## Subsection 2. STRAMINEO-FLAVIDAE

10. CLADONIA PLEUROTA (Floerke) Schaer. (25, p. 89). BURLINGTON: Martha (1937). MORRIS: Towaco (*Drouet*, 1937). OCEAN: near Lakewood (see Dillmann, 23). SOMERSET: Warrensville (*Mrs. Anderson*, 1934, not previously reported).

10b.\* CLADONIA PLEUROTA f. DECORATA Vainio (4, p. 402). CAPE MAY: Belle Plain State Forest (1935).

12. CLADONIA CRISTATELLA Tuck. (25, p. 90). OCEAN: near Lakewood (see Dillmann, 23). SUSSEX: Wawayanda cedar swamp (see Thomson, 27).

12a. CLADONIA CRISTATELLA f. BEAUVOISII (Del.) Vainio (25, p. 90). ATLANTIC: Elihu's Brook (1936) and Russia (1936). BERGEN: near Ridgewood (see Torrey, 30). CAPE MAY: near Fishing Creek (1935) and Steelmanton (1935). OCEAN: Bamber (*Drouet*, 1937), Lakewood (*Mrs. Harris*, 1908, not previously reported), and Island Beach (1936). Somerset: near Somerville (*Wright* 1935) and Warrensville (*Mrs. Anderson*, 1934, not previously reported).

12b. CLADONIA CRISTATELLA f. VESTITA Tuck. (25, p. 91). ATLANTIC: Elihu's Brook (1936). BERGEN: near Ridgewood (see Torrey, 30). GLOUCESTER: Sewell (*Kaiser*, 1910, not previously reported). OCEAN: Island Beach (1936) and near Lakewood (see Dillmann, 23). SOMERSET: Warrensville (*Mrs. Anderson*, 1934, not previously reported).

12e. CLADONIA CRISTATELLA f. SCYPHULIFERA Sandst. (25, p. 91). ATLANTIC: Elihu's Brook (1936). BERGEN: near Ridgewood (see Torrey, 30). OCEAN: Bamber (*Drouet*, 1937), Island Beach (1936), and near Jackson's Mills (1936).

13. CLADONIA INCRASSATA Floerke (25, p. 91). ATLANTIC: Elihu's Brook (1936) and Green Bank State Forest (1936). BURLINGTON: Martha (1937). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935). OCEAN: near Jackson's Mills (1935). MONMOUTH: Navesink Highlands (1936).

## Subsection 3. LEPORINAE

13A.\* CLADONIA LEPORINA Fr. in Tuckerman, Am. Jour. Sci. Arts 25: 428. 1858. CAPE MAY: Cape May Point (*Dillmann*, 1936, see Torrey, 29; *Nichols*, 1937). Although Vainio (22,<sup>1</sup>



p. 221) places this red-fruited species in the subsection *Stramineo-flavidae*, on account of its yellowish color, it is very different from the other members of this group. In the writer's opinion it is distinct enough to be made the type of a new subsection, for which (as indicated above) the name *Leporinae* is proposed. In this subsection the primary thallus, which is foliose in character, is short-lived and difficult to demonstrate. The podetia, on the other hand, which are copiously branched, continue growing independently for a long time, although the older parts gradually die and decay. In general habit, therefore, the *Leporinae* resemble the *Cladinae* and the *Unciales*.

The podetia of *C. leporina* may occur singly but usually grow in irregular and intricate colonies. Robust examples may attain a length of 7–8 cm. and a diameter of 3–5 mm. in the larger axes, but many of the podetia are shorter and more slender. They are destitute of squamules and of cups and branch repeatedly by dichotomies or by whorls of three or more, and there is a marked difference in diameter between the ultimate branchlets, and the axes of higher rank. Most of the axils are closed but some are open, and lateral perforations are not uncommon. In the younger parts of the podetia the cortex, which is never soresdiose, is continuous but usually presents a more or less rugulose appearance. This becomes much more marked in the older parts, where the surface is deeply and irregularly wrinkled. The internal surface of the podetia, owing to the absence of a cartilaginous layer, is distinctly arachnoid. *C. leporina* is negative with KOH but gives a yellow reaction with paraphenylenediamine. This color, however, does not deepen to orange or red.

According to Eckfeldt (see Britton, 3) *C. leporina* has been collected at Atco in Camden County. In the absence of specimens from this locality the station at Cape May Point is the most northern station that can be definitely cited at the present time. In the southern parts of the United States, from North Carolina southward to Florida and westward to Texas, the species is abundant, especially in sandy areas near the coast; and it is known also from Cuba.

## Section 2. OCHROPHAEAE

### Subsection 1. UNCIALES

#### 14. CLADONIA UNCIALIS (L.) Web. (25, p. 92). ATLANTIC:



Elihu's Brook (1936) and Green Bank State Forest (1936). BURLINGTON: Martha (1937). CAPE MAY: Steelmanton (1935). MORRIS: Green Pond (1937). OCEAN: near Collier's Mills (1935) and Lakewood (see Dillmann, 23). PASSAIC: Ringwood Mines (1935). SUSSEX: Kittatiny Mountain (1936) and Montague (1937). These specimens are not referable to any definite form.

14a. CLADONIA UNCIALIS f. OBTUSATA (Ach.) Vainio (25, p. 92). BURLINGTON: Martha (1937).

14b. CLADONIA UNCIALIS f. SUBOBTUSATA Coem. (25, p. 92). ATLANTIC: Elihu's Brook (1936). BURLINGTON: Martha (1937). OCEAN: near Collier's Mills (1935).

14f.\* CLADONIA UNCIALIS f. TURDESCENS (Del.) Fr. (5, p. 133). SUSSEX: Kittatiny Mountain (1937, det. Sandstede as f. *turgida* Schaer., a synonym of f. *turdescens*).

14g.\* CLADONIA UNCIALIS f. SORALIGERA Robbins (6, p. 42). SUSSEX: Montague (1937), det. Sandstede).

15a. CLADONIA CAROLINIANA (Schwein.) Tuck. f. DILATATA Evans (25, p. 93). ATLANTIC: Elihu's Brook (1936), Port Republic (1936), and Weymouth (1936). BURLINGTON: Martha (1937). CAMDEN: Berlin (*Kaiser*, 1910, not previously reported). CAPE MAY: Steelmanton (1935). OCEAN: near Collier's Mills (1935), Island Beach (1936), and Jackson's Mills (1936). PASSAIC: Ringwood Mines (1935).

15c. CLADONIA CAROLINIANA f. TENUIRAMEA Evans (25, p. 93). ATLANTIC: near Risley's (1935). CAPE MAY: Cape May Point (1935) and Steelmanton (1935). OCEAN: Island Beach, (1936), Jackson's Mills (1936), and Lakewood (*Mrs. Harris* 1908, not previously reported).

15d.\* CLADONIA CAROLINIANA f. DIMORPHOCLADA (Robbins) Evans (5, p. 137). BURLINGTON: Martha (1937). OCEAN: near Jackson's Mills (1936) and Lakehurst (see Torrey, 31).

16b.\* CLADONIA BORYI Tuck. f. LACUNOSA (Bory) Tuck. (4, p. 418). OCEAN: Island Beach (1936) and Point Pleasant (*Plitt*, 1907, not previously reported).

## Subsection 2. CHASMARIAE

### Group 1. MICROPHYLLAE

17. CLADONIA FURCATA (Huds.) Schrad. (25, p. 94). SUSSEX: north of Andover (1937, mostly thallus) and Wawayanda cedar swamp (see Thomson, 27).



17a. *CLADONIA FURCATA* var. *RACEMOSA* (Hoffm.) Floerke (25, p. 95). SOMERSET: Hall Mountain, north of Lebanon (1937).

17ab. *CLADONIA FURCATA* var. *RACEMOSA* f. *SQUAMULIFERA* Sandst. (25, p. 95). CAPE MAY: Cape May Point (1936). PASSAIC: Ringwood Mines (1935). SUSSEX: north of Andover (1937) and Kittatiny Mountain (1936).

17ac.\* *CLADONIA FURCATA* var. *RACEMOSA* f. *FURCATOSUBULATA* (Hoffm.) Vainio (4, p. 422). CAPE MAY: Cape May Point (1935, 1936).

17ad.\* *CLADONIA FURCATA* var. *RACEMOSA* f. *FISSA* (Floerke) Aigret (5, p. 153). SUSSEX: north of Andover (1937).

17A.\* *CLADONIA SCABRIUSCULA* (Del.) Leight. (4, p. 426). Represented in New Jersey by the following form:—

17Aa.\* *CLADONIA SCABRIUSCULA* f. *FARINACEA* (Vainio) Sandst. (4, p. 427). OCEAN: Island Beach (1936).

18. *CLADONIA FLORIDANA* Vainio (25, p. 95). ATLANTIC: Port Republic (1936). BURLINGTON: Hampton Gate (1936, see Torrey, 29). OCEAN: Barnegat (*Darrow*, 1935) and near Lakewood (see Dillmann, 23).

18b. *CLADONIA FLORIDANA* f. *ESQUAMOSA* Robbins (25, p. 96). BURLINGTON: Hampton Gate (1936). OCEAN: Lakehurst (see Torrey, 31).

19. *CLADONIA SANTENSIS* Tuck. (25, p. 96). ATLANTIC: near Elihu's Brook (1936). Green Bank State Forest (1936), and near Risley's (1935). BURLINGTON: Martha (1937) and Quaker Bridge (1936, see Torrey, 29). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935). OCEAN: near Collier's Mills (1935).

20. *CLADONIA SQUAMOSA* (Scop.) Hoffm. (25, p. 96). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935). MONMOUTH: Navesink Highlands (1936). OCEAN: near Lakewood (see Dillmann, 23). SUSSEX: Montague (1937).

20b. *CLADONIA SQUAMOSA* f. *PHYLLOPODA* Vainio (25, p. 97). BURLINGTON: Chatsworth (*Darrow*, 1935, det. Sandstede).

20c. *CLADONIA SQUAMOSA* f. *LEVICORTICATA* Sandst. (25, p. 97). MORRIS: Green Pond (1937).

20ca. *CLADONIA SQUAMOSA* f. *LEVICORTICATA* m. *PSEUDOCRISPATA* Sandst. (25, p. 97). ATLANTIC: near Elihu's Brook (1936). CAPE MAY: Belle Plain State Forest (1935). CUMBER-



LAND: Sharp's Branch of the Tuckahoe River (1935). PASSAIC: Ringwood Mines (1935).

20cb. CLADONIA SQUAMOSA f. LEVICORTICATA m. RIGIDA (Del.) Evans (24, p. 97). ATLANTIC: near Elihu's Brook (1936) and Green Bank (1936). CAPE MAY: Belle Plain State Forest (1935) and Steelmanton (1935). MORRIS: Green Pond (1937). PASSAIC: Packanack Lake, Preakness Township (Mrs. Anderson, 1934, not previously reported and Ringwood Mines (1935). SOMERSET: near Somerville (Wright, 1936). SUSSEX: Montague (1937).

20cc.\* CLADONIA SQUAMOSA f. LEVICORTICATA m. **pityrea** (Arn.) comb. nov. *C. squamosa* f. *pityrea* Arn. Flora 67: 84. 1884. *C. squamosa* f. *multibrachiata* subf. *pityrea* Harm. Lich. France 262. 1907. BURLINGTON: Martha (1937). MORRIS: Green Pond (1937). OCEAN: Island Beach (1937, det. Sandstede as f. *pityrea*). Podetia 10–2 mm. high, smooth or sparingly squamulose, cup-forming or radiately branched, and producing apothecia more or less abundantly. The last feature distinguishes m. *pityrea* from m. *pseudocrispata* and m. *rigida*.

20e.\* CLADONIA SQUAMOSA f. DENTICOLLIS (Hoffm.) Floerke (4, p. 434). MORRIS: Green Pond (1937, det. Sandstede). OCEAN: Lakewood (Mrs. Harris, 1908, not previously reported).

20f.\* CLADONIA SQUAMOSA f. PHYLLOCOMA (Rabenh.) Vainio (4, p. 434). SUSSEX: Kittatiny Mountain (1936, det. Sandstede).

20g.\* CLADONIA SQUAMOSA f. MURINA Scriba (4, p. 437). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935, det. Sandstede).

21a. CLADONIA DELICATA (Ehrh.) Floerke f. QUERCINA (Pers.) Vainio (25, p. 98). ATLANTIC: Elihu's Brook (1936) and Green Bank State Forest (1936). SUSSEX: Kittatiny Mountain (1936).

22. CLADONIA CAESPITICIA (Pers.) Floerke (25, p. 98). MORRIS: Towaco (Drouet, 1937).

## Group 2. MEGAPHYLLAE

23. CLADONIA APODOCARPA Robbins (25, p. 98). BERGEN: near Ridgewood (see Torrey, 30). MORRIS: Towaco (Drouet, 1937). PASSAIC: Ringwood Mines (1935). SOMERSET: Warrensville (Mrs. Anderson, 1934, not previously reported).



23A.\* *CLADONIA TURGIDA* (Ehrh.) Hoffm. (4, p. 441). ATLANTIC: Green Bank State Forest (1936, det. Sandstede). The New Jersey specimens represent a small form of the species, in which the podetia seem to have been arrested in their development. It will be remembered that the earlier records for *C. turgida* in the state were uncertain (see 25, p. 98) and that some of them at least were based on incorrect determinations.

### Subsection 3. CLAUSAE

#### Group 1. PODOSTELIDES

24. *CLADONIA MITRULA* Tuck. (25, p. 99). BERGEN: near Ridgewood (see Torrey, 30).

24a. *CLADONIA MITRULA* f. *IMBRICATULA* (Nyl.) Vainio (25, p. 99). BURLINGTON: Chatsworth (*Darrow*, 1935). CAPE MAY: near Fishing Creek (1935) and Tuckahoe State Forest (1936). SUSSEX: north of Andover (1937).

24b. *CLADONIA MITRULA* f. *PALLIDA* Robbins (25, p. 99), CAPE MAY: Tuckahoe State Forest (1936).

25a. *CLADONIA CLAVULIFERA* Vainio f. *NUDICAULIS* Evans (25, p. 100). ATLANTIC: near Port Republic (1936). CAPE MAY: Cape May Point (1935), near Fishing Creek (1935), and Steelmanton (1935). OCEAN: near Collier's Mills (1935) and Island Beach (1936). PASSAIC: Ringwood Mines (1935).

25b. *CLADONIA CLAVULIFERA* f. *SUBVESTITA* Robbins (25, p. 100). CAPE MAY: near Fishing Creek (1935).

25d\*. *CLADONIA CLAVULIFERA* f. *PLEUROCARPA* Robbins (4, p. 447). OCEAN: Island Beach (1936).

26. *CLADONIA SUBCARIOSA* Nyl. (25, p. 100). BERGEN: near Ridgewood (see Torrey, 30).

26a. *CLADONIA SUBCARIOSA* f. *EVOLUTA* Vainio (25, p. 100). CAPE MAY: Cape May Township (1936), near Fishing Creek (1935), and Tuckahoe State Forest (1936).

26b.\* *CLADONIA SUBCARIOSA* f. *SQUAMULOSA* Robbins (4, p. 451). CAPE MAY: Cape May Township (1936).

26A.\* *CLADONIA BREVIS* Sandst. (5, p. 156). OCEAN: near Collier's Mills (1935).



## Group 2. THALLOSTELIDES

27. *CLADONIA VERTICILLATA* (Hoffm.) Schaer. (25, p. 100). OCEAN: Lakehurst (see Dillmann, 23) and Lakewood (see Dillmann, 24). SUSSEX: Wawayanda cedar swamp (see Thomson, 27).

28. *CLADONIA CALYCANTHA* Del. (25, p. 101). ATLANTIC: Elihu's Brook (1936), Green Bank State Forest (1936) Inskip (*Blake*, 1928, not previously reported), and Russia (1935). BURLINGTON: Martha (1937) and New Gretna (*Musch*, 1928, not previously reported). CUMBERLAND: Lawrence Branch (1936) and Sharp's Branch (1935) of the Tuckahoe River. CAPE MAY: Cape May Point (1935) and Steelmanton (1935). OCEAN: Bamber (*Drouet*, 1937), Island Beach (1936), and near Lakewood (see Dillmann, 24).

28a. *CLADONIA CALYCANTHA* f. *FOLIOSA* Vainio (25, p. 101). BURLINGTON: Martha (1937). CUMBERLAND: Lawrence Branch (1936) and Sharp's Branch (1935) of the Tuckahoe River.

28A.\* *CLADONIA MATEOCYATHA* Robbins (4, p. 461). The discovery of this species in New Jersey is not surprising, since it occurs abundantly both north and south of the state. The material is referable to the following form:—

28Aa.\* *CLADONIA MATEOCYATHA* f. *SQUAMULATA* Robbins (4, p. 462). SOMERSET: Charlottesburg (*Wright*, 1935).

29aa. *CLADONIA PYXIDATA* (L.) Hoffm. var. *NEGLECTA* (Floerke) Mass. f. *SIMPLEX* (Ach.) Harm. (25, p. 103). PASSAIC: Ringwood Mines (1935).

30. *CLADONIA CHLOROPHAEA* (Floerke) Spreng. (25, p. 104). ATLANTIC: Elihu's Brook (1936). BURLINGTON: Chatsworth (*Darrow*, 1935). CUMBERLAND: Sharp's Branch of the Tuckahoe River (1935). PASSAIC: Ringwood Mines (1935). SUSSEX: Wawayanda cedar swamp (see Thomson, 27).

30b.\* *CLADONIA CHLOROPHAEA* f. *SIMPLEX* (Hoffm.) Arn. (4, p. 468). CAPE MAY: near Fishing Creek (1935). SUSSEX: Kittatiny Mountain (1936) and Montague (1937).

30c.\* *CLADONIA CHLOROPHAEA* f. *CARPOPHORA* (Floerke) Anders (4, p. 470). SUSSEX: Kittatiny Mountain (1936).

31. *CLADONIA GRAYI* Merrill (25, p. 104). ATLANTIC: near



Hammonton (1935). OCEAN: Island Beach (1936). PASSAIC: Ringwood Mines (1935).

31a.\* CLADONIA GRAYI f. SIMPLEX Robbins (26, p. 19). SUSSEX: Montague (1937).

31b.\* CLADONIA GRAYI f. CARPOPHORA Evans (26, p. 20). ATLANTIC: near Elihu's Brook (1936). CAPE MAY: near Fishing Creek (1935). MORRIS: Green Pond (1937).

31c.\* CLADONIA GRAYI f. SQUAMULOSA Sandst. (5, p. 160). MORRIS: Green Pond (1937). SOMERSET: near Somerville (*Wright*, 1935). SUSSEX: Kittatiny Mountain (1936).

31A.\* CLADONIA CONISTA (Ach.) Robbins (4, p. 472). Represented in New Jersey by the following form:—

31Aa.\* CLADONIA CONISTA f. SIMPLEX Robbins (4, p. 473). OCEAN: Lakewood (*Mrs. Harris*, 1908, not previously reported).

32. CLADONIA FIMBRIATA (L.) Fr. (25, p. 104). OCEAN: Lakewood (see Dillmann, 24).

33. CLADONIA NEMOXYNA (Ach.) Nyl. (25, p. 105). PASSAIC: Ringwood Mines (1935). SUSSEX: Montague (1937).

33a. CLADONIA NEMOXYNA f. FIBULA (Ach.) Vainio (25, p. 105). PASSAIC: Ringwood Mines (1935).

35. CLADONIA CONIOCRAEA (Floerke) Spreng. (25, p. 105). OCEAN: Lakewood (see Dillmann, 23).

35a. CLADONIA CONIOCRAEA f. CERATODES (Floerke) Dalla Torre & Sarnth. (25, p. 105). BERGEN: near Ridgewood (see Torrey, 30). CUMBERLAND: Sharp's Branch of Tuckahoe River (1935). MONMOUTH: Navesink Highlands (1936). SUSSEX: Kittatiny Mountain (1936) and Montague (1937).

35b. CLADONIA CONIOCRAEA f. TRUNCATA (Floerke) Dalla Torre & Sarnth. (25, p. 105). SUSSEX: north of Andover (1937) and Kittatiny Mountain (1936).

35c. CLADONIA CONIOCRAEA f. PYCNOTHELIZA (Nyl.) Vainio (25, p. 106). BERGEN: near Ridgewood (see Torrey, 30). OCEAN: near Collier's Mills (1935).

36. CLADONIA BORBONICA (Del.) Nyl. (25, p. 106). BERGEN: near Ridgewood (see Torrey, 30).

36a. CLADONIA BORBONICA f. CYLINDRICA Evans (25, p. 106). OCEAN: Bamber (*Drouet*, 1937). SUSSEX: north of Andover (1937).



## Group 3. FOLIOSAE

38. *CLADONIA STREPSILIS* (Ach.) Vainio (25, p. 106). CAPE MAY: Cape May Point (1935). OCEAN: Barnegat (*Darrow*, 1935) and near Collier's Mills (1935). PASSAIC: Ringwood Mines (1935). SOMERSET: Warrenville (*Mrs. Anderson*, 1934, not previously reported).

38a. *CLADONIA STREPSILIS* f. *GLABRATA* Vainio (25, p. 106). ATLANTIC: Port Republic (1936). CAPE MAY: near Fishing Creek (1935).

38b. *CLADONIA STREPSILIS* f. *CORALLOIDES* (Ach.) Vainio (25, p. 106). CAPE MAY: Cape May Point (1935) and near Fishing Creek (1935). SOMERSET: near Somerville (*Wright*, 1935).

38c. *CLADONIA STREPSILIS* f. *SUBSESSILIS* Vainio (25, p. 107). CAPE MAY: Cape May Point (1935) and near Fishing Creek (1935).

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