

## Rust Flora of the Ryukyu Islands, Japan

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### Abstract

Geographic distribution of rust fungi and their host plants were studied for a mycogeographical analysis of the Ryukyu Islands, in a broadest sense, from Yakushima and Tanegashima to Ishigakijima, Iriomotejima, Kita- and Minamidaitojima. Two hundreds and ninety-two species (one species with two varieties) in 41 genera were found to occur on 31 islands in the Ryukyus. Within the region, possible four mycogeographic subdivisions were suggested by the distribution patterns of the rust fungi. The Osumi Islands, the Amami Islands, the Okinawa Islands, and the Yaeyama Islands, as mycogeographical subdivisions (without formal designation of biogeographical categories and names), roughly corresponds to what was found by the vascular plant study.

### Introduction

The Ryukyu Islands, or Ryukyus, as referred here to as the geographic region for a mycogeographical analysis of the rust fungi (Uredinales), includes Tanegashima (30. 40°N, 131. 00°E) and Yakushima (30. 20°N, 130. 30°E) on the northeast, Iriomotejima (24. 20°N, 123. 50°E) and Ishigakijima (24. 24°N, 124. 12°E) on the south, Yonagunijima (24. 27°N, 123. 00°E) on the west, and Kitadaitojima (25. 57°N, 131. 18°E) and Minamidaitojima (25. 50°N, 131. 15°E) on the southeast in the geographic area (Fig. 1). The Senkaku Islands (approximately 25. 50°N, 123. 30°E) is also included in the Ryukyu Islands in a broadest sense. Within this geographic limit, there are 118 islands with more than 0. 1 km<sup>2</sup> of area and 75 islands with more than 1. 0 km<sup>2</sup>. The island of the largest acreage (1182. 52 km<sup>2</sup>) is Okinawajima. The islands lie as loose arc spreading from northeast to southwest. The Ryukyus consists of 1) mountainous high islands of Palaeozoic to Mesozoic and Palaeogenic (Tertiary) origins, 2) volcanic high islands of Neogenic (Tertiary) and Quaternary origins, 3) terrace islands of Quaternary origin, 4) emerged coral islands of Quaternary origin, and 5) sandy islands of the most recent origin (30). These topographically different islands with respective different geological origins lie roughly in the lengthwise in four zones. The high mountainous islands include 60 of those with more than 100 m altitude and 22 with more than 300 m. The highest mountain (1935. 3 m) is located on Yakushima.

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Biogeographically, the Ryukyu Islands is one of the most interesting areas in Japan because of geological and topographical diversity of the islands with different geological histories and diversity of climatic conditions. Major groups of mammals, reptiles, avians, fishes, insects, flowering plants, ferns, and fungi have been studied for their species diversity and their distribution patterns in the Islands (see 19 for a brief review). Mycologically speaking, the rust fungi (Uredinales) have been most intensively studied for the Islands. A brief history of the rust study in the Ryukyus was given by Hiratsuka (6).

Phytogeographically, most parts of the Ryukyus as defined here are included in the Ryukyu or Tokara-Okinawa Province, with the exclusion of Yakushima and Tanegashima which are included in the Japanese-Korean Province, of the Eastern Asiatic Region of the Holarctic Kingdom, the former also being separated from the Taiwan Province (42). Maekawa (29) recognizes nine floral divisions (regions in his terminology) in the Japanese Archipelago. Of those, the islands from Amamioshima southward are included in the Ryukyu region, and Tanegashima and Yakushima are included in the Sohayaki region. The Ryukyu region is related to, but definitely different from Taiwan.

The study of the northern limit in the Ryukyus of distribution of species and genera of mostly tropical vascular plants revealed that 129 species in 53 genera have their northern limit on Miyakojima (the Miyako Islands), Ishigakijima and Iriomotejima (the Yaeyama Islands), 54 species in 27 genera on Okinawajima (the Okinawa Islands), and 142 species in 41 genera on Amamioshima (the Amami Islands) (1, 29). This indicates that the Ryukyu or Tokara-Okinawa Province in Takhtajan's sense or the Ryukyu region in Maekawa's sense can be subdivided into three parts although no formal biogeographical category and names are designated: 1) the Miyako and Yaeyama Islands, 2) the Okinawa Islands, and 3) the Amami Islands.

The recognition of a floristically significant line (or a zone at best) between the Amami Islands and northern islands agrees with the Watase line based on the mammal distribution study. The floristic disjunction between the Miyako-Yaeyama Islands and the Okinawa Islands corresponds with the Hachisuka line based on the avian distribution study. This study intends to see distribution patterns of rust fungi in the Ryukyu Islands and determine mycogeographically significant division(s), if any, of the Islands.

### Materials and Methods

Geographic distribution records of rust fungi and their host plant records in the Ryukyus were extracted from the literature published in 1940 to 1991 (2-5, 7-18, 20-22, 28, 31-40), and were stored in a database with an aid of dBase III plus<sup>TM</sup> (Ashton-Tate Co.) for a subsequent mycogeographical analysis. The Sorensen's coefficient as an index of the mycofloristic similarities among the islands were calculated. The relationship between species number and island size were determined based on the island data provided by Mesaki (30).

Rust taxa and their hosts were arranged in an alphabetical order regardless of their phylogenetic relationships, and the distribution records were listed also in an alphabetical order under each rust taxon and each host taxon. Nomenclature of the host plants were corrected by manuals of flowering plants (1, 23-27, 43) and ferns (41).

## Results and Discussion

Two hundreds and ninety-two species (one with two varieties) in 41 genera of rust fungi were found to occur on 31 islands. The islands on which the rust fungi (number of species and genera in parentheses) were recorded are: Takeshima (22 species-11 genera), Iwojima (12-4), Kuroshima (48-12); Tanegashima (76-14), Yakushima (155-26) (the Osumi Islands); Nakanoshima (63-9), Suwanosejima (16-8), Akusekijima (12-5), Kotakarajima (9-4), Takarashima (55-13) (the Tokara Islands); Amamioshima (130-23), Kikaishima (25-10), Kakeromajima (4-4), Tokunoshima (67-16), Okinoerabujima (3-2), Yoronjima (38-10) (the Amami Islands); Iheyajima (69-20), Izenajima (13-4), Okinawajima (179-26), Yagajishima (3-1), Ieshima (17-6), Minnajima (5-3), Ikeijima (1-1), Kumejima (56-12) (the Okinawa Islands); Kitadaitojima (11-5), Minamidaitojima (21-2) (the Daito Islands); Miyakojima (49-15) (the Miyako Islands); Ishigakijima (105-19), Iriomotejima (80-15), Yonagunijima (49-11) (the Yaeyama Islands); and Uwotsurijima (4-2) (the Senkaku Islands) (Fig. 1). The rust taxa recorded for the islands (refereces in a baldface number in parentheses) are:

- Aecidium arallae* Sawada ex S. Ito & Maruyama on *Schefflera octophylla* Harms.: Yakushima (7, 22, 37).  
*Aecidium clerodendri* Hennings on *Clerodendron trichotomum* Thunb.: Amamioshima (7, 10, 13, 37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37).  
*Aecidium elaeagni-umbellatae* Dietel on *Elaeagnus* sp.: Okinawajima (7, 10, 37).  
*Aecidium hornotinum* Cummins on *Meliosma oldhami* Miq.: Ishigakijima (7, 11, 37); Tokunoshima (7, 40).  
*Aecidium meliosmae-pungentis* Hennings & Shirai on *Meliosma rigida* Sieb. & Zucc.: Okinawajima (7, 37).  
*Aecidium minoense* P. Sydow & H. Sydow on *Elaeagnus macrophylla* Thunb.: Nakanoshima (7, 14, 37).  
*Aecidium mori* Barclay on *Morus australis* Poir.: Ieshima (7, 37); Ishigakijima (7, 11, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Yakushima (7, 12, 16, 37); on *Morus bombycis* Koidz.: Ishigakijima (7, 37); Nakanoshima (7, 14, 37).  
*Aecidium orbiculare* Barclay on *Clematis meyeniana* Walp.: Miyakojima (7, 37); Tanegashima (7, 37); on *Clematis pierotii* Miq.: Tanegashima (7, 37); on *Clematis terniflora* DC.: Tanegashima (7, 37).  
*Aecidium phyllanthi* Hennings on *Phyllanthus flexuosus* (Sieb. & Zucc.) Muell. -Arg.: Amamioshima (7, 10, 13, 37); Iheyajima (7).  
*Aecidium raphiolepidis* H. Sydow on *Raphiolepis umbellata* (Thunb.) Makino: Ishigakijima (7, 11, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Yakushima (7, 16, 22, 28, 31, 37); on *Raphiolepis umbellata* (Thunb.) Makino var. *liukuensis* Koidz.: Iheyajima (37); Okinawajima (7, 37); on *Tutchelia virgata* (Koidz.) Nakai: Okinawajima (37: This is a doubtful record for the host is in Theaceae rather than Rosaceae).  
*Aecidium satsumense* Hiratsuka, f. on *Arisaema ringens* (Thunb.) Schott: Tanegashima (16, 37).  
*Aecidium smilacis-chinae* Sawada on *Smilax sebeana* Miq.: Iheyajima (7, 37); on *Smilax* sp.: Iriomotejima (7, 9).  
*Aecidium vincetoxici* Hennings & Shirai on *Tylophora japonica* Miq.: Amamioshima (7, 37); Iheyajima (7, 37); Okinawajima (7, 37).  
*Aecidium zanthoxyli-schinifolii* Dietel on *Fagara mantchurica* (Bennett) Honda: Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Takarajima (7, 14, 37); on *Zanthoxylum beecheyanum* K. Koch: Izenajima (37); Okinawajima (37).  
*Aterocauda hyalospora* (Sawada) Ono on *Acacia confusa* Merr.: Amamioshima (7, 11, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 10, 11, 37); Kumejima (7, 37); Minamidaitojima (7, 37); Miyakojima (7, 10, 11, 37); Okinawajima (2, 4, 7, 9, 10, 37); Tanegashima (7, 12, 37); Tokunoshima (7, 13, 37); Yoronjima (38).

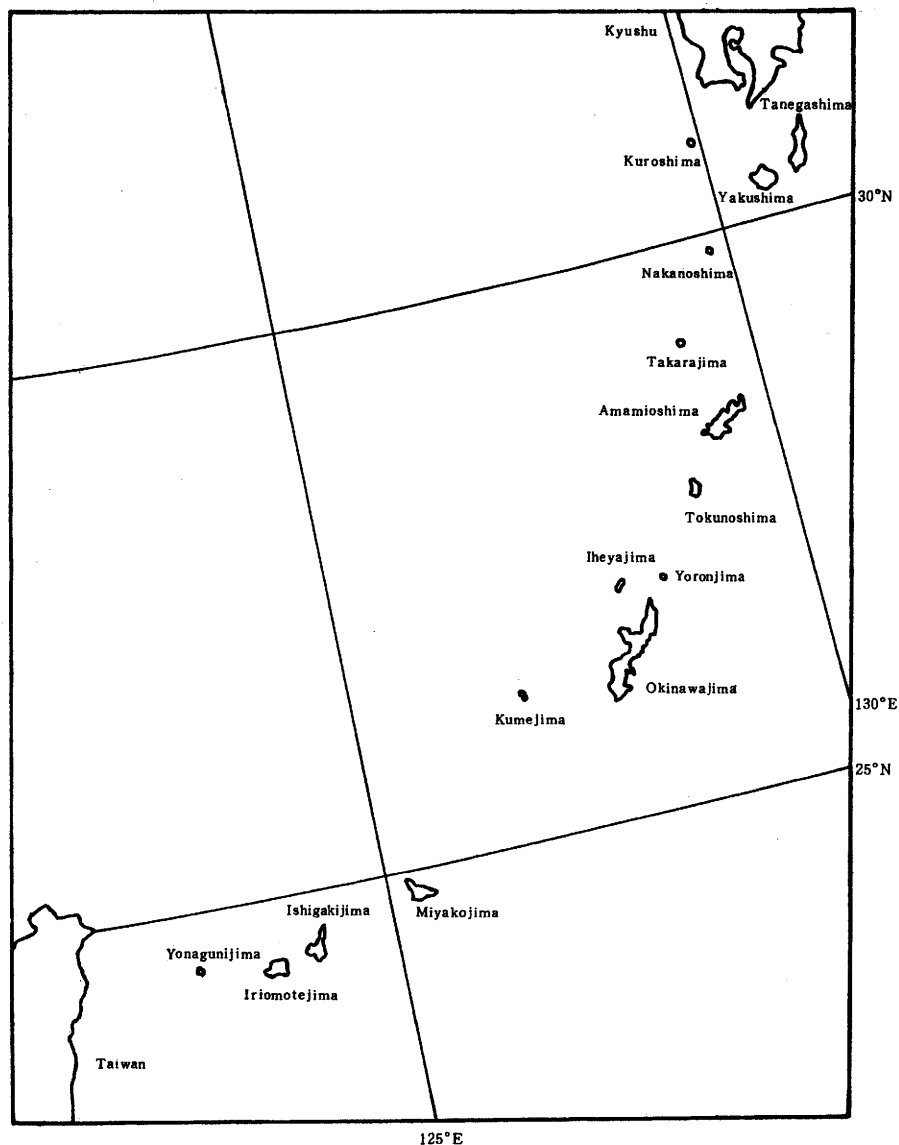


Fig. 1. Geographic distribution of the islands on which more than 30 rust species are recorded. Kuroshima (48 species in 12 genera); Tanegashima (76 species in 14 genera), Yakushima (155 species in 26 genera)(the Osumi Islands); Nakanoshima (63 species in 9 genera), Takarashima (55 species in 13 genera)(the Tokara Islands); Amamioshima (130 species in 23 genera), Tokunoshima (67 species in 16 genera), Yoronjima (38 species in 10 genera)(the Amami Islands); Iheyajima (69 species in 20 genera), Okinawajima (179 species in 26 genera), Kumejima (56 species in 12 genera)(the Okinawa Islands); Miyakojima (49 species in 15 genera)(the Miyako Islands); Ishigakijima (105 species in 19 genera), Iriomotejima (80 species in 15 genera), Yonagunijima (49 species in 11 genera)(the Yaeyama Islands).

- Cerotelium fici* (Butler) Arthur on *Ficus wightiana* Wallich: Ishigakijima (7, 37).
- Chrysocells gynostematis* Ono on *Gynostemma pentaphyllum* (Thunb.) Makino: Amamioshima (7, 34); Nakanoshima (7, 34).
- Coleopucciniella ideii* Hiratsuka, f. on *Rhaphiolepis umbellata* Makino: Amamioshima (7, 13, 37); Iheyajima (7, 37); Miyakojima (7, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Yakushima (16, 21); on *Rhaphiolepis umbellata* (Thunb.) Makino var. *integerrima* (H. & A.) Masamune: Kumejima (7, 37); Tokunoshima (7); on *Rhaphiolepis umbellata* (Thunb.) Makino var. *liukiensis* Koidz.: Kumejima (7, 10, 37); Okinawajima (2, 4, 7, 10, 37); Yakushima (7).
- Coleopucciniella simplex* (Dietel) Hara ex Hiratsuka, f. on *Eriobotrya japonica* Lindl.: Okinawajima (7, 10, 37).
- Coleosporium asterum* (Dietel) P. & H. Sydow on *Aster indicus* L.: Amamioshima (7, 10, 13, 37); Ieshima (7, 37); Kikaishima (7, 13, 37); Kumejima (7, 37); Okinawajima (2, 4, 7, 37); Tokunoshima (7, 13, 37); Yoronjima (39); on *Kalimeris yomena* Kitamura: Kuroshima (7, 12, 37); Tanegashima (7, 12, 37); Yakushima (7, 12, 37).
- Coleosporium bletiae* Dietel on *Calanthe discolor* Lindl.: Amamioshima (7, 13, 32, 37); Tanegashima (7); Yakushima (7, 16, 21, 31, 37); on *Calanthe furcata* Bateman: Nakanoshima (7, 14, 37); Okinawajima (4, 7, 10, 37); Tanegashima (7, 37); on *Calanthe* sp.: Okinawajima (7, 10, 37); on *Phajus tankervilleae* (Banks) Bl.: Okinawajima (4, 7, 10, 37).
- Coleosporium carpesii* Saccardo on *Carpesium abrotanoides* L.: Amamioshima (7, 10, 13, 37); Yakushima (7, 37); on *Carpesium cernuum* L.: Amamioshima (7, 13, 37); Kuroshima (7, 15, 37); Okinawajima (2, 4, 7, 10, 37); Yakushima (7, 16, 21, 37); on *Carpesium divaricatum* Sieb. & Zucc.: Amamioshima (7, 13, 32, 37); Tanegashima (37); Yakushima (7, 16, 37); on *Carpesium rosulatum* Miq.: Tanegashima (7, 16, 37); on *Carpesium* sp.: Amamioshima (32); Yakushima (31).
- Coleosporium clematidis* Barclay on *Clematis terniflora* DC.: Amamioshima (7, 13, 32, 37); Kikaishima (7); Tanegashima (7, 16, 37); Yakushima (7, 16, 21, 31, 33, 37).
- Coleosporium clematidis-apifoliae* Dietel on *Clematis apiifolia* DC.: Yakushima (16, 37); on *Clematis grata* Wall.: Iheyajima (37); Iriomotejima (37); Ishigakijima (11, 37); Izenajima (37); Kumejima (10, 37); Minnajima (37); Okinawajima (2, 4, 10, 37); on *Clematis grata* Wall. var. *ryukyuensis* Tamura: Iriomotejima (7); Ishigakijima (7, 8, 9); Kumejima (7); Okinawajima (7, 9); on *Clematis leschenaultiana* DC.: Amamioshima (7, 13, 37); on *Clematis pierotii* Miq.: Nakanoshima (7, 14, 37); Yakushima (21).
- Coleosporium clerodendri* Dietel on *Clerodendrum fragrans* Vent.: Okinawajima (2, 4, 7, 37); on *Clerodendrum trichotomum* Thunb.: Akusekijima (7, 14, 37); Amamioshima (7, 13, 32, 37); Ieshima (7, 37); Iheyajima (7, 37); Iriomotejima (7); Ishigakijima (7, 11, 37); Iwojima (7, 15, 37); Kotakarajima (7, 14, 37); Kumejima (37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Suwanosejima (7); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 31, 33, 37); Yonagunijima (7, 37, 38); Yoronjima (39); on *Clerodendrum trichotomum* Thunb. var. *esculentum* Makino: Iriomotejima (9); Okinawajima (7); on *Clerodendrum trichotomum* Thunb. var. *yakushimene* (Nakai) Ohwi: Iriomotejima (9); Okinawajima (7, 9); Ishigakijima (7); Okinawajima (7); on *Clerodendrum* sp.: Ishigakijima (8); Kumejima (10); Okinawajima (10).
- Coleosporium eupatorii* Arthur on *Eupatorium luchuense* Nakai: Kuroshima (37); on *Eupatorium reevesii*: Yakushima (21).
- Coleosporium evodiae* Dietel ex Hiratsuka, f. on *Evodia glauca* Miq.: Amamioshima (3, 7, 13, 37); Iheyajima (37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 9, 11, 37); Kakeromajima (7); Kumejima (7, 10, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 9); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 21, 37); Yonagunijima (7, 37, 38).
- Coleosporium lycopi* P. Sydow & H. Sydow on *Adenophora triphylla* DC.: Amamioshima (7, 32); Kumejima (7); Nakanoshima (7); Okinawajima (7); on *Adenophora triphylla* DC. var. *insularis* (Kitamura) Kitamura: Amamioshima (13, 37); Kumejima (10, 37); Nakanoshima (14, 37); on *Adenophora triphylla* DC. var. *japonica* (Regel) Hara: Amamioshima (37); on *Wahlenbergia marginata* DC.: Kuroshima (7, 15, 37); Okinawajima (7, 37); Yakushima (7, 16, 21, 31, 37).

- Coleosporium paederiae*** Dietel ex Hiratsuka, f. on *Paederia scandens* (Lour.) Merr. var. *mairei* (Lev.) Hara : Amamioshima (7, 13, 32, 37); Kotakarajima (14); Kuroshima (15); Nakanoshima (14); Iheyajima (7, 37); Iriomotejima (7); Iwojima (7, 37); Izenajima (7, 37); Kotakarajima (7, 37); Kuroshima (7, 37); Minnajima (37); Nakanoshima (7, 37); Okinawajima (2, 4, 7, 9, 10, 37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Yakushima (7, 15, 21, 31, 33, 37).
- Coleosporium phellodendri*** Komarov on *Phellodendron amurense* Rupr. var. *lavalleyi* (Dode) Sprague: Yakushima (33).
- Coleosporium pini-asteris*** Orishimo on *Aster scaber* Thunb.: Tanegashima (37).
- Coleosporium plectranthi*** Barclay on *Clinopodium micranthum* (Regel) Hara: Yakushima (21); on *Isodon japonicus* (Burm.) Hara: Yakushima (7, 16, 21, 37); on *Mosla dianthera* (Hamilt.) Maxim.: Amamioshima (7, 13, 37); Kotakarajima (7, 14, 37); Takarajima (7, 14, 37); Takeshima (15, 37); Tanegashima (37); on *Mosla punctulata* (J. F. Gmel.) Nakai: Amamioshima (7, 13, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 37); on *Perilla frutescens* (L.) Britt. var. *citriodora* (Makino) Ohwi: Tanegashima (7, 16, 37); Yakushima (16, 37); on *Perilla frutescens* (L.) Britt. var. *crispa* Decne.: Okinawajima (4, 7, 10, 37); Yakushima (7, 21, 37); on *Perilla frutescens* (L.) Britt. var. *japonica* (Hassk.) Hara: Yakushima (7).
- Coleosporium xanthoxyli*** Dietel & P. Sydow ex Dietel on *Fagara ailanthoides* (Sieb. & Zucc.) Engler: Amamioshima (7, 10, 13, 37); Ishigakijima (7, 11, 37); Iwojima (7, 15, 37); Nakanoshima (14, 37); Tanegashima (7, 16, 37); Yakushima (16, 21, 31, 37); on *Fagara fauriei* Nakai: Amamioshima (7, 13, 37); Tanegashima (37); Yakushima (7); on *Fagara mantchurica* (Bennett) Honda: Amamioshima (7, 13, 37); Tanegashima (16, 37); Tokunoshima (7, 13, 37); Yakushima (7); on *Zanthoxylum beecheyanum* K. Koch: Iheyajima (37); Ishigakijima (7, 11, 37); on *Zanthoxylum piperitum* (L.) DC.: Yakushima (33).
- Coleosporium yamabense*** (Saho) Hiratsuka, f. on *Petasites japonicus* Miq.: Yakushima (7, 16, 21, 31, 37).
- Cronartium quercuum*** Miyabe ex Shirai on *Castanopsis cuspidata* (Thunb.) Schottky var. *sieboldii* (Makino) Nakai: Amamioshima (7); Kakeromajima (37).
- Crossopora antidesmae-dioicae*** (P. Sydow & H. Sydow) Arthur & Cummins on *Antidesma japonicum* Sieb. & Zucc.: Amamioshima (7, 13, 32, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 37); Ishigakijima (7, 8, 9, 11, 37); Kumejima (7, 10, 37); Tokunoshima (7).
- Crossopora malloti*** (Raciborski) Cummins on *Mallotus japonicus* Muell-Arg.: Takeshima (7); Yakushima (21, 37); on *Melanolepis multiglandulosa* (Reinw.) Reichenb. f. & Zoll.: Iriomotejima (7); Ishigakijima (7, 8, 9, 11, 37); Miyakojima (7, 10, 11, 37); Yonagunijima (37, 38).
- Crossopora premnae*** (Petch) P. Sydow & H. Sydow on *Premna obtusifolia* R. Br.: Iriomotejima (7, 9); Kikaishima (7, 13, 37).
- Dasturella divina*** (H. Sydow) Mundkur & Kheswalla on *Bambusa multiplex* (Lour.) Raeusch.: Okinawajima (2, 4, 7, 10, 18, 37); Yoronjima (39); on *Bambusa vulgaris* Schrad.: Amamioshima (13, 18, 37); Iriomotejima (7, 12, 18, 37); Nakanoshima (7, 14, 18, 37); Okinawajima (7, 10, 18, 37); Yonagunijima (38); on *Phyllostachys bambusoides* Sieb. & Zucc.: Yakushima (7, 37); on *Pleioblastus* sp.: Iriomotejima (7, 8); Ishigakijima (7, 8).
- Didymopsorella lemanensis*** (Doidge) Hiratsuka, f. on *Toddalia asiatica* (L.) Lam.: Iheyajima (7, 37); Kikaishima (7, 13, 37); Okinawajima (4, 7, 10, 37).
- Endophylloides lysimachiae*** S. Kaneko & Hiratsuka, f. on *Lysimachia japonica* Thunb.: Okinawajima (3, 4, 7, 10, 37); Yakushima (7, 16, 37).
- Endophyllum emasculatum*** Arthur & Cummins on *Breynia officinalis* Hemsl.: Iheyajima (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 11, 37); Kikaishima (7, 13, 37); Miyakojima (7, 37); Okinawajima (2, 4, 7, 10, 37); Yonagunijima (39); Yoronjima (39).
- Endophyllum formosanum*** (P. Sydow & H. Sydow) Hiratsuka, f. & S. Kaneko on *Emilia sonchifolia* (L.) DC.: Amamioshima (7, 10, 13, 37); Iheyajima (7, 37); Iriomotejima (7, 8); Ishigakijima (7, 11, 37); Kitadaitojima (7, 37); Minamidaitojima (7, 37); Okinawajima (2, 4, 7, 10, 37); Tokunoshima (7, 37); Yonagunijima (38).
- Endophyllum griffithiae*** (Hennings) Raciborski on *Randia canthioides* Champ.: Amamioshima (7, 37); Iriomotejima (7, 37); Ishigakijima (7, 37); Okinawajima (7, 37); on *Randia sinensis* (Lour.) Roem. & Schult.: Ishigakijima (7, 11, 37).
- Endophyllum kaernbachii*** (Hennings) Stevens & Mendiola on *Ipomoea pes-caprae* (L.) R. Br.: Iriomotejima (7,

- 8, 11, 37); Ishigakijima (7, 10, 11, 37); Yonagunijima (38).
- Endophyllum machillii* (Hennings) Stevens on *Cinnamomum japonicum* Sieb. ex Nees: Iriomotejima (9); Okinawajima (7, 10, 37); Yakushima (7, 16, 22, 37); on *Machilus thunbergii* Sieb. & Zucc.: Amamioshima (7, 10, 13, 37); Ieshima (37); Iheyajima (7, 37); Iriomotejima (7, 8, 9, 11, 37); Ishigakijima (7, 8, 11, 37); Kikaishima (7, 13, 37); Kumejima (7, 10, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 9, 10, 37); Senkaku Islands (10, 11, 37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Tanegashima (7, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 22, 28, 31, 33, 37); Yonagunijima (7, 37).
- Endophyllum paederiae* Stevens & Mendiola on *Paederia scandens* (Lour.) Merr. var. *mairei* (Lev.) Hara: Iriomotejima (7); Ishigakijima (7, 8).
- Gerwasia rubi* Raciborski on *Rubus buergeri* Miq.: Kuroshima (7, 15, 37); Tanegashima (7, 37); Yakushima (7, 16, 21, 31, 37).
- Gymnosporangium asiaticum* Miyabe ex Yamada on *Juniperus chinensis* L.: Okinawajima (7, 10, 37).
- Hamaspora acutissima* P. Sydow & H. Sydow on *Rubus nesiotis* Focke: Okinawajima (4, 7, 10, 37).
- Hamaspora okinawensis* Hiratsuka, f. ex Hiratsuka, f. & Shimaburo on *Rubus utchinensis* Koidz.: Okinawajima (7, 10, 37).
- Hamaspora rubi-sieboldii* (Kawagoe) Dietel on *Rubus sieboldii* Bl.: Amamioshima (7, 10, 13, 32, 37); Iheyajima (7, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 37); Tokunoshima (7); Yakushima (7, 16, 21, 31, 37); Yoronjima (39).
- Hapalophragmium derridis* P. Sydow on *Derris uliginosa* Benth.: Miyakojima (7, 11, 37).
- Hyalopsora aculeata* Kamei on *Blechnum nipponicum* (Kunze) Makino: Yakushima (7, 16, 37).
- Hyalopsora hakodatensis* Hiratsuka, f. on *Diplazium dilatatum* Blume: Amamioshima (7, 32, 37).
- Hyalopsora polypodii* (Dietel) Magnus on *Anthyrium iseanum* Ros.: Yakushima (7); on *Blechnum orientale* L.: Amamioshima (13, 32); Kuroshima (7); Okinawajima (9, 10); on *Diplazium dilatatum* Blume: Amamioshima (13); on *Diplazium hachijoense* Nakai: Amamioshima (7, 13, 37); Kuroshima (15); Nakanoshima (14, 37); Okinawajima (3, 4, 7, 10, 37); Yakushima (7, 37); on *Lastrea laxa* (Fr. & Sav.) Cope: Yakushima (7, 16, 37); on *Leptogramma mollissima* (Fisch.) Ching: Kuroshima (7, 15, 37); Yakushima (7, 16, 21, 37); on *Woodwardia orientalis* Sw.: Kuroshima (7, 15, 37).
- Kernkampella breyniae* H. Sydow & P. Sydow on *Breynia officinalis* Hemsl.: Okinawajima (35).
- Kuehneola callicarpae* H. Sydow on *Callicarpa japonica* Thunb.: Tanegashima (7, 37); Yakushima (33); on *Callicarpa japonica* Thunb. var. *luxurians* Rehd.: Akusekijima (7, 14, 37); Amamioshima (7, 10, 13, 32, 37); Ishigakijima (7, 8, 9, 10, 11, 37); Kikaishima (13, 37); Kumejima (7, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 37); Yonagunijima (37, 38); Yoronjima (39); on *Callicarpa oshimensis* Hayata: Amamioshima (7, 13, 32, 37); on *Callicarpa oshimensis* Hayata var. *iriomotensis* (Masam.) Hatsusima: Iriomotejima (7, 9); Ishigakijima (7, 8, 9, 37); Yonagunijima (7, 37); on *Callicarpa oshimensis* Hayata var. *okinawensis* (Nakai) Hatsushima: Amamioshima (32).
- Kuehneola japonica* (Dietel) Dietel on *Rosa bracteata* Wendland: Ishigakijima (7, 37); on *Rosa chinensis* Jacq.: Okinawajima (7, 10, 37); on *Rosa wichuraiana* Crep. var. *wichuraiana*: Amamioshima (7, 10, 13, 37); Takarajima (7, 14, 37); Tanegashima (7, 37); Yakushima (7, 21, 37); Yoronjima (39); on *Rosa wichuraiana* Crep var. *glandulifera* (Koidz.) Honda: Iheyajima (7, 37); on *Rosa* sp.: Yakushima (7, 13, 37).
- Kuehneola malvicola* Arthur on *Malvastrum coromandelianum* (L.) Garke: Minamidaitojima (7, 37).
- Maravalia achroa* (Sydow) Arthur & Cummins on *Dalbergia sisso* Roxb.: Okinawajima (7, 10, 37).
- Melampsora coleosporioides* Dietel on *Salix babylonica* L.: Amamioshima (40); Ishigakijima (7, 15, 37); Okinawajima (7, 12, 37); Yakushima (7, 12, 37).
- Melampsora epitea* (Kunze & Schumacher) Thuemen on *Salix matsudana* Koidz.: Yakushima (33); on *Salix sachalinensis* F. Schmidt.: Yakushima (33).
- Melampsora idesia* Miyabe ex Hiratsuka on *Idesia polycarpa* Maxim.: Amamioshima (7, 13, 32, 37); Iriomotejima (7, 9, 11, 37); Ishigakijima (7); Yakushima (7, 16, 37).
- Melampsora yoshinagai* Hennings on *Wikstroemia ganpi* (Sieb. & Zucc.) Maxim.: Yakushima (21); on *Wikstroemia phymatoglossa* Koidz.: Amamioshima (7, 13, 32, 37); on *Wikstroemia yakushimensis* (Makino)

- Nakai: Yakushima (7, 16, 37).
- Melampsoridium hiratsukanum** S. Ito ex Hiratsuka, f. on *Alnus japonica* (Thunb.) Steud.: Okinawajima (7, 37).
- Milesina erythrosora** (Fauil) Hiratsuka, f. ex Hiratsuka, f. & Yoshinaga on *Dryopteris lacera* O. Kuntze: Tanegashima (7, 37).
- Milesina exigua** (Fauil) Fauil ex Hiratsuka, f. on *Ctenitis subglandulosa* (Hance) Ching: Takarajima (7, 14, 37); Tokunoshima (7); on *Dennstaedtia scabra* (Wall.) Moore: Yakushima (7, 16, 37); on *Hypoleis punctata* (Thunb.) Mett.: Yakushima (7, 16, 37); on *Microlepia strigosa* (Thunb.) Presl.: Amamioshima (7, 13, 32, 37); Yakushima (7, 16, 21, 31, 33, 37).
- Milesina faulliana** Hiratsuka, f. & Uemura ex Hiratsuka, f. on *Cyrtomium falcatum* (L. f.) Presl.: Takeshima (7, 15, 37).
- Milesina microspora** Hiratsuk, f. on *Cyclosorus acuminatus* (Houtt.) Nakai: Amamioshima (7, 13, 32, 37); Miyakojima (7); Okinawajima (2, 4, 7, 37).
- Milesina odontosoriae** Hiratsuka, f. on *Sphenomeris chusana* (L.) Copel.: Okinawajima (2, 4, 7, 10, 37); Yakushima (7, 16, 21, 31, 37).
- Milesina pteridicola** Hiratsuka, f. ex Hiratsuka, f. & Yoshinaga on *Plagiogyria japonica* Nakai: Amamioshima (13, 37); Yakushima (16, 37); on *Pteris dispar* Kunze: Takarajima (14); Takeshima (7, 37); Yakushima (7, 16, 33, 37); on *Pteris fauriei* Hieron.: Amamioshima (7, 13, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 37); Yakushima (21, 31); on *Pteris hachijoensis* Nakai: Yakushima (7, 16, 37).
- Milesina vogesiaca** (Fauil) H. Sydow ex Hiratsuka, f. on *Dryopteris varia* Kuntze: Tanegashima (7, 12, 37).
- Nothoravenelia japonica** Dietel on *Flueggea suffruticosa* (Pallas) Baill.: Iheyajima (7, 37); Ishigakijima (7, 8); Kikaishima (7, 13, 37); Miyakojima (7, 37); Nakanoshima (7); Takarajima (7, 14, 37).
- Ochropsora nambuana** (Hennings) Dietel on *Elaeagnus crispa* Thunb.: Okinawajima (7); Yakushima (7, 16, 21, 37); on *Elaeagnus macrophylla* Thunb.: Okinawajima (7, 37); Ieshima (37); on *Elaeagnus umbellata* Thunb.: Yakushima (16); on *Elaeagnus umbellata* Thunb. var. *rotundifolia* Makino: Yakushima (7, 16, 37).
- Phakopsora ampelopsidis** Dietel & P. Sydow on *Ampelopsis brevipedunculata* (Maxim.) Trautv.: Amamioshima (32); Yakushima (21, 33); on *Ampelopsis brevipedunculata* (Maxim.) Trautv. var. *hancei* Rehd.: Iriomotejima (7); Ishigakijima (7, 8, 9); Kumejima (7, 37); on *Ampelopsis brevipedunculata* (Maxim.) Trautv. var. *maximowiczii* (Regel) Rehd.: Akusekijima (7, 14, 37); Amamioshima (7, 10, 13, 37); Iriomotejima (7); Ishigakijima (7, 11, 37); Kikaishima (7, 13, 37); Kotakarajima (7, 37); Kuroshima (7, 15, 37); Miyakojima (7, 10, 11, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 37); Yonagunijima (7, 37, 38); on *Ampelopsis* sp.: Yakushima (33); on *Vitis flexuosa* Thunb.: Iriomotejima (7, 9); Ishigakijima (7); Yakushima (21); on *Vitis vinifera* L.: Amamioshima (7, 13, 37).
- Phakopsora artemisiae** Hiratsuka, f. on *Artemisia japonica* Thunb.: Nakanoshima (7, 14, 37); Okinawajima (3, 4, 7, 10, 37); on *Artemisia princeps* Pamp.: Okinawajima (2, 4, 7, 10, 37); on *Artemisia* sp.: Amamioshima (13); Yakushima (16); on *Chrysanthemum morifolium* Ramat.: Okinawajima (4); on *Eupatorium formosanum* Hayata var. *quasitripartitum* (Hayata) Kitamura: Iriomotejima (7); Ishigakijima (7, 8); on *Eupatorium luchuense* Nakai: Yakushima (21); on *Eupatorium variabile* Makino: Yakushima (7, 16, 21, 37).
- Phakopsora ehretiae** Hiratsuka on *Ehretia dicksoni* Hance: Kumejima (7, 37); on *Ehretia dicksonii* Hance. var. *japonica* Nakai: Ishigakijima (10, 11); Kumejima (10); Miyakojima (10, 11); on *Ehretia acuminata* R. Br. var. *obovata* (Lindl.) Johnst.: Iheyajima (7, 37); Okinawajima (2, 4, 7, 10, 37); Tanegashima (7, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 37).
- Phakopsora ficu-erectae** S. Ito & Otani ex S. Ito & Maruyama on *Ficus erecta* Thunb.: Akusekijima (7, 37); Amamioshima (7, 13, 32, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 9, 32); Iwojima (7, 15, 37); Kikaishima (7, 13, 37); Kitadaitojima (37); Kumejima (7, 37); Kuroshima (7, 15, 37); Miyakojima (7, 11, 37); Nakanoshima (7, 37); Okinawajima (7, 9, 10, 37); Suwanosejima (7, 37); Takarajima (7, 37); Takeshima (7, 15, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 31, 33, 37); Yonagunijima (38); Yoronjima (39); on *Ficus benguetensis* Merr.: Iriomotejima (7, 11, 37); on *Ficus sep-*



- tica* Burn. f.: Iriomotejima (7, 8); Yonagunijima (38); on *Ficus variegata* Bl. var. *sycomoroides* (Miq.) Conner: Ishigakijima (7, 11, 37); Yakushima (7, 16, 37); on *Ficus* sp.: Iriomotejima (7, 9); Ishigakijima (7, 8); Okinawa (10, 37); on *Morus australis* Poir.: Amamioshima (7, 13, 37); Ishigakijima (7, 8); Kikaishima (7, 13, 37); Nakanoshima (7, 37); Okinawajima (7, 9); Takeshima (7, 15, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (16, 21); Yoronjima (39).
- Phakopsora formosana*** P. Sydow & H. Sydow on *Bridelia balansae* Tutcher: Iriomotejima (7, 9, 37); on *Glochidion acuminatum* Muel. -Arg.: Amamioshima (7, 13, 37); Okinawajima (7, 9, 10, 37); on *Glochidion fortunei* Hance: Yonagunijima (7, 37, 38); on *Glochidion lanceolatum* Hayata: Ishigakijima (7, 37); on *Glochidion obovatum* Sieb. & Zucc.: Iheyajima (37); Ishigakijima (12, 37); Kumejima (37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Tokunoshima (7); Yoronjima (39); on *Glochidion zeylanicum* (Gaertn.) A. Juss.: Ishigakijima (7, 37); Yonagunijima (7, 38); on *Glochidion* sp.: Okinawajima (4, 10).
- Phakopsora glochidii*** (P. Sydow & H. Sydow) Arthur on *Glochidion lanceolatum* Hayata: Iriomotejima (7, 8, 9); Ishigakijima (7, 8); Iriomotejima (9); on *Glochidion zeylanicum* (Gaertn.) A. Juss.: Iheyajima (7, 37); Iriomotejima (7, 8); Ishigakijima (7, 15, 37); Miyakojima (7, 37); Tokunoshima (7, 13, 37); Yakushima (7, 12, 37).
- Phakopsora incompleta*** (P. Sydow & H. Sydow) Cummins on *Ischaemum aristatum* L. var. *aristatum*: Amamioshima (7); Iheyajima (37); Iriomotejima (7, 9); Kumejima (7, 37); Miyakojima (7, 11, 18, 37); Okinawajima (4, 7, 10, 18, 37); Tanegashima (16, 18, 37); Tokunoshima (7); Yakushima (7, 16, 18, 33, 37); Yonagunijima (38, 39); on *Microstegium ciliatum* A. Camus: Amamioshima (32); Ishigakijima (7, 11, 18, 37); Okinawajima (7, 10, 18, 37); Yakushima (7, 16, 18, 33, 37); Yonagunijima (38); on *Microstegium vimineum* (Trin.) A. Camus: Amamioshima (7, 10, 13, 18, 37); Yakushima (7, 21, 37).
- Phakopsora malloti*** Cummins on *Mallotus japonicus* (Thunb.) Muell. -Arg.: Amamioshima (7, 13, 32, 37); Ishigakijima (7, 11, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 10, 37); Yakushima (7, 13, 33, 37).
- Phakopsora mangalorica*** Ramakrishnan & Sundarum on *Desmodium caudatum* DC.: Ishigakijima (7, 8, 12, 37): This species has been reported as *Uredo desmodii-pulchelli* Sydow, but *U. desmodii-pulchelli* was recently found to be a uredinial anamorph of *P. mangalorica*, Ono *et al.*, unpublished).
- Phakopsora meliosmae*** Kusano on *Meliosma rhoifolia* Maxim.: Amamioshima (40); Iriomotejima (7, 37); Yonagunijima (7, 37, 38).
- Phakopsora nishidana*** S. Ito on *Ficus variegata* Bl.: Iriomotejima (7, 9).
- Phakopsora pachyrhizi*** H. Sydow & P. Sydow on *Glycine max* (L.) Merr.: Iheyajima (7, 37); Iriomotejima (7, 11, 37); Ishigakijima (7); Kikaishima (7, 13, 37); Okinawajima (7, 10, 37); Tanegashima (7, 16, 37); on *Ormocarpum cochinchinense* (Lour.) Merr.: Iriomotejima (36); on *Pueraria lobata* (Willd.) Ohwi: Kuroshima (7, 15, 37); Yakushima (7, 21, 37); on *Pueraria montana* Merr.: Kotakarajima (7, 14, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Yakushima (7, 37); Yonagunijima (38).
- Phakopsora tecta*** Jackson & Holway on *Commelina communis* L.: Okinawajima (2, 4, 7, 10, 37); on *Commelina nudiflora* L.: Amamioshima (7, 13, 37); Kikaishima (7, 13, 37); Miyakojima (7, 37); Okinawajima (2, 4, 7, 10, 37); Tokunoshima (7, 13, 37).
- Phakopsora zizyphi-vulgalis*** Dietel on *Colubrina asiatica* (L.) Brong.: Ishigakijima (7, 12, 37).
- Phragmidium griseum*** Dietel on *Rubus croceacanthus* Lev.: Yakushima (7, 16, 37); on *Rubus illecebrosus* Focke: Tanegashima (7, 37); on *Rubus rosaefolius* Sm. var. *maximowiczii* Focke: Amamioshima (7, 13, 37); Iheyajima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (4, 7, 10, 37); Yakushima (7, 21, 37).
- Phragmidium heterosporum*** Dietel on *Rubus ribisoideus* Matsum.: Nakanoshima (7, 14, 37); on *Rubus parvifolius* L.: Kuroshima (7, 37).
- Phragmidium pauciloculare*** (Dietel) P. Sydow & H. Sydow on *Rubus parvifolius* L. var. *triphlyus* (Thunb.) Nakai: Amamioshima (32); Kuroshima (7, 15, 37); Miyakojima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 37); Yoronjima (39).
- Phragmidium rosae-multiflorae*** Dietel on *Rosa multiflora* Thunb.: Amamioshima (32); on *Rosa wichuraiana* Crép.: Amamioshima (7, 13, 37); Ishigakijima (7, 8, 37); Tokunoshima (7, 37); Yoronjima (39).
- Pileolaria pistaciae*** Tai & Wei on *Pistacia chinensis* Bunge: Yakushima (7, 16, 21, 37).

- Pileolaria shiraiana* (Dietel & P. Sydow) S. Ito on *Rhus javanica* L.: Ishigakijima (7, 9: The name applied for the fungus on this plant is probably an error for *Pileolaria klugkistiana* Dietel); on *Rhus succedanea* L.: Amamioshima (7, 10, 13, 37); Iheyajima (7, 37); Iriomotejima (7, 9, 11, 37); Ishigakijima (7, 8, 11, 37); Kikaishima (7, 13, 37); Kumejima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 37); Yonagunijima (7, 37, 38).
- Puccinia absinthii* (Hedwig, f.) de Candolle on *Artemisia japonica* Thunb.: Okinawajima (3, 4, 7, 10, 37); on *Artemisia princeps* Pamp.: Miyakojima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (3, 4, 7, 10, 37); Takarajima (7, 14, 37); Tanegashima (7, 37).
- Puccinia acetosae* Koernicke on *Rumex acetosa* L.: Yakushima (7, 21, 37).
- Puccinia aestivalis* Dietel on *Mazus miquelii* Makino var. *stolonifer* Nakai: Amamioshima (7, 10, 13, 37); on *Microstegium japonicum* Koidz. var. *somai* (Hayata) T. Koyama: Okinawajima (7, 37); on *Microstegium nudum* (Trin.) A. Camus: Nakanoshima (7, 14, 18, 37); Takarajima (7, 14, 18, 37); on *Microstegium vimineum* (Trin.) A. Camus: Amamioshima (18); Okinawajima (7, 37).
- Puccinia agropyri-ciliaris* Tai & Wei on *Agropyron ciliare* (Trin.) Franch.: Okinawajima (7, 10, 18, 37); Yakushima (7, 16, 18, 37); on *Agropyron tsukushiense* (Honda) Ohwi var. *transiens* (Hack.) Ohwi: Kuroshima (7, 15, 37).
- Puccinia ainsliaeae* P. Sydow & H. Sydow on *Ainsliaea apiculata* Sch. -Bip.: Yakushima (7, 16, 37).
- Puccinia allii* (de Candolle) Rudolphi on *Allium fistulosum* L.: Okinawajima (7, 10, 37); on *Allium scorodoprasum* L. var. *viviparum* Regel: Tokunoshima (7); Okinoerabushima (40); Tokunoshima (40); on *Allium tuberosum* Rottle: Amamioshima (40); Okinawajima (7, 37); Okinoerabushima (40); Tokunoshima (7, 40).
- Puccinia angelicae* (Schumacher) Fuckel on *Peucedanum japonicum* Thunb.: Ishigakijima (7, 11, 37); Kikaishima (7, 13, 37); Okinawajima (7, 10, 37); Senkaku Islands (7, 37); Yakushima (7, 16, 21, 31, 33, 37).
- Puccinia angustata* Peck on *Scirpus ternatanus* Reinw.: Tanegashima (7, 37); on *Scleria terrestris* (L.) Fassett: Ishigakijima (7, 9).
- Puccinia arthroxonis-ciliaris* Cummins on *Arthroxon hispidus* Makino: Amamioshima (7, 13, 18, 37); Ieshima (7, 37); Iheyajima (7, 37); Ishigakijima (7, 37); Kikaishima (7, 13, 18, 37); Izenajima (37); Kumejima (7, 37); Miyakojima (7, 37); Nakanoshima (7, 14, 18, 37); Okinawajima (3, 4, 7, 10, 18, 37); Takarajima (7, 14, 18, 37); Tanegashima (7, 18, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 18); Yonagunijima (7, 12, 18, 37); Yoronjima (39).
- Puccinia arundinellae-anomalae* Dietel on *Arundinella hirta* (Thunb.) Tanaka var. *ciliata* Koidz.: Yakushima (7, 16, 18, 21, 33, 37).
- Puccinia arundinis-donacis* T. Hiratsuka on *Arundo donax* L.: Miyakojima (7, 18, 37).
- Puccinia asparagi-lucidii* Dietel on *Asparagus cochinchinensis* Merr.: Tanegashima (7, 12, 37).
- Puccinia benguetensis* H. Sydow on *Microstegium ciliatum* (Trin.) A. Camus var. *wallichianum* (Nees) Honda: Okinawajima (3, 4).
- Puccinia benokiyamensis* Hiratsuka, f. on *Polygonum chinense* L.: Okinawajima (4, 7, 9, 10, 37); Yakushima (7, 16, 37).
- Puccinia brevicornis* S. Ito on *Phalaris arundinacea* L. var. *picta* L.: Okinawajima (7, 37); Tanegashima (7, 37); Yakushima (7, 37).
- Puccinia breviculmis* Dietel on *Carex breviculmis* R. Br.: Akusekijima (7, 14, 37); Iheyajima (7, 37); Kumejima (7, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tokunoshima (7); Yakushima (7, 12, 37); Yoronjima (39).
- Puccinia buxi* de Candolle on *Buxus microphylla* Sieb. & Zucc. var. *japonica* Rehd. & Wilson: Yakushima (7, 16, 21, 31, 37).
- Puccinia cacao* McAlpine on *Hemarthria sibirica* (Gandog.) Ohwi: Tanegashima (7, 18); Yakushima (7, 18, 21, 37).
- Puccinia calcitrapae* de Candolle var. *centaureae* (de Candolle) Cummins on *Cirsium yakushimense* Masamune: Yakushima (7, 16, 37); on *Cirsium mariimum* Makino: Yakushima (7).
- Puccinia canaliculata* (Schweinitz) Lagerheim on *Cyperus brevifolius* (Rottb.) Hassk.: Iriomotejima (7, 8); on *Cyperus compressus* L.: Iwojima (7, 15, 37); on *Cyperus distans* L., f.: Iriomotejima (7, 37); Yonagunijima

- (7, 37, 38); on *Cyperus polistachyos* Rottb.: Amamioshima (40); Tanegashima (7, 16, 37); Yakushima (7, 16, 33, 37); on *Cyperus* sp.: Yakushima (21).
- Puccinia caricis-blepharicarpae*** Hiratsuka, f. on *Smilax china* L.: Yakushima (33).
- Puccinia caricis-bootlianae*** Hiratsuka, f. on *Carex brunnea* Thunb.: Iheyajima (7, 37); Kumejima (7, 10, 37); Nakanoshima (14); Okinawajima (7, 37); Tokunoshima (7); Yakushima (7, 37); on *Farfugium japonicum* Kitamura: Amamioshima (7, 13, 32, 37); Iheyajima (7, 37); Iriomotejima (7, 8); Ishigakijima (7, 8); Kumejima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (4, 7, 10, 37); Takarajima (7, 14, 37); Yakushima (7, 16, 33, 37).
- Puccinia caricis-brunneae*** Dietel on *Carex brunnea* Thunb.: Iriomotejima (7, 37); Kuroshima (7, 15, 37); Tanegashima (7, 37); Yonagunijima (38); on *Carex cruciata* Wahlenb.: Yakushima (7, 37); on *Carex doniana* Spreng.: Ishigakijima (7, 9); Nakanoshima (7); Tanegashima (7); on *Carex warburgiana* Kukenth.: Okinawajima (7, 37).
- Puccinia caricis-japonicae*** Dietel on *Carex doniana* Spreng.: Yakushima (7, 21); Nakanoshima (14, 37); Tanegashima (37); Yakushima (37).
- Puccinia caricis-macrocephalae*** Dietel on *Carex pumila* Thunb.: Okinawajima (7, 10, 37); Tokunoshima (7, 40).
- Puccinia cenchri*** Dietel & Holway ex Holway on *Cenchrus calyculatus* Cav.: Ieshima (7, 18, 37); Iheyajima (7, 37); Iriomotejima (7); Ishigakijima (7, 12, 18, 37); Okinawajima (7, 12, 18, 37).
- Puccinia chaetochloae*** Arthur on *Pennisetum polystachyon*: Ishigakijima (7, 8).
- Puccinia chrysanthemi*** Roze on *Chrysanthemum japonense* (Makino) Nakai var. *crassum* Kitamura: Nakanoshima (7, 14, 37); on *Chrysanthemum morifolium* Ramat.: Amamioshima (7, 10, 13, 37); Okinawajima (7); Tanegashima (7).
- Puccinia citrina*** P. Sydow & H. Sydow on *Heterosmilax japonica* Kunth.: Amamioshima (7, 13, 37); Iheyajima (7, 37); Iriomotejima (7, 37); Kumejima (7, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Tokunoshima (7); Yonagunijima (7, 38); on *Smilax bracteata* Presl: Iriomotejima (7, 9); Ishigakijima (7, 8, 9, 37); Iwojima (7, 15, 37); Kuroshima (7, 37); Takeshima (7, 15, 37); on *Smilax china* L.: Iriomotejima (8); Ishigakijima (8); Okinawajima (4, 7, 10, 37); Tokunoshima (7); Yakushima (33); Yoronjima (39); on *Smilax planipeduncula* Hayata: Ishigakijima (7, 11, 37); on *Smilax* sp.: Iriomotejima (8, 9); Kumejima (7, 37); Okinawajima (9, 10, 37).
- Puccinia congesta*** Berkeley & Broome on *Polygonum chinense* L.: Akusekijima (7, 14, 37); Amamioshima (7, 10, 13, 37); Iriomotejima (7); Ishigakijima (7, 12, 37); Iwojima (7, 15, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 9, 10, 37); Suwanosejima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 16); Yakushima (7, 16, 21, 31, 33, 37).
- Puccinia convolvuli*** Castagne on *Calystegia soldanella* (L.) Roem. & Schult.: Amamioshima (7, 32, 37); Iheyajima (7, 37); Kumejima (7, 10, 37); Miyakojima (7, 37); Okinawajima (7, 10, 37); Tanegashima (7, 16, 37); Yakushima (7, 16, 21, 31, 33, 37); Yoronjima (39); on *Ipomoea denticulata* Chois.: Kumejima (7, 10, 37); Okinawajima (2, 4, 7, 10, 37).
- Puccinia coronata*** Corda on *Avena sativa* L.: Amamioshima (18); on *Lolium multiflorum* Lam.: Okinawajima (7, 10, 18, 37).
- Puccinia crepidis-integrae*** Hiratsuka, f. on *Crepidiastrum lanceolatum* Nakai: Amamioshima (7, 10, 13, 32, 37); Okinawajima (3, 4, 10, 37); Yakushima (7, 12, 33, 37); on *Crepidiastrum lanceolatum* Nakai forma *pinatilobum* (Maxim.) Nakai: Nakanoshima (7, 14, 37).
- Puccinia crepidis-japonicae*** Dietel on *Youngia japonica* DC.: Akusekijima (7, 14, 37); Amamioshima (7, 10, 37); Ieshima (7, 13, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 11, 37); Iwojima (15, 37); Kikaishima (7, 13, 37); Kumejima (7, 37); Kuroshima (15, 37); Minamidaitojima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 9, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 37); Yoronjima (39).
- Puccinia curculionis*** Raciborski on *Curculigo orchoides* Gaertner: Iriomotejima (7, 37); Ishigakijima (7, 11, 37).
- Puccinia cynodontis*** Lacroix ex Desmazieres on *Cynodon dactylon* (L.) Persoon: Amamioshima (7, 13, 18, 32, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 9, 11, 18); Ishigakijima (7, 37); Kotakarajima (7, 14, 18, 37);

- Kumejima (7, 37); Minamidaitojima (7, 37); Miyakojima (7, 37); Okinawajima (2, 4, 7, 10, 18, 37); Tanegashima (7, 12, 18, 37); Tokunoshima (7); Yagajisjima (7, 18, 37); Yakushima (7, 18, 37); Yonagunijima (38); Yoronjima (39).
- Puccinia dietelliana*** P. Sydow on *Lysimachia clethroides* Duby: Yakushima (7, 21, 37).
- Puccinia dioscoreae*** Komarov on *Dioscorea matsudai* Hayata: Ishigakijima (7, 37); on *Dioscorea septemloba* Thunb.: Kuroshima (7, 15, 37).
- Puccinia eleocharidis*** Arthur on *Eleocharis* cf. *congesta* D. Don var. *japonica* (Miq.) T. Koyama: Yakushima (33); on *Ligularia tussilaginea* (Burm., f.) Makino: Yakushima (22).
- Puccinia erebia*** P. Sydow & H. Sydow on *Clerodendrum inerme* (L.) Gaertn.: Amamioshima (7, 10, 13, 37); Iheyajima (7); Iriomotejima (7, 9); Ishigakijima (7, 11, 37); Izenajima (7, 37); Kikaishima (7, 13, 37); Kumejima (7, 10, 37); Miyakojima (7, 10, 11, 37); Okinawajima (2, 4, 7, 10, 37); Yonagunijima (7, 37, 38); Yoronjima (39).
- Puccinia erythropus*** Dietel on *Miscanthus sinensis* Anders.: Amamioshima (18, 37); Kitadaitojima (7, 37); Kumejima (7, 37); Minamidaitojima (7, 37); Okinawajima (2, 4, 7, 9, 10, 18, 37); Yakushima (7, 33, 37); on *Miscanthus sinensis* Anders. var. *condensatus* Makino: Kitadaitojima (37).
- Puccinia exhausta*** Dietel on *Clematis grata* Wall.: Iheyajima (7, 37); Ishigakijima (7, 10, 11); Kumejima (7, 37); Miyakojima (7, 10, 11, 37); Okinawajima (2, 4, 7, 10, 37); Yoronjima (39); Okinoerabushima (40); on *Clematis grata* Wall. var. *ryukyuensis* Tamura: Okinawajima (7, 9).
- Puccinia ferruginea*** Leveille on *Heterosmilax japonica* Kunth: Amamioshima (32); Yonagunijima (38); on *Smilax bracteata* Presl: Iheyajima (7, 37); Iriomotejima (7); Ishigakijima (7, 10, 37); Yonagunijima (7, 37, 38); *Smilax china* L.: Amamioshima (7, 10, 13, 37); Okinawajima (7, 10, 37); Tanegashima (7, 37); Yakushima (7, 16, 21, 31, 37); Yonagunijima (38); on *Smilax* sp.: Iriomotejima (8, 9); Ishigakijima (7, 8, 9); Okinawajima (7, 9, 10, 37).
- Puccinia ferruginosa*** P. Sydow & H. Sydow on *Artemisia princeps* Pamp.: Iheyajima (7, 37); Iriomotejima (7); Ishigakijima (7, 11, 37); Kumejima (7, 10, 37); Kuroshima (7, 15, 37); Okinawajima (2, 4, 7, 10, 37); Takeshima (7); Tokunoshima (7); Yakushima (7, 16, 21, 37); Yoronjima (39).
- Puccinia festucae*** Plowright on *Festuca* sp.: Okinawajima (7, 37).
- Puccinia flaccida*** Berkeley & Broome on *Oplismenus compositus* Beauv.: Amamioshima (40); Kuroshima (7, 15, 18, 37); Nakanoshima (7, 14, 18, 37); Okinawajima (3, 4, 7, 10, 18, 37); on *Oplismenus patens* Honda: Iriomotejima (7, 12, 18, 37); on *Oplismenus undulatifolius* Roem. & Schult. var. *japonicus* (Steud.) Koidz.: Tanegashima (7, 37); Yakushima (7, 21, 37).
- Puccinia flavipes*** P. Sydow & H. Sydow on *Fimbristylis dichotoma* (L.) Vahl: Amamioshima (7, 13, 37); Ishigakijima (7, 11, 37); Nakanoshima (7, 14, 37); Tanegashima (7, 16, 37); Yakushima (7, 37); Yonagunijima (7, 37, 38); on *Fimbristylis littoralis* Gaudich: Yonagunijima (38); on *Fimbristylis monostachyos* (L.) Hassk.: Iheyajima (7, 37); on *Fimbristylis tristachya* R. Br.: Nakanoshima (7, 14, 37).
- Puccinia glechomatis*** de Candolle ex Poir. on *Glechoma hederacea* L. var. *grandis* Kudo: Amamioshima (7, 10, 13, 37).
- Puccinia graminis*** Persoon on *Agropyron tsukushiense* (Honda) Ohwi var. *transiens* (Hack.) Ohwi: Yakushima (7, 37); on *Hordeum sativum* Jess. var. *hexastichon* Hack.: Ieshima (7, 37); Okinawajima (3, 4, 7, 10, 18, 37); on *Triticum aestivum* L.: Amamioshima (18); Ieshima (7, 37); Ishigakijima (7, 37); Miyakojima (7, 11, 18, 37); Okinawajima (3, 4, 7, 10, 18, 37).
- Puccinia hashioakai*** Hiratsuka, f. on *Epipremnum mirabile* Schott: Iriomotejima (7, 11, 37); Okinawajima (3, 4, 7, 10, 37).
- Puccinia hemerocallidis*** Thuemen on *Hemerocallis aurantiaca* Baker: Miyakojima (7, 37); on *Hemerocallis fulva* (L.) L. var. *kwanso* Regel.: Amamioshima (7, 10, 37); Kumejima (37); Kuroshima (7, 37); Miyakojima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Tanegashima (7, 37); Yakushima (21, 31, 37); on *Hemerocallis fulva* (L.) L. var. *sempervirens*: Amamioshima (7); Tanegashima (7); Yakushima (7); on *Hemerocallis longituba* Miq.: Amamioshima (13); Kuroshima (15); Tanegashima (16); Yakushima (16); on *Hemerocallis* sp.: Amamioshima (7, 10, 32, 37); Iriomotejima (7, 9); Okinawajima (9); Yakushima (33).
- Puccinia hordei*** Oth on *Hordeum sativum* Jess. var. *hexastichon* Hack.: Amamioshima (3, 7, 10, 13, 18, 37);

- Okinawajima (3, 4, 7, 10, 18, 37); on *Hordeum sativum* Jess. var. *vulgare* Hack. f. *coeleste* Makino: Okinawajima (7, 12, 37).
- Puccinia horiana* Hennings on *Chrysanthemum morifolium* Ramat.: Okinawajima (7).
- Puccinia infra-aequatorialis* Joerstad on *Cirsium japonicum* DC.: Kuroshima (7, 15, 37).
- Puccinia jogashimensis* Hiratsuka, f. & S. Kaneko on *Peucedanum japonicum* Thunb.: Ishigakijima (7); Kikaishima (7); Okinawajima (7); Senkaku Islands (7); Tokunoshima (7); Yakushima (7).
- Puccinia juncelli* Dietel on *Juncellus serotinus* Clarke: Amamioshima (40); Ishigakijima (7, 11, 37); Tanegashima (7, 12, 37); Yakushima (7).
- Puccinia kuehnii* Butler on *Saccharum arundinaceum* Retzius: Okinawajima (2, 4, 7, 10, 18, 37); on *Saccharum officinarum* L.: Miyakojima (7, 18, 37).
- Puccinia kusanoi* Dietel on *Pleioblastus hindsii* Nakai: Akusekijima (7, 14, 18, 37); Amamioshima (40); Iwojima (7, 15, 18, 37); Kuroshima (7, 18, 37); Suwanosejima (7, 14, 18, 37); Takarajima (7, 14, 18, 37); on *Pleioblastus linearis* Nakai: Iriomotejima (7, 8); Ishigakijima (8); Kumejima (7, 37); Okinawajima (4, 7, 10, 18, 37); Yonagunijima (38); on *Pleioblastus* sp.: Okinawajima (7).
- Puccinia kyllingiae-brevifoliae* Miura ex S. Ito & Homma on *Kyllingia brevifolia* Rottb. var. *leiolepis* (Fr. & Sav.) Hara: Kuroshima (7, 15, 37); Miyakojima (7, 12, 37); Okinawajima (2, 4, 7, 10, 37); Yakushima (7, 16, 37).
- Puccinia lactucae-debills* Dietel on *Ixeris dentata* Nakai: Tanegashima (7, 37); Yakushima (7, 16, 21, 37); on *Ixeris dentata* Nakai var. *alpicola* Ohwi: Yakushima (7, 16, 37); on *Ixeris japonica* (Burm.) Nakai: Iriomotejima (7, 8); Kuroshima (7, 15, 37); Miyakojima (7, 37); Nakanoshima (7, 37); Okinawajima (4, 7, 10, 37); Tokunoshima (7); Yoronjima (39); on *Ixeris nakazonei* Kitamura: Kumejima (37); Okinawajima (10, 37); on *Ixeris stolonifera* A. Gray: Okinawajima (2, 4, 7, 10, 37); Tanegashima (7, 16).
- Puccinia lactucae-denticulatae* Dietel on *Youngia denticulata* Nakai: Miyakojima (7, 37); Yakushima (7, 16, 37).
- Puccinia lactucae-repentis* Miyabe & T. Miyake on *Ixeris repens* A. Gray: Iheyajima (7, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Tokunoshima (7, 40).
- Puccinia lantanae* W. G. Farlow on *Justicia procumbens* L. var. *hayatae* (Yamam.) Ohwi: Yonagunijima (38); on *Justicia procumbens* L. var. *leucantha* Honda: Ishigakijima (8, 11); Kuroshima (7, 15, 37); Tanegashima (7, 16, 37); Yakushima (7, 16, 37); on *Justicia procumbens* L. var. *riukiensis* Yamam.: Amamioshima (7, 13, 37); Iriomotejima (7); Ishigakijima (7, 37); Tokunoshima (7, 13, 37).
- Puccinia lapsanae* Fuckel on *Lapsana humilis* Makino: Amamioshima (7, 10, 13, 37).
- Puccinia lepturi* Hiratsuka, f. on *Lepturus repens* R. Br.: Iheyajima (7, 37); Ishigakijima (7, 11, 18, 37); Kumejima (7, 37); Okinawajima (4, 7, 10, 18, 37); Tokunoshima (7, 40); Yagajishima (37); Yonagunijima (38).
- Puccinia levis* (Saccardo & Bizzozero) Magnus on *Digitaria adscendens* (H. B. K.) Henrard: Amamioshima (32); Ieshima (7, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 37); Kumejima (7); Minamidaitojima (37); Minnajima (37); Okinawajima (7, 9, 37); Takarajima (7, 14, 18, 37); Yakushima (7, 37); Yonagunijima (7, 37, 38); Yoronjima (39); on *Digitaria adscendens* (H. B. K.) Henrard var. *evalvula* Honda: Kotakarajima (7, 14, 37); on *Digitaria sasakii* (Honda) Tuyama: Amamioshima (18); Okinawajima (3, 4, 7, 10, 18, 37); on *Digitaria timorensis* (Kunth) Balansa var. *hirsuta* (Ohwi) Henrard: Kotakarajima (18); Okinawajima (3, 4, 7, 10, 18, 37).
- Puccinia ligusticicola* T. Miyake on *Angelica japonica* A. Gray: Amamioshima (7); Okinawajima (7).
- Puccinia lophatheri* (P. Sydow & H. Sydow) Hiratsuka, f. on *Lophatherum gracile* Brongon: Amamioshima (7, 10, 13, 18, 32, 37); Iheyajima (37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 9, 11, 18, 37); Okinawajima (2, 4, 7, 10, 18, 37); Tokunoshima (7, 13, 18, 37); Yonagunijima (7, 37, 38).
- Puccinia magnusiana* Koernicke on *Phragmites communis* Trin.: Amamioshima (18); on *Phragmites japonica* Steud.: Okinawajima (7, 10, 18, 37); on *Phragmites karka* (Retz.) Trin.: Iriomotejima (7, 18, 37).
- Puccinia metanarthecii* Patouillard on *Metanarthecium luteo-viride* Maxim. var. *nutans* Masam.: Yakushima (7, 16, 37).
- Puccinia microspora* Dietel on *Hemarthria* sp.: Okinawajima (7, 9).
- Puccinia minussensis* Thuemen on *Lactuca indica* L.: Amamioshima (7, 10, 13, 37); Ieshima (7, 37); Iheyajima

- (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 8); Kumejima (7, 37); Kuroshima (7, 15, 37); Minamidaitojima (7, 37); Miyakojima (11); Okinawajima (2, 4, 7, 10, 37); Yoronjima (39); on *Lactuca indica* L. var. *dracoglossa* Kitamura: Okinawajima (7, 37).
- Puccinia miscanthi*** Miura on *Imperata cylindrica* (L.) Beauv. var. *major* C. E. Hubb.: Iriomotejima (7); Ishigakijima (7, 8); on *Miscanthus floridulus* (Labill.) Warb.: Yoronjima (39); on *Miscanthus sinensis* Anders.: Iheyajima (37); Iriomotejima (7, 9); Ishigakijima (7, 11, 18, 37); Miyakojima (7, 11, 18, 37); Okinawajima (7, 10, 18, 37); Takarajima (7, 14, 18, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 18, 21); Yoronjima (39); on *Miscanthus sinensis* Anders. var. *condensatus* Makino: Akusekijima (7, 14, 18, 37); Amamioshima (7, 18, 37); Iwojima (7, 15, 18, 37); Kakeromajima (18, 37); Kuroshima (7, 15, 18, 37); Minamidaitojima (7, 37); Nakanoshima (7, 18, 14); Okinawajima (7, 10, 18, 37); Suwanosejima (7, 14, 18, 37); Takeshima (7, 15, 18, 37).
- Puccinia miyoshiana*** Dietel on *Bothriochloa parviflora* (R. Br.) Ohwi: Okinawajima (7, 10, 18, 37); on *Eccoilopus coulifer* (Thunb.) A. Camus: Amamioshima (40); Kumejima (7, 37); Okinawajima (3, 4, 7, 10, 18, 37); Okinoerabushima (40); Tanegashima (7, 16, 18, 37); Tokunoshima (7, 40).
- Puccinia nakanishikii*** Dietel on *Bothriochloa intermedia* (R. Br.) A. Camus: Yonagunijima (38); on *Bothriochloa parviflora* (R. Br.) Ohwi: Okinawajima (4); on *Cymbopogon citratus* Stapf: Takarajima (7, 18, 37); Tanegashima (7, 18); Yakushima (7, 18, 37); on *Cymbopogon tortilis* (Presl) A. Camus: Ieshima (7, 37); Miyakojima (7, 18, 37); Okinawajima (7, 18, 37); Yakushima (7, 21, 33, 37); Yoronjima (39).
- Puccinia nanbuana*** Hennings on *Angelica kiusiana* Maxim.: Amamioshima (13, 37); Okinawajima (4, 10, 37); on *Angelica shikokiana* Makino: Yakushima (7, 16, 21, 37).
- Puccinia nishidana*** Hennings on *Cirsium brevicaulis* A. Gray: Okinawajima (4, 7, 10, 37); on *Cirsium maritimum* Makino: Yakushima (7, 16, 21, 31, 37).
- Puccinia oahuensis*** Ellis & Everhart on *Digitaria adscendens* (H. B. K.) Henrard: Kumejima (7, 37); Miyakojima (7, 37); Okinoerabushima (40); on *Digitaria decumbens*: Iriomotejima (7); Ishigakijima (7, 8); on *Digitaria sasakii* (Honda) Tuyama: Kitadaitojima (7, 37); Kumejima (7, 37); Minamidaitojima (7, 37); Okinawajima (7, 10, 18, 37); Okinoerabushima (40); on *Digitaria timorensis* (Kunth) Bal. var. *hirsuta* (Ohwi) Henrard: Iheyajima (7, 37); Okinawajima (7, 10, 18, 37); on *Digitaria violascens* Link: Amamioshima (40); Iheyajima (7, 37); Iriomotejima (7, 8); Ishigakijima (7, 11, 18, 37); Izenajima (7); Kumejima (7, 37); Minamidaitojima (7, 37); Okinawajima (7, 10, 18, 37); Tokunoshima (7, 40); Yakushima (7, 16, 18, 21, 37); Yonagunijima (38); on *Digitaria* sp.: Okinawajima (10, 18, 37).
- Puccinia oenanthes-stoloniferae*** S. Ito ex Tranzschel on *Oenanthe javanica* (Bl.) DC.: Amamioshima (7, 13, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 21, 37).
- Puccinia ophiopogonis*** Cummins on *Ophiopogon jaburan* Lodd.: Okinawajima (?) (7, 10, 37).
- Puccinia oxalidis*** Dietel & Ellis on *Oxalis corymbosa* DC.: Tanegashima (7).
- Puccinia panici-montani*** Ramachar & Cummins on *Setaria palmifolia* Stapf: Okinawajima (7, 9, 10, 18, 37); Yakushima (7, 16, 18, 37).
- Puccinia paspalina*** Cummins on *Paspalum orbiculare* G. Forst.: Amamioshima (7, 13, 18, 32, 37); Ishigakijima (7, 8); Kumejima (7, 37); Minamidaitojima (7, 37); Miyakojima (7, 18); Nakanoshima (7, 14, 18, 37); Okinawajima (4, 7, 10, 18, 37); Takarajima (7, 14, 18, 37); Tokunoshima (7); Yakushima (7, 16, 18, 22, 37); Yonagunijima (7, 12, 18, 37, 38); Yoronjima (39).
- Puccinia patriniae*** Hennings on *Patrinia villosa* Juss.: Nakanoshima (7, 14, 37); Yakushima (7, 16, 21, 31, 37).
- Puccinia phellopteri*** P. Sydow & H. Sydow on *Glehnia littoralis* Fr. Schmidt: Iheyajima (7, 37); Kumejima (7, 10, 37); Okinawajima (7, 10, 37); Takarajima (7, 14, 37); Tokunoshima (7); Yakushima (7, 21, 37); Yoronjima (39).
- Puccinia philippinensis*** P. Sydow & H. Sydow on *Cyperus polystachyos* Rottb.: Nakanoshima (7, 14, 37); on *Cyperus rotundus* L.: Ishigakijima (7, 11, 37); Kitadaitojima (7, 37); Minamidaitojima (7, 37); Okinawajima (2, 4, 7, 10, 37); Yonagunijima (38).
- Puccinia phragmitis*** (Schumacher) Koernicke on *Phragmites japonica* Steud.: Okinawajima (3, 4, 7, 10, 18, 37).
- Puccinia phyllostachydis*** Kusano on *Alundinaria linearis* Hack.: Yonagunijima (38); on *Bambusa multiplex*

- (Lour.) Raeusch.: Iheyajima (7, 37); Yakushima (7, 37); on *Phyllostachys aurea* A. & C. Riviere: Amamioshima (7, 13, 18, 37); Iheyajima (7, 37); Ishigakijima (7, 11, 18, 37); Kitadaitojima (7, 37); Kumejima (7, 10, 18, 37); Minamidaitojima (7, 37); Okinawajima (4, 7, 10, 18, 37); Takarajima (7, 14, 18, 37); Tokunoshima (7); Yonagunijima (7, 37, 38); on *Phyllostachys bambusoides* Sieb. & Zucc.: Amamioshima (32); Iheyajima (7); Nakanoshima (7, 14, 18, 37); Yakushima (7, 12, 18, 37); on *Phyllostachys* sp.: Iriomotejima (7, 9).
- Puccinia pogonatheri*** Petch on *Pogonatherum crinitum* (Thunb.) Kunth.: Amamioshima (7, 13, 18, 37); Ishigakijima (7, 8); Okinawajima (7, 10, 18); Yakushima (7, 12, 18, 37).
- Puccinia pollinicola*** H. Sydow ex H. Sydow & Petrak on *Microstegium ciliatum* (Trin.) A. Camus: Yonagunijima (38); Yoronjima (39); on *Microstegium vimineum* (Trin.) A. Camus: Okinawajima (7, 10, 18, 37); Yakushima (7, 16, 18, 37); on *Microstegium vimineum* (Trin.) A. Camus forma *polystachyum* (Fr. & Sav.) T. Koyama: Izenajima (7, 37); Nakanoshima (7, 14, 18, 37); Yakushima (21).
- Puccinia polygoni-amphibii*** Persoon var. *tovariae* Arthur on *Antenoron filiforme* (Thunb.) Roberty & Vautier: Yakushima (7, 16, 37); on *Polygonum chinense* L.: Yakushima (33); on *Polygonum cuspidatum* Sieb. & Zucc.: Amamioshima (7, 37); Iwojima (7, 37); Suwanosejima (7, 37); on *Polygonum japonicum* Meisn.: Amamioshima (10, 13, 32); Iwojima (15); Suwanosejima (14); on *Polygonum multiflorum* Thunb.: Okinawajima (3, 4, 7, 10, 37); on *Polygonum senticosum* (Meisn.) Fr. & Sav.: Yakushima (7, 37); on *Polygonum thunbergii* Sieb. & Zucc.: Yakushima (7, 16, 21, 37).
- Puccinia purpurea*** Cooke on *Cymbopogon citratus* Stapf: Takarajima (7, 14, 37); on *Sorghum bicolor* (L.) Moench.: Iriomotejima (7); Ishigakijima (7, 11, 18, 37); Nakanoshima (7, 14, 18, 37); Takarajima (7, 14, 18, 37); Yoronjima (39); on *Sorghum halepense* (L.) Pers.: Minamidaitojima (7, 37); Okinawajima (7, 10, 18, 37); on *Sorghum sudanense* Hitchc.: Okinawajima (7, 10, 18, 37).
- Puccinia pusilla*** P. Sydow & H. Sydow on *Bothriochloa assimilis* (Steud.) Ohwi: Amamioshima (18); Iheyajima (7, 37); Ishigakijima (7, 8, 37); Kumejima (7, 37); Okinawajima (7, 10, 18, 37); Yakushima (7, 16, 18, 21, 33, 37); Yonagunijima (7, 37, 38); on *Bothriochloa spicigera* (Benth.) T. Koyama: Tokunoshima (7).
- Puccinia recondita*** Roberge ex Desmazieres on *Agropyron tsukushiense* (Honda) Ohwi var. *transiens* (Hack.) Ohwi: Ishigakijima (7); Miyakojima (7); Okinawajima (4, 7, 10, 18, 37); Tanegashima (7, 37); Yakushima (7, 16, 18, 37); Yoronjima (39); on *Agrostis exarata* Trin. var. *nukabo* (Ohwi) T. Koyama: Iriomotejima (7, 9); Nakanoshima (7, 14, 18, 37); on *Triticum aestivum* L.: Ishigakijima (7, 12, 18, 37); Miyakojima (7, 37); Okinawajima (7, 18, 37).
- Puccinia rufipes*** Dietel on *Imperata cylindrica* (L.) Beauv. var. *major* C. E. Hubb.: Amamioshima (7, 13, 18, 37); Iheyajima (7, 37); Ishigakijima (7, 8, 11, 18, 37); Iwojima (7, 15, 18, 37); Kitadaitojima (7, 37); Kuroshima (7, 15, 18, 37); Miyakojima (7); Nakanoshima (7, 14, 18, 37); Okinawajima (2, 4, 7, 10, 18, 37); Suwanosejima (7, 14, 37); Takarajima (7, 18, 37); Takeshima (7, 14, 15, 18, 37); Tanegashima (7, 16, 18, 37); Yakushima (7, 16, 18, 22, 31, 37); Yonagunijima (7, 37, 38); Yoronjima (39).
- Puccinia schedonnardi*** Kellerman & Swingle on *Muehlenbergia japonica* Steud.: Tanegashima (7, 37).
- Puccinia scirpi-ternatani*** Hiratsuka, f. on *Scirpus ternatanus* Reinwardt: Amamioshima (7, 10, 13, 37); Okinawajima (4, 7, 10, 37); on *Scleria levis* Retz.: Iriomotejima (7, 37).
- Puccinia scleriae*** (Pazschke) Arthur on *Scleria terrestris* (L.) Fassett: Akusekijima (7, 14, 37); Amamioshima (7, 10, 13, 37); Iriomotejima (7, 9); Ishigakijima (7, 8, 9, 11, 37); Kumejima (7, 10, 15, 37); Kuroshima (7, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 37); Yonagunijima (38).
- Puccinia smilacis-sieboldii*** Hiratsuka, f. on *Smilax china* L.: Amamioshima (7, 10, 13, 37); Iheyajima (7, 37); Iriomotejima (7); Kumejima (7, 37); Nakanoshima (7, 37); Okinawajima (7); Suwanosejima (7, 37); Takarajima (7, 14, 37); Yakushima (7, 16, 37); on *Smilax china* L. var. *kuru* Sakaguchi ex Yamamoto: Iriomotejima (7, 9); Iheyajima (37); on *Smilax nervo-marginata* Hayata: Amamioshima (32); Kumejima (7, 10, 37); Okinawajima (7, 10, 37); on *Smilax* sp.: Nakanoshima (7).
- Puccinia sorghi*** Schweinitz on *Zea mays* L.: Okinawajima (7, 10, 18, 37).
- Puccinia stauntoniae*** Tranzschel & Dietel on *Stauntonia hexaphylla* Decne.: Amamioshima (7, 13, 37); Okinawajima (7, 10, 37).
- Puccinia taiwaniana*** Hiratsuka, f. & Hashioka on *Panicum patens* L.: Okinawajima (3, 4, 7, 10, 18, 37).

- Puccinia thaliae*** Dietel on *Canna generalis* Bailey: Iriomotejima (7, 8); Ishigakijima (7, 8); on *Canna indica* L.: Iriomotejima (7, 37); Ishigakijima (7).
- Puccinia tokyensis*** P. Sydow & H. Sydow on *Cryptotaenia japonica* Hassk.: Amamioshima (7, 13, 32, 37); Kuroshima (7, 15, 37); Okinawajima (4, 7, 10, 37); Yakushima (7, 12, 37).
- Puccinia variformis*** Patouillard on *Hoya carnosa* R. Br.: Amamioshima (7, 10, 13, 37); Iheyajima (7, 37); Takarajima (7, 37); Tanegashima (7, 37); Yakushima (7, 16, 22, 31, 33, 37).
- Puccinia velutina*** Kakishima & S. Sato on *Elaeagnus glabra* Thunb.: Amamioshima (40); Iheyajima (7, 37); Izenajima (7, 37); Kumejima (7, 37); Kuroshima (7, 15, 37); Okinawajima (7, 10, 37); Okinoerabushima (40); Tanegashima (7, 37); Tokunoshima (7, 12, 40); Yonagunijima (7, 37, 38); on *Elaeagnus macrophylla* Thunb.: Miyakojima (7, 37); Takeshima (7, 15, 37); on *Elaeagnus maritima* Koidz.: Yakushima (7, 22, 37); on *Elaeagnus thunbergii* Serb.: Takarajima (7, 14, 37).
- Puccinia versicolor*** Dietel & Holway on *Heteropogon contortus* Beauv.: Okinawajima (3, 4, 7, 10, 18, 37).
- Puccinia violae*** de Candolle on *Viola coreana* H. Boiss.: Nakanoshima (7, 14, 37); on *Viola mandshurica* W. Beck.: Yakushima (7, 22, 37).
- Puccinia wattiana*** Barclay on *Clematis meyeniana* Walp.: Amamioshima (7, 10, 13, 37); Iheyajima (7, 37); Kumejima (7, 10, 37); Nakanoshima (7, 14, 37); Okinawajima (7); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); on *Clematis tashiroi* Maxim.: Kumejima (7, 37); Okinawajima (2, 4, 7, 10, 37).
- Puccinia zoysiae*** Dietel on *Paederia scandens* (Lour.) Merr. var. *mairi* (Lev.) Hara: Akusekijima (7, 14, 37); Amamioshima (7, 13, 32, 37); Iriomotejima (7, 9); Ishigakijima (7, 11, 37); Izenajima (7, 37); Kikaishima (7, 37); Kitadaitojima (7, 37); Kumejima (7, 37); Miyakojima (7, 10, 37); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 9, 10, 37); Senkaku Islands (7); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 22, 37); Yonagunijima (38); on *Zoysia japonica* Steud.: Okinawajima (10, 18); on *Zoysia macrostachya* Fr. & Sav.: Okinawajima (4, 7, 18, 37); on *Zoysia matrella* (L.) Merr.: Okinawajima (18); Yoronjima (39); on *Zoysia sinica* Hance: Okinawajima (4, 7, 10, 18, 37); on *Zoysia sinica* Hance var. *nipponica* Ohwi: Okinawajima (7, 10, 37); Yagajishima (37); on *Zoysia tenuifolia* Willd.: Iriomotejima (7); Ishigakijima (7, 37); Izenajima (7, 37); Kitadaitojima (7, 37); Minamidaitojima (7, 37); Okinawajima (4, 7, 10, 18, 37); Yoronjima (39).
- Pucciniastrum actinidiae*** Hiratsuka, f. on *Actinidia arguta* (Sieb. & Zucc.) Planch var. *rufa* (Sieb. & Zucc.) Maxim.: Amamioshima (7, 13, 32, 37); Iriomotejima (37); Ishigakijima (7); Miyakojima (7); Nakanoshima (7, 14, 37); Okinawajima (7, 9, 10, 37); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 37).
- Pucciniastrum agrimoniae*** (Dietel) Tranzschel on *Agrimonia pilosa* Ledeb. var. *japonica* (Miq.) Nakai: Amamioshima (7, 10, 13, 32, 37); Kuroshima (7, 15, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Tanegashima (7, 16, 37); Yakushima (7, 16, 37).
- Pucciniastrum boehmeriae*** P. Sydow & H. Sydow on *Boehmeria frutescens* Thunb. var. *viridula* Suzuki: Kikaishima (7, 13, 37); on *Boehmeria holocericea* Bl.: Yakushima (7, 37); on *Boehmeria* sp.: Yakushima (7, 16, 37).
- Pucciniastrum corni*** Dietel on *Cornus kuosa* Buerger ex Hance: Yakushima (7, 16, 37).
- Pucciniastrum hikosanense*** Hiratsuka, f. on *Acer insulare* Makino: Amamioshima (7, 13, 32, 37).
- Pucciniastrum hydrangeae-petiolariidis*** Hiratsuka, f. on *Hydrangea petiolaris* Sieb. & Zucc.: Yakushima (7, 16, 21, 37).
- Pucciniastrum kusanoi*** Dietel on *Clethra barbinervis* Sieb. & Zucc.: Yakushima (7, 21, 33, 37).
- Pucciniastrum potentillae*** Komarov on *Potentilla freyniana* Bornm.: Amamioshima (7, 32).
- Pucciniastrum styracinum*** Hiratsuka on *Styrax japonica* Sieb. & Zucc.: Amamioshima (7, 10, 13, 37); Iriomotejima (7, 9); Ishigakijima (7, 8, 9); Kikaishima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (9); Tanegashima (7, 16, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 33, 37); on *Styrax japonica* Sieb. & Zucc. var. *kotoensis* Masam.: Iheyajima (7, 37); Okinawajima (7, 10, 37).
- Pucciniostele clarkiana*** (Barclay) Dietel on *Astilbe thunbergii* Miq. var. *terrestris* Ohwi: Yakushima (7, 16, 37).
- Pucciniostele hashlokai*** (Hiratsuka, f.) Cummins on *Ampelopsis leoides* (Maxim.) Planch.: Yakushima (7, 37).



- Ravenella hobsoni* Cooke on *Pongamia pinnata* Merr.: Iheyajima (7, 37); Ishigakijima (7, 37); Kumejima (7, 37); Miyakojima (7, 10, 11, 37); Okinawajima (2, 4, 7, 10, 37); Yonagunijima (7, 37, 38).
- Ravenella tephrosiicola* Hiratsuka, f. on *Tephrosia candida* DC.: Okinawajima (2, 4, 7, 10, 37).
- Skierka agallocha* Rachiborski on *Excoecaria agallocha* L.: Okinawajima (3, 4, 7, 17, 37).
- Sphaerophragmium acaciae* (Cooke) Magnus on *Albizzia lebbek* Benth.: Okinawajima (7, 37).
- Thekopsora vaccinii* (Winter) Hiratsuka, f. on *Hugeria japonica* (Miq.) Nakai: Yakushima (7, 37).
- Tranzschelia discolor* (Fuckel) Tranzschel & Litwinow on *Prunus salicina* Lindl. var. *typica* Nakai: Amamioshima (13, 37); Okinawajima (7, 37).
- Triphragmium pulchrum* Raciborski on *Derris elliptica* (Roxb.) Benth.: Iriomotejima (7, 8).
- Uredinopsis kameiana* Faull on *Pteridium aquilinum* Kuehn var. *latiusculum* Underw.: Okinawajima (7); Yakushima (7, 21, 37).
- Uredinopsis pteridis* Dietel & Holway ex Dietel on *Pteridium aquilinum* Kuehn. var. *latiusculum* Underw.: Amamioshima (7, 13, 32, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 10, 37); Yakushima (7, 16, 21, 31, 37).
- Uredo alocasiae* P. Sydow & H. Sydow on *Alocasia macrohiza* Schott.: Akusekijima (7, 14, 37); Amamioshima (7, 13, 37); Iriomotejima (7); Ishigakijima (7, 11, 37); Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37); Okinawajima (3, 4, 7, 10, 37); Tokunoshima (7); Yakushima (7, 12, 37).
- Uredo amami-oshimaensis* Y. Morimoto on *Ligustrum ovalifolium* Hassk.: Amamioshima (32).
- Uredo arisanense* (Hiratsuka, f.) Hiratsuka, f. on *Athyrium elegans* Tagawa: Yakushima (7).
- Uredo bromi-pauciflorae* S. Ito on *Bromus remotiflorus* Ohwi: Tanegashima (7, 37); Yakushima (7, 37).
- Uredo cassiae-glaucæ* P. Sydow & H. Sydow on *Cassia surattensis* Burm., f.: Ishigakijima (7, 8).
- Uredo cryptogrammes* (Dietel) Hiratsuka, f. on *Onychium japonicum* Kunze: Okinawajima (7, 37); Tanegashima (7, 37); Yakushima (7, 37).
- Uredo dianellae* Dietel on *Dianella ensifolia* Red.: Amamioshima (7, 13, 32, 37); Ishigakijima (7, 11, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 10, 37); Suwanosejima (7, 14, 37); Takarajima (7, 14, 37); Takeshima (7, 15, 37); Yakushima (7, 16, 22, 31, 37).
- Uredo diplazii* (Hiratsuka, f.) Hiratsuka, f. on *Diplazium hachijoense* Nakai: Yakushima (7, 16, 21, 31, 37).
- Uredo ehretiae* Barclay on *Ehretia dicksoni* Hance.: Iriomotejima (7, 37); Kumejima (7, 37); Miyakojima (7, 37).
- Uredo fagarae* P. Sydow & H. Sydow on *Zanthoxylum nitidum* (Roxb.) DC.: Ishigakijima (7, 11, 37).
- Uredo gardeniae-floribundae* Hiratsuka, f. on *Gardenia jasminoides* Ell. var. *grandiflora* Nakai: Amamioshima (3, 7, 10, 13, 37); Okinawajima (7, 10, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 37).
- Uredo guettardae* Hiratsuka, f. & Hashioka on *Guettarda speciosa* L.: Ishigakijima (7, 11, 37).
- Uredo hiratsukai* (Y. Morimoto) Uchida on *Plagiogyria adnata* (Bl.) Bedd.: Amamioshima (7); Yakushima (7); on *Plagiogyria japonica* Nakai: Amamioshima (7, 32); Yakushima (7, 21, 31).
- Uredo horikawai* Y. Morimoto on *Diospyros morriniana* Hance: Yakushima (7, 16, 22, 31, 33, 37).
- Uredo iriomotense* Hiratsuka, f. & S. Kaneko on *Ludwigia octovalvis* (Jacq.) Raven var. *sessiliflora* (Mich.) Raven: Iriomotejima (7, 9).
- Uredo iyoensis* Hiratsuka, f. & Yoshinaga on *Viola grypceras* A. Gray: Kuroshima (7, 15, 37).
- Uredo lasianthi* H. Sydow on *Mephitidia plaginophylla* Nakai: Amamioshima (7, 10, 13, 37).
- Uredo leucaenae-glaucæ* Hiratsuka, f. & Hashioka on *Acacia farnesiana* Willd.: Ishigakijima (7, 37).
- Uredo morifolia* Sawada on *Morus australis* Poir.: Iriomotejima (7, 9); Ishigakijima (37); Iwojima (37); Yakushima (37).
- Uredo morindae* Y. Morimoto on *Morinda umbellata* L.: Amamioshima (32).
- Uredo nankaiensis* S. Uchida on *Lindsaea chienii* Ching: Yakushima (7).
- Uredo ophiorrhizae* Petch on *Ophiorrhiza japonica* Bl. var. *acutiloba* (Hey.) Ohwi: Iriomotejima (7, 8); Ishigakijima (7, 8).
- Uredo paederiae* P. Sydow & H. Sydow on *Paederia scandens* (Lour.) Merr. var. *mairei* (Lev.) Hara: Iriomotejima (7, 9).
- Uredo pipturi* (H. Sydow) Hiratsuka, f. on *Pipturus arborescens* C. B. Clarke: Iriomotejima (7, 37); Ishigakijima (7, 37).

- Uredo polygalaecola* Hiratsuka, f. on *Polygala japonica* Houtt.: Takarajima (7, 14, 37); Yakushima (7, 16, 37).
- Uredo polypodii-superficialis* (Hiratsuka, f.) Hiratsuka, f. on *Colysis pothifolia* (Don) Presl.: Yakushima (7, 16, 21, 31, 37).
- Uredo psychotricola* Hennings on *Psychotria luikiuensis* Hatsusima: Iheyajima (7, 37); Iriomotejima (7, 9, 11, 37); Kumejima (7, 10, 37); Okinawajima (7, 37); Okinoerabushima (40); Tokunoshima (7, 40).
- Uredo sawadae* S. Ito & Otani ex S. Ito & Murayama on *Ficus carica* L.: Amamioshima (7, 13, 37); Minamidaitojima (7, 37); Okinawajima (7, 37); Tanegashima (7, 12, 37); Yakushima (7, 12, 37); on *Ficus wightiana* Wall.: Minamidaitojima (7, 37).
- Uredo sinensis* Trotter on *Cudrania cochinchinensis* (Lour.) Kudo & Masamune var. *gerontogea* (Sieb. & Zucc.) Kudo & Masamune: Ishigakijima (7, 11, 37).
- Uredo stachyuri* Dietel on *Stachyurus matsuzakii* Nakai: Amamioshima (7, 37); Yakushima (7, 16, 37).
- Uredo tenuis* (Fauil) Hiratsuka, f. on *Nephrolepis auriculata* (L.) Trimen: Okinawajima (7, 10, 37); Yakushima (7, 16, 21, 31, 37).
- Uredo tylophorae* (Y. Morimoto) Hiratsuka, f. on *Tylophora japonica* Miq.: Amamioshima (7, 32).
- Uredo yakushimensis* Y. Morimoto on *Psychotria serpens* L.: Yakushima (7, 16, 22, 31, 37).
- Uredo yuwandakensis* Y. Morimoto on *Smilax biflora* Sieb. ex Miq.: Amamioshima (32).
- Uromyces acori* Ramakrishnan & Rangaswami on *Acorus asiaticus* Nakai: Amamioshima (7, 10, 13, 37); Ishigakijima (7); Kikaishima (7, 13, 37); Okinawajima (2, 4, 7, 10, 37); Tokunoshima (7, 13, 37).
- Uromyces amurensis* Komarov on *Maackia tashiroi* Makino: Kikaishima (7, 37); Kuroshima (7, 15, 37); Miyakojima (7, 37); Takarajima (7, 14, 37); Yakushima (7, 21, 37).
- Uromyces anthyllidis* Schröeter on *Melilotus suaveolens* Ledeb.: Miyakojima (7); Okinawajima (7).
- Uromyces appendiculatus* (Persoon) Unger on *Phaseolus angularis* (Willd.) Wight: Iriomotejima (7, 11, 37); Ishigakijima (37); Kikaishima (7, 13, 37); Miyakojima (7, 10, 11, 37); Okinawajima (7); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Tokunoshima (7); Yakushima (7); on *Phaseolus angularis* (Willd.) Wight, f. *nipponensis* (Ohwi) Kitamura: Ishigakijima (37); Okinawajima (7, 37); on *Phaseolus vulgaris* L.: Amamioshima (7, 13, 37); Iheyajima (37); Iriomotejima (7); Ishigakijima (7, 12, 37); Kikaishima (7); Miyakojima (7); Okinawajima (4, 7, 10, 37); Takarajima (7); Tanegashima (7, 12, 37); Tokunoshima (7); on *Phaseolus* sp.: Iriomotejima (8); Ishigakijima (9).
- Uromyces baewmlerianus* Bubak on *Melilotus alba* Desv.: Okinawajima (7, 10, 37).
- Uromyces bidenticola* Arthur on *Bidens pilosa* L.: Iriomotejima (7); Ishigakijima (7); Okinawajima (7, 9).
- Uromyces commelinae* Cooke on *Commelina auriculata* Bl.: Amamioshima (7, 37); Okinawajima (7, 10, 37); on *Commelina communis* L.: Amamioshima (7, 13, 37); Kuroshima (7, 15, 37); Okinawajima (2, 4, 7, 10, 37); Tanegashima (7, 37); Yakushima (7); Yakushima (16, 21, 31, 37); on *Commelina nudiflora* L.: Iriomotejima (7, 8, 9); Ishigakijima (7, 8, 11, 37); Kumejima (7, 37); Kuroshima (7); Nakanoshima (7, 14, 37); Okinawajima (2, 4, 7, 10, 37); Suwanoseshima (7, 14, 37); Takarajima (7, 14, 37); Tanegashima (7); Yonagunijima (38); Yoronjima (39); on *Commelina* sp.: Yakushima (7, 16, 37); on *Pollia japonica* Thunb.: Kuroshima (7, 15, 37); Nakanoshima (7, 14, 37).
- Uromyces coronatus* Miyabe & Nishida ex Dietel on *Zizania latifolia* Turcz.: Amamioshima (7, 10, 13, 18, 37); Ishigakijima (10, 11, 18, 37); Kitadaitojima (7, 37); Minamidaitojima (7, 37); Okinawajima (7, 10, 18, 37).
- Uromyces dactylidis* Otth var. *poae* Cummins on *Alopecurus aequalis* Sobol var. *amurensis* (Komar.) Ohwi: Amamioshima (7, 10, 13, 18, 37); Okinawajima (7, 10, 37).
- Uromyces decoratus* P. Sydow & H. Sydow on *Crotalaria* sp.: Ishigakijima (7, 8).
- Uromyces dianthi* Niessl on *Dianthus chinensis* L.: Okinawajima (7, 10, 37).
- Uromyces durus* Dietel on *Allium macrostemon* Bunge: Okinawajima (7, 10, 37); Tokunoshima (7); Yoronjima (39).
- Uromyces ervi* Westendorp on *Vicia hirsuta* Koch.: Okinawajima (7, 10, 37); Tokunoshima (7); on *Vicia sativa* L.: Ishigakijima (7, 11, 37); Kumejima (7, 37); Okinawajima (7, 10, 37); Tokunoshima (7); Yoronjima (39); on *Vicia sepium* (L.) S. F. Gray: Yoronjima (39); on *Vicia tetrasperma* Moench.: Okinawajima (7, 10, 37); Tokunoshima (7).

- Uromyces euphorbiae*** Cooke & Peck on *Euphorbia makinoi* Hayata: Amamioshima (7, 11, 13, 37); Iheyajima (7, 37); Ishigakijima (37); Izenajima (7, 37); Kitadaitojima (7, 37); Kumejima (37); Minamidaitojima (37); Miyakojima (7, 37); Okinawajima (7, 10, 37); Tokunoshima (7, 13, 37); Yonagunijima (7, 37, 38); Yoronjima (39); on *Euphorbia supina* Rafin.: Tanegashima (7, 12, 37).
- Uromyces galli*** Dietel on *Galium spurium* L. var. *achinospermum* Hyek.: Okinawajima (7, 10, 37); Tokunoshima (40).
- Uromyces kunigamiensis*** Shimabukuro ex Hiratsuka, f. on *Fimbristylis dichotoma* Vahl.: Okinawajima (7, 37).
- Uromyces lespedezae-procumbentis*** (Schweinitz) Curtis var. *itoanus* (Hiratsuka, f.) Hiratsuka, f. on *Kummerowia striata* Schindl.: Amamioshima (7); Okinawajima (7, 10, 37); Takeshima (15, 37); Tanegashima (7, 37); Tokunoshima (7, 13, 37); Yakushima (7, 16, 21, 37).
- Uromyces lespedezae-procumbentis*** (Schweinitz) Curtis var. *lespedezae-procumbentis* on *Lespedeza bicolor* Turcz. var. *japonica* Nakai: Kuroshima (7, 15, 37); on *Lespedeza cuneata* G. Don: Amamioshima (7, 10, 13, 37); Ieshima (37); Kikaishima (7, 13, 37); Kumejima (37); Kuroshima (7, 15); Miyakojima (7, 11, 37); Okinawajima (2, 4, 7, 10, 37); Takarajima (7, 14, 37); Tanegashima (7, 37); Tokunoshima (7, 13, 37); Yakushima (21); on *Lespedeza cyrtobotrya* Miq.: Tanegashima (7, 37); Yakushima (7, 37); on *Lespedeza homoloba* Nakai: Yakushima (7, 37); on *Lespedeza pilosa* Sieb. & Zucc.: Kuroshima (7, 15, 37); Tanegashima (7, 16, 37).
- Uromyces linearis*** Berkeley & Broome on *Panicum repens* L.: Amamioshima (7, 13, 18, 32, 37); Ieshima (7, 37); Iheyajima (7, 37); Iriomotejima (7, 8, 9); Ishigakijima (7, 9); Izenajima (7, 37); Kakeromajima (18); Kumejima (7, 37); Minamidaitojima (7, 37); Miyakojima (7, 10, 11, 18, 37); Okinawajima (2, 4, 7, 10, 18, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 18, 21, 37); Yonagunijima (37, 38); Yoronjima (39).
- Uromyces mucunae*** Rabenhorst on *Mucuna hasjoo* Rock: Okinawajima (2, 4, 7, 37); on *Mucuna pruriens* Prodr.: Ishigakijima (7, 8); Miyakojima (7, 11, 37); Okinawajima (7, 37).
- Uromyces orientalis*** P. Sydow & H. Sydow on *Indigofera trifoliata* L. var. *liukiensis* Matsum.: Ishigakijima (7, 11, 37); Miyakojima (7, 37).
- Uromyces saururi*** Hennings on *Saururus chinensis* (Lour.) Baill.: Kikaishima (7, 13, 37); Okinawajima (7, 12, 37); Yakushima (7, 21, 37).
- Uromyces setariae-italicae*** Yoshino on *Eriochloa procera* C. E. Hubb.: Ishigakijima (7, 11, 18, 37); Kitadaitojima (7); Minamidaitojima (7, 37); Miyakojima (7, 37); Yonagunijima (7, 37, 38); on *Eriochloa villosa* Kurth. var. *stenantha* Ohwi: Iriomotejima (7, 11, 18, 37); on *Setaria glauca* (L.) Beauv.: Minamidaitojima (7); Okinawajima (2, 4, 10, 18, 37); Yonagunijima (38); on *Setaria glauca* (L.) Beauv. var. *pallide-fusca* (Schum.) T. Koyama: Okinawajima (7, 10, 18, 37); Tokunoshima (7); on *Setaria italica* (L.) Beauv.: Amamioshima (7); Ishigakijima (7, 37); Kikaishima (13, 18); Kuroshima (7, 37); Miyakojima (7, 10, 11, 18, 37); Okinawajima (7); Suwanosejima (7, 14, 18); Tokunoshima (7); on *Setaria verticillata* (L.) Beauv. f. *ambigua* (Guss.) T. Koyama: Kitadaitojima (37); Minamidaitojima (37); on *Setaria viridis* (L.) Beauv.: Amamioshima (13); Tanegashima (16); on *Setaria viridis* (L.) Beauv. var. *genuina* Honda: Amamioshima (7, 18, 37); Ishigakijima (7, 11, 18, 37); Okinawajima (7, 37); Tanegashima (7, 18, 37); on *Setaria viridis* (L.) Beauv. var. *pachystachys* (Fr. & Sav.) Makino & Nemoto: Iheyajima (7, 37); Izenajima (7, 37); Minnajima (37); Okinawajima (7, 10, 18, 37); Takarajima (7, 14, 18, 37); Yakushima (7, 16, 18, 37).
- Uromyces striatus*** Schröeter on *Medicago lupulina* L.: Iheyajima (7, 37); Okinawajima (2, 4, 7, 10, 37).
- Uromyces tairae*** Hiratsuka, f. on *Messerschmidia argentea* (L., f.) Johnst.: Okinawajima (3, 4, 7, 10, 37).
- Uromyces tenuiculis*** McAlpine on *Sporobolus indicus* R. Br.: Amamioshima (7, 10, 13, 18, 32, 37); Iheyajima (37); Iriomotejima (7, 9, 18); Ishigakijima (7); Izenajima (7, 37); Kitadaitojima (7, 37); Kumejima (7, 37); Kuroshima (7, 15, 18, 37); Minamidaitojima (7, 37); Nakanoshima (7, 14, 18, 37); Okinawajima (2, 4, 7, 10, 18, 37); Takarajima (7, 14, 18, 37); Takeshima (7, 18, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 16, 18, 21, 37); Yonagunijima (7, 18, 37, 38); Yoronjima (39).
- Uromyces thermopsidicola*** Shimabukuro on *Thermopsis chinensis* Benth.: Ieshima (7, 37); Ikeijima (7); Okinawajima (7, 10, 12, 37); Yoronjima (39).
- Uromyces triquetrus*** Cooke on *Hypericum japonicum* Thunb.: Amamioshima (7, 37); Yakushima (7, 37).

- Uromyces viciae-fabae*** (Persoon) Schroeter on *Vicia faba* L.: Iheyajima (7, 37); Kumejima (7, 10, 37); Okinawajima (2, 4, 7, 10, 37).
- Uromyces vignae*** Barclay on *Dolichos lablab* L.: Okinawajima (2, 4, 7, 10, 37); on *Vigna marina* (Burm.) Merr.: Amamioshima (10, 13, 37); Iriomotejima (7, 8); Ishigakijima (7, 8); on *Vigna minima* (Roxb.) Ohwi & Ohashi: Okinawajima (4, 10, 37); on *Vigna sesquipedalis* Furwirth: Amamioshima (7); Iriomotejima (37); Ishigakijima (7); Okinawajima (7, 10, 37).
- Uromyces wedelliae*** Hennings on *Wedelia biflora* DC.: Amamioshima (7, 10, 13, 37); Iriomotejima (7); Ishigakijima (7, 9, 11, 37); Kotakarajima (7, 14, 37); Minnajima (7, 37); Nakanoshima (7, 14, 37); Okinawajima (7, 37); Takarajima (7, 14, 37); Yakushima (7, 16, 21, 37); Yonagunijima (38); on *Wedelia chinensis* Merr.: Amamioshima (7); Tanegashima (7, 37); on *Wedelia prostrata* Hemsl.: Kumejima (7, 10, 37); Yakushima (31); Yoronjima (39); on *Wedelia robusta* (Makino) Kitamura: Amamioshima (7, 13, 37); Ieshima (7, 37); Iheyajima (7, 37); Kumejima (7, 37); Okinawajima (7, 37); Tanegashima (7, 37); Tokunoshima (7); Yakushima (7, 37).
- Uromyces yakushimensis*** Hiratsuka, f. & Katsuki on *Trichosanthes bracteata* Voigt.: Amamioshima (40); Iriomotejima (7); Ishigakijima (7, 8, 11, 37); Takarajima (7, 14, 37); Tanegashima (7, 16, 37); Yakushima (7, 16, 21, 37); on *Trichosanthes* sp.: Iriomotejima (7, 9).
- Xenostele litseae*** (Patouillard) H. Sydow on *Cinnamomum japonicum* Sieb.: Okinawajima (7, 10, 37); on *Neolitsea aciculata* (Bl.) Koidz.: Ishigakijima (7, 9); on *Neolitsea sericea* (Bl.) Koidz.: Iheyajima (7, 37).
- Xenostele sakamotoi*** (Hiratsuka, f. & Yoshinaga) S. Ito & Maruyama: *Distylium racemosum* Sieb. & Zucc.: Iheyajima (7, 37); Okinawajima (7, 12, 37); Yakushima (7, 16, 21, 31, 37).
- Xenostele takakumensis*** Hiratsuka, f. on *Actinodaphne longifolia* (Bl.) Nakai: Iriomotejima (9); on *Neolitsea aciculata* (Bl.) Koidz.: Iriomotejima (7: The fungus on this plant is perhaps error for *Xenostele litseae* (Patouillard) H. Sydow).
- Zaghouania phillyrae*** Patouillard on *Osmanthus zentaroanus* Makino: Nakanoshima (7, 37).

Table 1. Similarity matrix (Sorensen's coefficient) of the islands for which more than 30 rust species are reported.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1															
2	47														
3	39	50													
4	43	48	46												
5	45	48	43	48											
6	37	52	62	48	47										
7	36	48	44	44	48	51									
8	32	36	28	36	43	27	49								
9	26	44	39	34	48	44	54	46							
10	31	41	61	41	42	64	48	34	47						
11	40	44	36	39	47	46	61	54	62	45					
12	29	41	27	22	33	34	51	40	42	34	45				
13	28	42	47	42	39	49	50	38	54	47	46	40			
14	36	41	39	39	36	46	45	38	50	42	51	35	63		
15	34	41	33	35	44	40	48	41	50	35	54	37	52	52	

1. Kuroshima; 2. Tanegashima; 3. Yakushima; 4. Nakanoshima; 5. Takarashima; 6. Amamioshima; 7. Tokunoshima; 8. Yoronjima; 9. Iheyajima; 10. Okinawajima; 11. Kumejima; 12. Miyakojima; 13. Ishigakijima; 14. Iriomotejima; 15. Yonagunijima.

No definite mycogeographic pattern is recognized by inspection of the above distribution records. A similarity matrix (in the Sorrensen's coefficient) among fifteen islands, on which more than 30 rust species are recorded, (Table 1) indicates that the physical distance does not affect significantly similarities in the rust flora among the islands. The highest coefficients are found between Amamioshima and Okinawajima (64), between Ishigakijima and Iriomotejima (63), between Yakushima and Amamioshima (62), and between Yakushima and Okinawajima (61). These islands are most diverse in the rust species composition in the Ryukyus with more than 70 species recorded.

The relationships among species number, island area, and origin of islands show interesting tendencies in mycogeography of the Ryukyus (Fig. 2). Species number increases proportionally with the increase of island areas. This is a significant deviation from what has traditionally recognized in the island biogeography: logarithm of the species number proportionally relates to logarithm of the island area. No reason for this deviation in rust fungi in the Ryukyus is apparent. Those with larger areas and more species (Yakushima, Amamioshima, Okinawajima, Ishigakijima, and Iriomotejima) are high

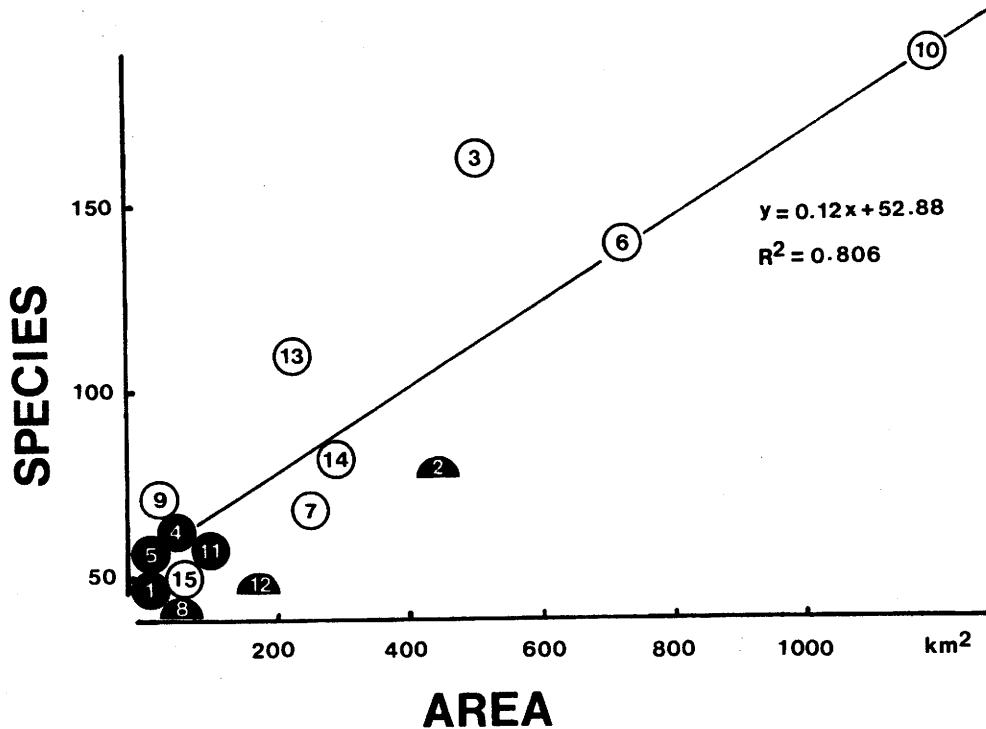


Fig. 2. Relationships among size and topography of the islands (with more than 30 rust species) and number of rust species recorded on them. Open circle: mountaneous high island. Solid circle: volcanic island. Solid semicircle: low island (either terrace or emerged coral). 1. Kuroshima; 2. Tanegashima; 3. Yakushima; 4. Nakanoshima; 5. Takarashima; 6. Amamioshima; 7. Tokunoshima; 8. Yoronjima; 9. Iheyajima; 10. Okinawajima; 11. Kumejima; 12. Miyakojima; 13. Ishigakijima; 14. Iriomotejima; 15. Yonagunijima.

mountainous islands of geologically older origin (before Tertiary). These large, high mountainous islands undoubtedly provide more diverse habitats for vascular plants. The islands of volcanic mountains (Nakanoshima, Takarashima, Kuroshima, and Kumejima) have less rust species. Those with smaller areas and least species are either low terrace (Tanegashima) or emerged coral (Miyakojima and Yoronjima) of geologically recent origin (mostly Quaternary)(30). Apparently, the period during which the islands were continuous to the Asian Continent, how the islands were isolated from the Continent, or how they were newly emerged are crucial for the establishment of vascular plants, and in turn rust fungi as their parasites, in the islands. These geological events, resultant size and topology of islands, and their physical distance have determined the diversity of vascular plants and their rust parasites of each island, and subsequently mycofloristic similarity or dissimilarity of the islands.

The overall similarity based on the Sorrensen's coefficient does not depict any geographic pattern of similarity distribution in the Ryukyu Islands. If rust species have extended their geographic distribution along the islands from southwest to northward and vice versa, however, there should be certain geographic distribution pattern of the areas with different species compositions in the Ryukyus. The study of the northward extension of mostly tropical rust species yielded the following results: 1) 7 species in 5 genera (*Cerotelium fici*, *Endophyllum kaernbachii*, *E. paederiae*, *Puccinia curculigonis*, *P. thaliae*, *Triphragmium pulchrum*, and *Uredo fagarae*) have their northern limit on the Yaeyama Islands, 2) 3 species in 3 genera (*Hapalophragmium derridis*, *Puccinia arundinis-donacis*, and *Uromyces orientalis*) on the Miyako Islands, 3) 15 species in 9 genera (*Hamaspora acutissima*, *Kernkampella breyniae*, *Maravalia achroa*, *Puccinia cenchri*, *P. hashiokai*, *P. keuhnii*, *P. taiwaniana*, *Ravenelia hobsonii*, *R. tephrosiicola*, *Skierka agallocha*, *Sphaerophragmium acaciae*, *Uromyces baeumlerianus*, *U. bidenticola*, *U. mucunae*, and *U. saururi*) on the Okinawa Islands, 4) 12 species in 8 genera (*Aecidium hornotinum*, *Crossopora antidesmae-dioicae*, *Crossopora premnae*, *Didymopsorella lemanensis*, *Endophyllum emasculatum*, *E. formosanum*, *E. griffithiae*, *Phakopsora tecta*, *Puccinia erebia*, *P. lophatheri*, *P. scirpi-ternatani*, and *Uredo psychotricola*) on the Amami Islands, 4) 3 species in 2 genera (*Phakopsora formosanum*, *P. malloti*, and *Puccinia philippinensis*) on the Tokara Islands, 5) 16 species in 8 genera (*Aecidium clerodendri*, *Crossopora malloti*, *Endophyllum lysimachiae*, *Phakopsora glochidii*, *Pileolaria pistaciae*, *Puccinia citrina*, *P. flaccida*, *P. panici-montani*, *P. paspalina*, *P. pogonatheri*, *P. polli-nicola*, *P. scleriae*, *P. variiformis*, *P. wattiana*, *Pucciniostele hashiokai*, and *Uredo sawadae*) on the Osumi Islands. Similarly, the study of southward extension of mostly cool-temperate rust species yielded the following results: 1) 19 species in 9 genera (*Coleosporium phellodendri*, *C. yamabense*, *Hyalopsora aculeata*, *Melampsora epitea*, *Milesina erythrosora*, *M. faulliana*, *M. vogesiaca*, *Phragmidium heterosporum*, *Puccinia acetosae*, *P. arundinellae-anomallae*, *P. dieteliana*, *P. infra-aequatorialis*, *P. metanartheccii*, *P. schedonnardi*, *Pucciniastrum corni*, *P. hydrangeae-petiolelaridis*, *P. kusanoi*, *Thekopsora vaccini*, and *Uredo diplazii*) have their southern limit on the Osumi Islands, 2) 3 species in 2 genera (*Aecidium minoense*, *Puccinia patriniae*, and *P. violae*) on the Tokara Islands, 3) 9 species in 6 genera (*Cronartium quercuum*, *Hyalopsora hakodatensis*, *Milesina exigua*, *M. pteridicola*, *Puccinia glechomatis*, *P. lapsanae*, *Pucciniastrum hikosanense*, *P. potentillae*, and *Uredo hiratsukai*) on the Amami Islands, 4) 40 species in 12 genera (*Aecidium elaeagni-umbellatae*, *A. lysimachiae-japonicae*, *A. meliosma-pungentis*, *A. vincetoxici*, *A.*

*zanthoxyli-schinifolii*, *Coleosporium bletiae*, *C. lycopi*, *Gymnosporangium asiaticum*, *Hyalopsora polypodii*, *Milesina odontosoriae*, *Ochropsora nambuana*, *Phragmidium griseum*, *Puccinia aestivalis*, *P. agropyri-ciliaris*, *P. allii*, *P. angelicae*, *P. breviculmis*, *P. crepidis-intergrae*, *P. horiana*, *P. lactucae-repentis*, *P. microspora*, *P. miyoshiana*, *P. nanbuana*, *P. nishidana*, *P. oenanthes-stoloniferae*, *P. ophiopogonis*, *P. phellopteri*, *P. phragmitis*, *P. stauntoniae*, *P. tokyensis*, *Pucciniastrum agrimoniae*, *Tranzschelia discolor*, *Uredinopsis kameiana*, *U. macrospermae*, *U. pteridis*, *Uromyces dactylidis*, *U. dianthi*, *U. durus*, *U. gallii*, and *U. striatus*) on the Okinawa Islands, 5) 5 species in 3 genera (*Milesina microspora*, *Phragmidium pauciloculare*, *Puccinia exhausta*, *P. kylingiae-brevifoliae*, and *P. lactucae-denticulatae*) on the Miyako Islands, and 6) 7 species in 4 genera (*Melampsora coleosporioides*, *M. idesiae*, *Phragmidium rosae-multiflorae*, *Puccinia angustata*, *P. crepidis-japonicae*, *P. hemerocallidis*, and *Uromyces ervi*) on the Yaeyama Islands.

These northern and southern limits of geographic distribution of mostly tropical and cool-temperate rust species on the Ryukyu Islands indicate that mycogeographically significant disjunctions exist between the Osumi and the Tokara-Amami Islands, between the Amami and the Okinawa Islands, and between the Okinawa and the Miyako-Yaeyama Islands. These mycogeographical disjunctions correspond with what have been observed in the vascular-plant distribution (1, 29): 129 species in 53 genera of mostly tropical vascular plants have their northern limits on the Yaeyama Islands, 54 species in 27 genera on the Okinawa Islands, and 142 species in 41 genera on the Amami Islands. The Osumi Islands is also different in the rust species composition from the mainland of Kyushu. Although full analysis has not yet been completed, it has been suggested that the Taiwan and the Miyako-Yaeyama Islands are rust floristically quite different. This can be suspected alternatively from the difference in vascular plant flora between the two geographic areas, because rust fungi are biotrophic parasites of vascular plants and because geographic distribution of rust fungi are dependent primarily, but not exclusively, upon the distribution of their host plants.

Within the island groups circumscribed by the similarity within the group of, and the difference between the groups in, the rust species composition, the rust floras of terrace islands, emerged coral islands, and sandy islands are significantly different from those of high mountaneous islands and volcanic islands. These low islands show significantly less rust species diversity. This is due largely to less habitats available for vascular plants and to ecophysiological constraints exerted to vascular plants, on which rust fungi obligately parasitize, to occur on these low islands. A limited number of plant species with high salt-tolerance or tolerance to physiological desiccation can grow on those islands, and this in turn limits the number of rust fungi to be distributed in these islands. The low diversity of rust species in the low islands is due also to relatively short geological time available for rust fungi to migrate from the nearest islands.

The rust flora of the Ryukyus has not been determined simply by the northward or southward extension, along the island arc, of rust fungi that are potentially capable of being distributed. But this study indicates that the gradual extension of geographic distribution is a major factor in determining the rust species composition of each island and the recognizable mycofloristic divisions in the Ryukyus. Floristic mycogeographically, the Ryukyus fall into a single province in Takhtajan's sense, and no formal mycogeographical subdivisions and names are applied to the island groups between which the rust

species compositions are different. Rather, the difference observed by this study will aid at the historical mycogeographical analysis of the Ryukyu Islands.

The Ryukyus has the following endemic rust species: *Aterocauda hyalospora*, *Chrysocelis gynostemmatis*, *Hamasporea okinawaensis*, *Puccinia lepturi*, *P. scirpi-ternatani*, *Uromyces kumigamiensis*, *U. tairae*, *U. thermopsidicola*, *U. yakushimense*, *Uredo horikawai*, *U. iriomotense*, *U. yakushimensis*, and *Xenosteles takakumensis*. The phylogenetic relationships to suspected parent and/or sister species and their relations in geographic distribution will provide a clue to the establishment and further development of the rust flora of the Ryukyu Islands.

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