INCERTÆ SEDIS.

11. *Aleurodiscus sendaiensis* YASUDA (nomen) apud LLOYD, Myc. Writ. VII. Myc. Not. No. 67. p. 1162 (1922).

NOMEN JAP.: *Sendai Kōyaku-take* (mihi).

HAB. Honshū: in Gongen-no-mori prope urbem Sendai, prov. Rikuzen (leg. A. YASUDA, 24. Oct. 1900). Herb. YASUDA.

DISTRIB. Endemicus.

Chrysomyxa of Japan

(Notes on the Melampsoraceae of Japan II*)

By

Naohide Hiratsuka

The genus *Chrysomyxa* was established by F. UNGER in 1840 taking as its type species, *Chrysomyxa Abietis* (WALLR.) UNGER, an autoecious lepto-form having only teleutostage in its life-cycle. In 1906, J. C. ARTHUR restricted the generic character and separated those species having all spore stages as a new genus, *Melampsoropsis* (SCHRÖT.) ARTH. In the present paper, the writer has treated the genus *Chrysomyxa* in a broad sense.

There are about twenty species of this genus have been described up to the present time, among which the following ten species are found in our country. They are: *Chrysomyxa Ledi* (ALB. et SCHW.) DE BARY, *Ch. ledicola* (PECK) LAGERH., *Ch. Rhododendri* (DC.) DE BARY, *Ch. expansa* DIET., *Ch. Cassandrae* (PECK et CLINT.) TRANZSCH., *Ch. Menziesiae* DIET., *Ch. Pirolae* (DC.) ROSTR., *Ch. Ramischiae* LAGERH., *Ch. Empetri* (PERS.) SCHRÖT. and *Ch. Abietis* (WALLR.) UNGER. Besidesthem, a new species, *Chrysomyxa alpina* HIRATS. f. is now added by the writer to the mycological flora of Japan. Therefore, the total number of species in our country is eleven.

In this short paper, the writer intends to enumerate these eleven species of this genus.

The writer wishes to express here his sincere thanks to Prof. Dr. S. ITÔ for his valuable suggestions and constant guidance.

Chrysomyxa UNGER in Beitr. zur vergl. Path. p. 24, 1840; ARTHUR in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338,

* Notes on the Melampsoraceae of Japan I—Thekopsora of Japan (Bot. Mag. Tokyo, XLIII, p. 12-22, 1929).

1906; N. Amer. Fl. VII, p. 690, 1925; BUBÁK, Rostpilze Böhmens, p. 171, 1908; DIETEL in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**, p. 39, 1897; FISCHER, Ured. Schw. p. 426, 1904; FRAGOSO, Fl. Ibér. Ured. II, p. 289, 1925; GROVE, Brit. Rust Fungi, p. 310, 1913; HARIOT, Ured. p. 282, 1908; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 707, 1913; MIGULA, Krypt.-Fl. III, 1, p. 456, 1910; OUDEMANS, Rév. Champ. I, p. 575, 1892; PLOWRIGHT, Monogr. Ured. & Ustil. p. 252, 1889; SACCARDO, Syll. Fung. VII, p. 579, 1888; SCHRÖTER, Pilze Schles. I, p. 371, 1887; SYDOW, Monogr. Ured. III, p. 502, 1915; TROTTER, Fl. Ital. Crypt. Ured. p. 358, 1914; WEIR in Mycologia XV, p. 183, 1923; WINTER in Pilze Deutschl. I, p. 249, 1881.

Syn. *Coleosporium* § *Melampsoropsis* SCHRÖT. in Beitr. Biol. Pfl. III, p. 57, 1879.

Melampsoropsis ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906; N. Amer. Fl. VII, p. 117, 1907; BLASDALE in Univ. Calif. Publ. Bot. VII, p. 114, 1919.

Key to the Japanese species of *Chrysomyxa*

Uredo-and teleutospores on Ericaceae.

Uredo-and teleutospores on *Ledum*.

Uredo-and teleutosori hypophyllous.

1. *Chrysomyxa Ledi* (ALB. et SCHW.) DE BARY

Uredo-and teleutosori epiphyllous.

2. *Chrysomyxa ledicola* (PECK) LAGERH.

Teleutospores on *Rhododendron*.

Uredospores present.

Teleutosori hemispherical or conical without a narrowed short stalk. On Sect. *Rhodrastrum*.

3. *Chrysomyxa Rhododendri* (DC.) DE BARY

Teleutosori expands into a subglobose or ellipsoidal head with a narrowed short stalk. On Sect. *Eurhododendron*.

4. *Chrysomyxa alpina* HIRATS. f.

Uredospores lacking, on Sect. *Eurhododendron*.

5. *Chrysomyxa expansa* DIET.

Uredo-and teleutospores on *Chamaedaphne*.

6. *Chrysomyxa Cassandrae* (PECK et CLINT.) TRANZSCH.

Uredospores lacking, teleutospores on *Menziesia*.

7. *Chrysomyxa Menziesiae* DIET.

Uredo-and teleutospores on Pirolaceae.

Primary uredospores absent in its life-cycle.

8. *Chrysomyxa Pirolae* (DC.) ROSTR.

Primary uredospores present in its life cycle.

9. *Chrysomyxa Ramischiae* LAGERH.

Uredo-and teleutospores on Empetraceae.

10. *Chrysomyxa Empetri* (PERS.) SCHRÖT.

Teleutospores on Pinaceae.

11. *Chrysomyxa Abietis* (WALLR.) UNGER

On Ericaceae

1. ***Chrysomyxa Ledi*** (ALB. et SCHW.) DE BARY in Bot. Zeitg. XXXVII, p. 809, pl. X, fig. 7, 8, 1879; BUBÁK, Rostpilze Böhmens, p. 172; DIETEL in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**, p. 40, 1897; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 34, 1927; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 710; p. 692, fig. K, 2 (I-III); LIRO, Ured. Fenn. p. 459; MIGULA, Krypt.-Fl. III, 1, p. 457; SACCARDO, Syll. Fung. VII, p. 760; SCHRÖTER, Pilze Schles. I, p. 371; SYDOW, Monogr. Ured. III, p. 504; WINTER in Pilze Deutschl. I, p. 251. (HIRATSUKA in Jap. Jour. Bot. III, p. 315, 1927; Bot. Mag. Tokyo, XLII, p. 32, 1928; Jour. Soc. Agric. & Forestr. Sapporo, XIX, no. 88, p. 121, 1928; Transact. Sapporo Nat. Hist. Soc. X, p. 121, 1929; HIRATSUKA & HOMMA in Jour. Soc. Agric. & Forestr. Sapporo, XIX, no. 85, p. 78, 1927).

Syn. *Uredo Ledi* ALB. et SCHW., Consp. Fung. Nisk. p. 125, 1805.

U. abietina SPRENG., Syst. Veg. IV, p. 572, 1827.

U. ovoideo-aurantiaca BON., Coniom. et Cryptom. p. 32, 1860.

Caeoma Ledi SCHLECHT., Fl. Berol. II, p. 122, 1824.

C. Ledi LINK, Sp. Pl. II, p. 15, 1825.

C. longiusculum LASCH in KLOTZSCH, Herb. myc. I, no. 495, 1842.

C. piceatum LINK, Sp. Pl. II, p. 62, 1825, p. p.

Erysibe Ledi WALLR., Fl. Crypt. Germ. II, p. 199, 1833.

Pucciniastrum Ledi KARST., Myc. Fenn. IV, p. 57, 1878.

Coleosporium Ledi SCHRÖT., Beitr. Biol. Pfl. III, p. 55, 1879.

Melampsoropsis abietina ARTH. in N. Amer. Fl. VII, p. 119, 1907.

M. Ledi ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906.

Aecidium abietinum ALB. et SCHW., Consp. Fung. Nisk. p. 120, 1805, p. p.; REESS in Abhandl. Naturf. Ges. Halle XI, p. 98, 1869.

Peridermium abietinum THÜM. in Mitteil. Forstl. Versuchsw. Oesterr. II, p. 320, 1881; ARTHUR & KERN in Bull. Torr. Bot. Club, XXXIII, p. 430, 1906.

Hab. On leaves of *Picea jezoensis* CARR. (*Yezo-matsu*).

S. Saghalien: Manui (Aug. 22, 1928, NAOHIDE HIRATSUKA).

On leaves of *Ledum palustre* L. var. *angustum* BURSCH (*Hosoba-isotsutsuji*).

S. Saghalien:—Mt. Tosso (July 20, 1927, NAOHIDE HIRATSUKA, S. IWADARE, M. NAGAI & S. ARAKI); Shisuka (Aug. 12, 1928, NAOHIDE HIRATSUKA).

On leaves of *Ledum palustre* L. var. *dilatatum* WAHL. (*Karafuto-isotsutsuji*).

Hokkaidô:—Prov. Tokachi: Mt. Nupukaushi (June 6, 1925, NAOHIDE HIRATSUKA). Prov. Kushiro: Mt. Meakan (July 19, 1921, K. TOGASHI); Mt. Oakan (July 14, 1928, NAOHIDE HIRATSUKA); Kawayu (July 17, 1928, S. SHIMADA, M. TERUI, K. SASAKI & K. FUJITA); Mt. Atosa-nupuri (July 17, 1928, S. SHIMADA, M. TERUI, K. SASAKI & K. FUJITA). Prov. Nemuro: Ochiishi (July 16, 1924, NAOHIDE HIRATSUKA & I. TANAKA; July 21, 1928, S. SHIMADA, M. TERUI, K. SASAKI & K. FUJITA).

S. Saghalien:—Aihama (July 17, 1927, NAOHIDE HIRATSUKA, S. IWADARE, M. NAGAI & S. ARAKI); Shisuka (Aug. 3, 1928, S. SHIMADA, M. TERUI & K. FUJITA; Aug. 13, 1928, NAOHIDE HIRATSUKA); Manui (Aug. 20, 1928, NAOHIDE HIRATSUKA); Mt. Kashipo (Aug. 8, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA).

Kuriles:—Shikotan: Shikotan (July 17, 1924, A. ABE).

On leaves of *Ledum palustre* L. var. *nipponicum* NAKAI (*Iso-tsutsuji*).

Hokkaidô:—Prov. Ishikari: Horomui (June 14, 1925, NAOHIDE HIRATSUKA & I. TANAKA; Sept. 10, 1923, NAOHIDE HIRATSUKA).

On leaves of *Ledum palustre* L. var. *yesoense* NAKAI (*Yezo-isotsutsuji*).

Hokkaidô:—Prov. Iburi: Noboribetsu (Sept. 3, 1910, K. MIYABE). Prov. Ishikari: Mt. Kuro-dake (Aug. 5, 1925, NAOHIDE HIRATSUKA); Hakuun-sawa (Daisetsu-zan) (Aug. 14, 1927, S. ITÔ, NAOHIDE HIRATSUKA & S. IWADARE).

Distrib. Europe, United States of America, Siberia and Japan (*Hokkaidô*, *Saghalien* and *the Kuriles*).

2. Chrysomyxa ledicola (PECK) LAGERH. in Tromsø Mus. Aarsh. XVI, p. 119, 1893; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 35, 1927; SYDOW, Monogr. Ured. III, p. 507. (HIRATSUKA in Jap. Jour. Bot. III, p. 315, 1927).

Syn. *Uredo ledicola* PECK in Ann. Rept. N.Y. State Mus. XXV,

p. 90, 1873.

Puccinia Ledi BERK. et CURT. in Grev. III, p. 54, 1874; SACCARDO, Syll. Fung. VII, p. 713.

Dicaeoma Ledi KUNTZE, Rev. Gen. III, p. 469, 1898.

Melampsoropsis ledicola ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906; N. Amer. Fl. VII, p. 119; FRASER in Mycologia III, p. 70, 1911; IV, p. 177, 1912.

Hab. On leaves of *Ledum palustre* L. var. *procumbens* AIT. (*Hime-isotsutsuji*).

Hokkaidô.—Prov. Ishikari: Mt. Hokkai-dake (Aug. 4, 1925, NAOHIDE HIRATSUKA; Aug. 19, 1925, K. MIYABE & NAOHIDE HIRATSUKA); Mt. Hakuun-dake (Aug. 5, 1925, NAOHIDE HIRATSUKA); Mt. Kuro-dake (July, 1928, H. KATAOKA; July 26, 1926, S. ITÔ, NAOHIDE HIRATSUKA, etc.; Aug. 4, 1925, NAOHIDE HIRATSUKA; Aug. 18, 1925, K. MIYABE & NAOHIDE HIRATSUKA); Kumonotaira (Daisetsu-zan) (July 28, 1926, S. ITÔ, NAOHIDE HIRATSUKA, etc.; Aug. 19, 1925, K. MIYABE & NAOHIDE HIRATSUKA).

Distrib. United States of America, Canada, Alaska, Kamchatka, Greenland and Japan (*Hokkaidô*).

3. Chrysomyxa Rhododendri (DC.) DE BARY in Bot. Zeitg. XXXVII, p. 809, pl. X, fig. 1-6, 1879; BUBÁK, Rostpilze Böhmens, p. 171, fig. 39; DIETEL in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**, p. 39, fig. 23, 1897; FISCHER, Ured. Schw. p. 426; FRAGOSO, Fl. Ibér. Ured. II, p. 291, fig. 142, 143; GROVE, Brit. Rust Fungi, p. 384; HARIOT, Ured. p. 283, fig. 45; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 708; p. 692, K, 1 (I-III); MIGULA, Krypt.-Fl. III, 1, p. 456, pl. IX, J, fig. 2; SACCARDO, Syll. Fung. VII, p. 760; SYDOW, Monogr. Ured. III, p. 508, pl. XXIII, fig. 168; TROTTER, Fl. Ital. Crypt. Ured. p. 359, fig. 25, 26, 87; WINTER in Pilze Deutschl. I, p. 250, fig. 1, 2. (DIETEL in Engl. bot. Jahrb. XXXVII, p. 107, 1905; HENNINGS in Engl. bot. Jahrb. XXVIII, p. 263, 1900; XXXII, p. 36, 1902; HIRATSUKA in Jap. Jour. Bot. III, p. 316, 1927; YOSHINAGA in Bot. Mag. Tokyo, XV, p. (95), 1901).

Syn. *Uredo Rhododendri* DC. in Fl. franç. VI, p. 86, 1815.

Caeoma Rhododendri LINK, Sp. Pl. II, p. 16, 1825.

C. piceatum LINK, Sp. Pl. II, p. 62, 1825, p.p.

Erysibe Rhododendri WALLR., Fl. Crypt. Germ. II, p. 199, 1833.

Coleosporium Rhododendri SCHRÖT. in Beitr. Biol. Pfl. III, p. 56, 1879.

Melampsora Rhododendri THÜM. in Bull. Soc. Imp. Nat. Moscou,

LV, p. 87, 1880.

Melampsoropsis Rhododendri ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906.

Aecidium abietinum ALB. et SCHW., Consp. Fung. Nisk. p. 120, 1805, p. p.

Hab. On leaves of *Rhododendron indicum* (L.) Sw. var. *macranthum* MAXIM. (*Satsuki-tsutsuji*).

Shikoku:—Prov. Tosa: Sakawa-machi (1906, T. YOSHINAGA).

On leaves of *Rhododendron dauricum* L. (*Yezo-murasaki-tsutsuji*).

Hokkaidô:—Prov. Iburi: Mukawa (Aug. 27, 1895, S. ENDÔ). Prov. Hidaka: Mt. Apoi (Aug. 17, 1912, K. KONDÔ). Prov. Nemuro: Ochiishi (July 17, 1924, NAOHIDE HIRATSUKA). Prov. Tokachi: Lake side of Shikaribetsu-numa (July 7, 1925, NAOHIDE HIRATSUKA).

Distrib. Europe, Siberia, Manchuria and Japan (*Honshû*, *Shikoku* and *Hokkaidô*).

4. *Chrysomyxa alpina* HIRATSUKA, f. sp. nov.

Uredosori hypophyllous, occasionally on petioles, scattered, round, pulverulent, yellow; uredospores globose, ovate, ellipsoidal or oblong, $18-36 \times 14.4-23.4 \mu$; epispore densely echinulate, hyaline; contents yellow.

Teleutosori hypophyllous, causing reddish yellow or brown spots on the upper surface, scattered or grouped, minute, expands into a subglobose or ellipsoidal head, 0.25–0.6 mm. in diameter, waxy yellow; teleutospores catenulate, 0.12–0.28 mm. long, cylindrico-prismatic, oblong to ovate, $14.4-27 \times 7.2-12.6 \mu$; epispore rather thin, smooth.

Hab. On leaves and petioles of *Rhododendron chrysanthum* PALL. (*Kibana-shakunage*).

Honshû:—Prov. Shinano: Mt. Yatsugatake (July 9, 1925, K. TOGASHI).

Hokkaidô:—Prov. Shiribeshi: Mt. Makkari-nupuri (July 9, 1925, K. ISE). Prov. Ishikari: Mt. Sapporo (April 20, 1924; June 17, 1923, NAOHIDE HIRATSUKA; June 25, 1914, B. ISHIDA); Mt. Kuro-dake (July 26, 1926, S. ITÔ, NAOHIDE HIRATSUKA, etc.; Aug. 4, 1925, NAOHIDE HIRATSUKA); Mt. Eboshi-dake (Daisetsu-zan) (Aug. 5, 1925, NAOHIDE HIRATSUKA); Kumonotaira (Daisetsu-zan) (July 5, 1928; Aug. 4, 1925, NAOHIDE HIRATSUKA; July 27, 1926, S. ITÔ, NAOHIDE HIRATSUKA, etc.); Mt. Hakuun-dake (Aug. 5, 1925, NAOHIDE HIRATSUKA). Prov. Kitami: Mt. Rishiri (Rishiri) (Aug. 5, 1922, K. TOGASHI).

S. Saghalien:—Mt. Tosso (July 20, 1927, NAOHIDE HIRATSUKA,

S. IWADARE, M. NAGAI & S. ARAKI; July 23, 1927, NAOHIDE HIRATSUKA, S. IWADARE & M. NAGAI; July 30, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA; Mt. Kashipo (Aug. 8, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA).

Kuriles.—Shikotan: Shakotan (July 16, 1924, A. ABE).

Distrib. Kamchatka and Japan (*Honshû*, *Hokkaidô*, *Saghalien* and the *Kuriles*).

Remarks.—The present species distinctly differs from the related species, *Chrysomyxa expansa* DIET. by the presence of the uredostage.

In 1915, K. MIYABE¹⁾ identified this fungus with the latter species. Since then, it has been also reported by K. TOGASHI²⁾ and the writer^{3, 4, 5)} from Hokkaidô, Saghalien and the Kuriles under the same name.

In 1914, W. TRANZSCHEL⁶⁾ recorded a *Chrysomyxa* on *Rhododendron chrysanthum* PALL. from Kamchatka as *Chrysomyxa Rhododendri* (DC.) DE BARY. But, that fungus seems to be identical with this species by the presence of the uredostage and its host relation.

5. *Chrysomyxa expansa* DIET. in Engl. bot. Jahrb. XXVIII, p. 287, 1900; MIYABE in Bot. Mag. Tokyo, XXIX, p. 258, 1915, p.p.; SACCARDO, Syll. Fung. XVI, p. 319; SYDOW, Monogr. Ured. III, p. 512. (HIRATSUKA in Jap. Jour. Bot. III, p. 314, 1927, p. p.; Transact. Sapporo Nat. Hist. Soc. IX, p. 234, 1927).

Syn.? *Peridermium Piceae-hondoensis* DIET. in Engl. bot. Jahrb. XXXIV, p. 519, 1905; SACCARDO, Syll. Fung. XXI, p. 747; SYDOW, Monogr. Ured. IV, p. 5.

Hab. On leaves of *Picea jezoensis* CARR. (*Yezo-matsu*).

Hokkaidô.—Prov. Ishikari: Ochiai (July 28, 1912, K. MIYABE).

On leaves of *Rhododendron Degronianum* CARR. (*Shakunage*).

Honshû.—Prov. Shimotsuke: Nikkô (May 29, 1899, S. KUSANO, *type specimen*!).

On leaves of *Rhododendron Fauriae* FRANCH. var. *roseum* NAKAI (*Yezo-shakunage*).

Hokkaidô.—Prov. Ishikari: Kanayama (May 10, 1917, M. TOCHINAI); Ochiai (July 7, 1926, M. OKAMOTO; July 18, 1926, NAOHIDE HIRATSUKA; July 28, 1912, K. MIYABE); Kushinai (June 20, 1907,

1) Bot. Mag. Tokyo, XXIX, p. 258, 1915.

2) Jap. Jour. Bot. II, p. 81, 1924.

3) Ibid. III, p. 314, 1927.

4) Bot. Mag. Tokyo, XLII, p. 31, 1928.

5) Jour. Soc. Agric. & Forestr. Sapporo, XIX, no. 98, p. 121, 1928.

6) In ELENKIN, A.A.-Plantes cryptogames de Kamtschatka, p. 553, 1914.

NAOHARU HIRATSUKA; July 18, 1926, NAOHIDE HIRATSUKA); Mt. Kuro-dake (July 5, 1928; July 26 1926, NAOHIDE HIRATSUKA). Prov. Kushiro: Mt. Meakan (July 13, 1928, NAOHIDE HIRATSUKA; July 31, 1897, T. KAWAKAMI; July 19, 1921, K. TOGASHI); Mt. Oakan (July 14, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI, K. SASAKI & K. FUJITA). Prov. Tokachi: Lake side of Shikaribetsu-numa (July 6, 1925, NAOHIDE HIRATSUKA).

Distrib. Japan (*Honshû* and *Hokkaidô*).

6. *Chrysomyxa Cassandrae* (PECK et CLINT.) TRANZSCH. in Trudi St. Petersburg. Obshch. Est. Otd. Bot. XXIII, p. 28, 1893; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 32, 1927; LIRO, Ured. Fenn. p. 465; SACCARDO, Syll. Fung. XVII, p. 397; SYDOW, Monogr. Ured. III, p. 513. (HIRATSUKA in Jap. Jour. Bot. III, p. 314, 1927; Bot. Mag. Tokyo, XLII, p. 31, 1928; HIRATSUKA & HOMMA in Jour. Soc. Agric. & Forestr. Sapporo, XIX, no. 85, p. 78, 1927).

Syn. *Uredo Cassandrae* PECK et CLINT. in Ann. Rept. N. Y. State XXX, p. 54, 1878; SACCARDO, Syll. Fung. VII, p. 844.

Caeoma Cassandrae GOBI in Script. Bot. Hort. Univ. Petropol. I, p. 177, 1886; GOBI & TRANZSCHER in Script. Bot. Hort. Univ. Petropol. III, p. 113, 1891.

C. Cassandrae ROSTR. in Medd. Bot. For. Kjöb. II, p. 90, 1888.

Melampsoropsis Cassandrae ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906; N. Amer. Fl. VII, p. 119, 689; FRASER in Mycologia III, p. 68, 1911; IV, p. 178, 1912.

Peridermium consimile ARTH. et KERN in Bull. Torr. Bot. Club, XXXIII, p. 427, 1906; SACCARDO, Syll. Fung. XXI, p. 746.

Hab. On leaves of *Chamaedaphne calyculata* (L.) MOENCH. (*Horomui-tsutsuji*).

Hokkaidô:—Prov. Ishikari: Horomui (June 20, 1922, NAOHIDE HIRATSUKA).

S. Saghalien:—Aihama (July 17, 1927, NAOHIDE HIRATSUKA, S. IWADARE, M. NAGAI & S. ARAKI); Lake side of Hakuchô-ko (July 17, 1927, NAOHIDE HIRATSUKA, S. IWADARE, M. NAGAI & S. ARAKI); Makunkotan (July 29, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA); Shisuka (Aug. 2, 1927, M. NAGAI; Aug. 12 & 13, 1928, NAOHIDE HIRATSUKA; Oct., 1925, S. KAGABAYASHI).

Distrib. Europe, Siberia, Kamchatka, United States of America, Canada and Japan (*Hokkaidô* and *Saghalien*).

7. *Chrysomyxa Menziesiae* DIET. in Engl. bot. Jahrb. XXXII, p. 627, 1903; SACCARDO, Syll. Fung. XVII, p. 396; SYDOW, Monogr.

Ured. III, p. 516.

Hab. On leaves of *Menziesia pentandra* MAXIM. (*Ko-yôrakutsutsuji*).

Honshû :—Prov. Shimotsuke: Mt. Shirane (July 14, 1900, S. KUSANO, *type specimen*!).

Distrib. Japan (*Honshû*).

On Pirolaceae

8. Chrysomyxa Pirolae (DC.) ROSTR. in Bot. Centralbl. V, p. 127, 1881; BUBÁK, Rostpilze Böhmens, p. 173; DIETEL in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**, p. 40, 1897; FISCHER, Ured. Schw. p. 429, fig. 327; FRAGOSO, Fl. Ibér. Ured. II, p. 293, fig. 144; GROVE, Brit. Rust Fungi, p. 312, fig. 236, 237; HARIOT, Uréd. p. 282; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 36, 1927; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 713; p. 722, fig. K, 4 (I-IV); LIRO, Ured. Fenn. p. 456; MIGULA, Krypt.-Fl. III, 1, p. 457; OUDEMANS, Rév. Champ. I, p. 575; SACCARDO, Syll. Fung. VII, p. 761; SYDOW, Monogr. Ured. III, p. 516; TROTTER, Fl. Ital. Crypt. Ured. p. 358. (HIRATSUKA in Jap. Jour. Bot. III, p. 313, 1927; Transact. Sapporo Nat. Hist. Soc. IX, p. 234, 1927; X, p. 120, 1929).

Syn. *Aecidium* (?) *Pirolae* DC. in Fl. franç. VI, p. 99, 1815.

Ae. conorum-Abietis REESS in Tagebl. Vers. Deutsch. Naturf. XLII, p. 189, 1868; KARSTEN, Myc. Fenn. IV, p. 46, 1879.

Ae. conorum-Piceae REESS in Abhandl. Naturf. Ges. Halle XI, p. 102, Pl. II, fig. 1-4, 1869; FISCHER, Ured. Schw. p. 525; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 861; p. 856, fig. X, 1 (I, II); LIRO, Ured. Fenn. p. 564; WINTER in Pilze Deutschl. I, p. 260.

Ae. Engelmanni DIET. in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**, p. 79, 1897.

Caeoma (*Aecidium*) *Pyrolatum* SCHW. in Transact. Amer. Phil. Soc. II, 4, p. 294, 1832.

Uredo pirolata KÖRN. in Hedw. XVI, p. 28, 1877.

Peridermium conorum THÜM. in Mitteil. Forstl. Versuchsw. Österr. II, p. 313, 1881; SACCARDO, Syll. Fung. VII, p. 836.

P. Engelmanni THÜM. in Mitteil. Forstl. Versuchsw. Österr. II, p. 314, 1881.

P. conorum-Piceae ARTH. et KERN in Bull. Torr. Bot. Club, XXXIII, p. 431, 1906.

Chrysomyxa pirolatum WINT. in Pilze Deutschl. I, p. 250, 1881.

Ch. Pirolae SCHRÖT., Pilze Schles. I, p. 372, 1887; PLOWRIGHT,

Monogr. Ured. & Ustil. p. 253.

Melampsoropsis Pirolae ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906; N. Amer. Fl. VII, p. 118, 688.

Hab. On leaves of *Pirola media* SW. (*Maruba-no-ichiyakusô*).

Hokkaidô:—Prov. Tokachi: Mt. Nupukaushi (June 6, 1925, NAOHIDE HIRATSUKA).

On leaves of *Pirola minor* L. (*Yezo-ichiyakusô*).

S. Saghalien:—Mt. Tosso (July 30, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA).

On leaves and petioles of *Pirola renifolia* MAXIM. (*Jinyô-ichiyakusô*).

Hokkaidô:—Prov. Ishikari: Sapporo (May 6, 1890, K. MIYABE); Maruyama (June 7, 1928, NAOHIDE HIRATSUKA); Nopporo (May 1, 1921; May 8, 1920; May 18, 1922, K. TOGASHI; June 16, 1923, H. TAKASUGI & Y. HOMMA; May 1, 1927; May 17, 1926; June 22, 1923; July 12, 1924, NAOHIDE HIRATSUKA). Prov. Iburi: Lake side of Shikotsu (June 5, 1927, T. ISHIYAMA, S. IWADARE & M. NAGAI).

Distrib. Europe, United States of America, Canada, Alaska, Greenland, Siberia, Manchuria and Japan (*Hokkaidô* and *Saghalien*).

9. Chrysomyxa Ramischiae LAGERH. in Svensk Bot. Tidskr. III, p. 26, fig. 1, 3, 1909; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 715; SACCARDO, Syll. Fung. XXI, p. 717; SYDOW, Monogr. Ured. III, p. 518. (HIRATSUKA in Jap. Jour. Bot. III, p. 314, 1927).

Hab. On leaves of *Pirola secunda* L. (*Yama-ichiyakusô*).

Hokkaidô:—Prov. Tokachi: Lake-side of Shikaribetsu-numa (June 6, 1925, NAOHIDE HIRATSUKA).

Distrib. Europe, United States of America, Alaska, Kamchatka and Japan (*Hokkaidô*).

On Empetraceae

10. Chrysomyxa Empetri (PERS.) SCHRÖT., Pilze Schles. I, p. 372, 1887; FRAGOSO, Fl. Ibér. Ured. II, p. 295; GROVE, Brit. Rust Fungi, p. 311, fig. 235; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 33, 1927; LIRO, Ured. Fenn. p. 454; PLOWRIGHT, Monogr. Ured. & Ustil. p. 253; MIGULA, Krypt.-Fl. III, 1, p. 457; SYDOW, Monogr. Ured. III, p. 515; TROTTER, Fl. Ital. Crypt. Ured. p. 360. (HIRATSUKA in Jap. Jour. Bot. III, p. 316, 1927; Transact. Sapporo Nat. Hist. Soc. IX, p. 234, 1927; Bot. Mag. Tokyo, XLII, p. 32, 1928).

Syn. *Uredo Empetri* PERS. in MOUG. et NESTL., Stirp. Crypt. vogeso-rhen. no. 391, 1812.

Caeoma Empetri LINK, Sp. Pl. II, p. 16, 1825.

C. Empetri WINT. in Pilze Deutschl. I, p. 257, 1881.

Erysibe Empetri WALLR., Fl. Crypt. Germ. II, p. 199, 1833.

Thekopsora Empetri KARST., Myc. Fenn. IV, p. 143, 1879.

Chrysomyxa Empetri ROSTR. in Medd. Bot. For. Kjöb. III, p. 536, 1888; BUBÁK, Rostpilze Böhmens, p. 73; FISCHER, Ured. Schw. p. 577; HARIOT, Uréd. p. 282; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 716; p. 722, fig. K, 6 (I, II); LAGERHEIM in Tromsø Mus. Aarsh. XVI, p. 107, 109, 1893; SACCARDO, Syll. Fung. VII, p. 762.

Melampsoropsis Empetri ARTH. in Résult. Sci. Congr. Internat. Bot. Vienne (1905), p. 338, 1906; N. Amer. Fl. VII, p. 118.

Hab. On leaves of *Empetrum nigrum* L. (*Gankôran*).

Honshû:—Prov. Rikuchû: Mt. Hayachine (Aug. 3, 1905, G. YAMADA). Prov. Shinano: Mt. Yatsugatake (Aug. 1926, G. YAMADA).

Hokkaidô:—Prov. Ishikari: Mt. Kuro-dake (July 28, 1926, S. ITÔ, NAOHIDE HIRATSUKA, etc.). Prov. Tokachi: Lake side of Shikaribetsu-numa (July 7, 1925, NAOHIDE HIRATSUKA). Prov. Kushiro: Mt. Meakan (July 19, 1921, K. TOGASHI); Mt. Oakan (Aug. 10, 1923, NAOHIDE HIRATSUKA). Prov. Nemuro: Nemuro (July 12, 1925, NAOHIDE HIRATSUKA; July 19, 1924, NAOHIDE HIRATSUKA & I. TANAKA).

S. Saghalien:—Mt. Tosso (July 23, 1927, NAOHIDE HIRATSUKA, S. IWADARE & M. NAGAI; July 30, 1928, NAOHIDE HIRATSUKA, S. SHIMADA, M. TERUI & K. FUJITA).

Distrib. Europe, United States of America, Greenland, Canada and Japan (*Honshû*, *Hokkaidô* and *Saghalien*).

On Pinaceae

11. Chrysomyxa Abietis (WALLR.) UNGER in Beitr. zur vergl. Path. p. 24, fig. 1-8, 1840; BUBÁK, Rostpilze Böhmens, p. 174, fig. 40; DIETEL in ENGLER-PRANTL, Natürl. Pflanzenfam. I, 1. Abt.**., p. 40, 1897; FISCHER, Ured. Schw. p. 429; HIRATSUKA in Jour. Facul. Agric. Hokkaidô Imp. Univ. XXI, p. 32, 1927; KLEBAHN in Kryptogamenfl. Mark Brandenbr. Va, p. 712; p. 722, fig. K, 3 (I, II); MIGULA, Krypt.-Fl. III, 1, p. 457; pl. IX, G, fig. 2-4; SACCARDO, Syll. Fung. VII, p. 762; SCHRÖTER, Pilze Schles. I, p. 372; SYDOW, Monogr. Ured. III, p. 519; TROTTER, Fl. Ital. Crypt. Ured. p. 360; WEIR in Mycologia XV, p. 183, 1923. (HIRATSUKA in Jap. Jour. Bot. III, p. 316, 1927).

Syn. *Blennoria Abietis* WALLR. in Allgem. Forst.-u. Jagdzeitg. XVII, p. 65, 1834.

Uredo epidermoidalis HARTIG in Verhandl. d. Harzer Forstvereins, p. 61, 1864.

Sphaeria navicularis WALLR. in Tharandter Jahrb. p. 111, 1853.

Hab. On leaves of *Picea Glehni* MAST. (*Aka-ozomatsu*).

Hokkaidô:—Prov. Ishikari: Nopporo (March 5, 1918, NISHIMURA). Prov. Tokachi: Mt. Nupukaushi (June 6, 1925, NAOHIDE HIRATSUKA).

Distrib. Europe and Japan (*Hokkaidô*).

Table I. Showing the distribution of the species of *Chrysomyxa* in Japan

Species	District	Kuriles	Saghalien	Hokkaidô	Honshû	Shikoku & Kiushû
<i>Chrysomyxa</i> Ledi		+	+	+		
Ch. ledicola				+		
Ch. Rhododendri				+	+	+
Ch. alpina		+	+	+	+	
Ch. expansa				+	+	
Ch. Cassandrae			+	+		
Ch. Menziesiae					+	
Ch. Pirolae			+	+		
Ch. Ramischiae				+		
Ch. Empetri			+	+	+	
Ch. Abietis				+		
Total		2	5	10	5	1

Table II. Showing the distribution of the Japanese species of *Chrysomyxa* in the world

Species	Region	Japan	Asia	Europe	N. America
<i>Chrysomyxa</i> Ledi		+	+	+	+
Ch. ledicola		+	+		+
Ch. Rhododendri		+	+	+	
Ch. alpina		+	+		
Ch. expansa		+			
Ch. Cassandrae		+	+	+	+
Ch. Menziesiae		+			
Ch. Pirolae		+	+	+	+
Ch. Ramischiae		+	+	+	+
Ch. Empetri		+		+	+
Ch. Abietis		+		+	
Total		11	7	7	6

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<i>L. palustre</i> L. var. <i>procumbens</i> AIT. ..	<i>Ch. ledicola</i> (PECK) LAGERH.
<i>L. palustre</i> L. var. <i>yesoense</i> NAKAI	
	<i>Ch. Ledi</i> (ALB. et SCHW.) DE BARY
<i>Menziesia pentandra</i> MAXIM.	<i>Ch. Menziesiae</i> DIET.
<i>Picea Glehni</i> MAST.	<i>Ch. Abietis</i> (WALLR.) UNGER
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<i>Rh. indicum</i> (L.) SW. var. <i>macranthum</i> MAXIM.	
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