Competing sexual and asexual generic names in *Pucciniomycotina* and *Ustilaginomycotina* (*Basidiomycota*) and recommendations for use

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Abstract: With the change to one scientific name for pleomorphic fungi, generic names typified by sexual and asexual morphs have been evaluated to recommend which name to use when two names represent the same genus and thus compete for use. In this paper, generic names in *Pucciniomycotina* and *Ustilaginomycotina* are evaluated based on their type species to determine which names are synonyms. Twenty-one sets of sexually and asexually typified names in *Pucciniomycotina* and eight sets in *Ustilaginomycotina* were determined to be congeneric and compete for use. Recommendations are made as to which generic name to use. In most cases the principle of priority is followed. However, eight generic names in the *Pucciniomycotina*, and none in *Ustilaginomycotina*, are recommended for protection: *Classica* over *Naiadella*, *Gymnosporangium* over *Roestelia*, *Helicobasidium* over *Thanatophyrum* and *Tuberculina*, *Melampsosrella* over *Peridermium*, *Milesina* over *Milesia*, *Phragmidium* over *Aregma*, *Sporobolomyces* over *Blastoderma* and *Rhodomyces*, and *Uromyces* over *Uredo*. In addition, eight new combinations are made: *Blastospora jurenensis*, *S. subneurophyla*, *Cronartium bethelii*, *C. kurilense*, *C. sahoanum*, *C. yamabense*, *Milesina poly podii*, and *Prospodium crusculum* combs. nov.

Key words: Basidiomycetes, pleomorphic fungi, taxonomy, protected names, nomenclature, new taxa

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INTRODUCTION

With the change to one scientific name for all *Fungi* in accordance with the *International Code of Nomenclature for algae, fungi, and plants* (ICN, McNeill et al. 2012), it has been necessary to determine which generic name should be applied when two or more generic names are typified by different morphs of the same genus. Recommendations about which generic name to use have been made primarily by specialized Subcommittees or Working Groups of the International Commission for the Taxonomy of Fungi (ICTF), each representing a different group of *Fungi*. A number of papers recommending generic names for use have been published including the major groups of *Sordariomycetes* such as *Diaporthales* (Rossman et al. 2015a), *Hypocreales* (Rossman et al. 2013, Quadt et al. 2014, Kepler et al. 2017), *Magnaporthales* (Zhang et al. 2016), *Microascales* and *Ophiostomatales* (de Beer et al. 2013), *Xylariaceae* (Stadler et al. 2013) and remaining *Sordariomycetes* (Réblová et al. 2016) as well as *Dothideomycetes* (Rossman et al. 2015b), *Eurotiales* (Samson et al. 2014, Visagie et al. 2014), *Leotiomycetes* including *Erysiphales* (Braun 2013, Johnston et al. 2014), *Orbiliomycetes* (Baral et al. 2017), *Pezizomycetes* (Healy et al. 2016), yeasts (Daniel et al. 2014) and overlooked generic names in the *Ascomycota* (Rossman et al. 2016). A companion paper to this one on the *Agaricomycota* is in progress. Generic names that follow the principle of priority whether they are sexually or asexually typified do not need to be confirmed by the Nomenclature Committee for Fungi (NCF) and General Committee of the International Botanical Congress (IBC). The former Art. 57.2 which required approve for the use of asexually typified names over sexually typified ones was removed from the Code at the 2017 International Botanical Congress (Turland et al. 2017, 2018). However,
those generic names that do not have priority must be approved by the NCF.

Generic names of Pucciniomycotina and Ustilaginomy
cotina (Basidiomycota), representing sexually and asexually
typhied genera that compete for use have been evaluated by the Heterobasidiomycetes Working Group and the International Subcommission on Rust Taxonomy of the ICTF. Members of these groups have been consulted and agree with the recommendations made herein about which generic name to use1. The comprehensive list of sexual-asexual
generic names by Wijayawardene et al. (2012) was used as the initial starting point for discovering competing basidiomycete
generic names. Citations for generic names and type species are based on Index Fungorum. Each set of generic names
was evaluated based on the phylogenetic placement of their type species using the literature to determine whether the names are congeneric. Then a recommendation for use is made considering such factors as priority, number of species and thus number of required name changes, use outside of the ICN, frequency of citations in the literature and frequency of use based primarily on number of citations in Google Scholar (GS).

Here we advocate abandoning the use of many asexually
typhied generic names in Pucciniales such as Aecidium, Caeoma, Milesia, Peridermium, Roestelia, and Uredo for their corresponding sexually typhied generic names. This is problematic as many species have been described using these names. Often it is difficult to determine in which genus a rust fungus belongs because of the lack of the telial stage. However, these formal asexually typhied generic names are based on type species that are synonyms of species in other genera. In the case of Aecidium and Caeoma these generic names are synonyms of an earlier generic name, Puccinia. For Peridermium the type species is a synonym of a species in Melampsorella, a later generic name that is recommended for protection over Peridermium; most species described in Peridermium, however, belong in Cronartium. Similarly, the type species of the generic name Roestelia is a synonym of the type species in Gymnosporangium, an important and well-defined genus that is recommended for protection. Finally, the generic name Uredo is a synonym of the later name Uromyces, which is recommended for use for two reasons. Firstly, species of Uredo belong to many different rust genera, and secondly Uromyces is a commonly used generic name. See under those generic names for more detailed discussion.

Although the abandoned Pucciniales asexual morph names should no longer be used to describe new species, the species already described in those names are not invalidated and can still be used. As for all scientific names

that cannot be correctly placed in a genus, the problem with the generic name could be noted by including quotes around the name or by indicating the temporary taxonomic placement with “pro tem.” as has been suggested for anamorphically typhied species of Ustilaginomycotina (Wang et al. 2015b). Efforts will be made in the future to determine the correct generic placement for the names currently in use in these asexually typhied genera. With the increasingly available use of molecular data for determining phylogenetic relationships, the need for these asexually typhied names of rust fungi should be eliminated or, as has been done for years, species known only from an asexual state can be placed in the genus most likely to be considered correct.

Generic names used for asexual rust fungi can, however, be used in a non-latinized sense to describe a morphology, as illustrated in Cummins & Hiratsuka (2003). As in other groups of fungi, for example, a species may be described as having ascomata that are nectria-like, meaning they produce light- to bright-coloured, fleshy perithecia, or fusarium-like meaning that they produce fusiform, multiseptate, hyaline conidia. Thus, one can refer to an asexual morph of a rust fungus as beingaecidium-like, caeoma-like, peridermium-like, or uredo-like.

Twenty-one sets of sexual and asexual generic names in Pucciniomycotina and eight sets of generic names in Ustilaginomycotina were determined to compete for use and evaluated for recommended use. Most of the generic names recommended for use have priority. None of the names of Ustilaginomycotina but eight generic names of Pucciniomycotina do not have priority and are recommended for protection over older names, specifically: Classicipula over Naiadella, Gymnosporangium over Roestelia, Helicobasidium over Thanatophytum and Tuberclina, Melampsorella over Peridermium, Milesina over Milesia, Phragmidium over Aregma, Sporobolomyces over Rhodomyces and Blastoderma, and Uromyces over Uredo. Details about each set of generic names and the basis for each decision are presented below with an S indicating a sexually typhied name and an A indicating an asexually typhied name. The citation for each generic name, type species, accepted name of type species, and action required are listed in Table 1 for Pucciniomycotina and Table 2 for Ustilaginomycotina.

COMPETING SEXUAL AND ASEXUAL GENERIC NAMES OF PUCCINIOMYCOTINA, BASIDIOMYCOTA AND RECOMMENDATIONS FOR USE

Use Basidiopycnis Oberw. et al. 2006 (S) rather than Basidiopycnides J. Reid et al. 2008 (A)

The monotypic generic name Basidiopycnis is typhied by the sexual species B. hyalina, described from bark beetle galleries (Oberwinkler et al. 2006). Another monotypic generic name Basidiopycnides typhied by B. albertensis was described for an asexual morph also from bark beetle galleries (Hausner et al. 2008). Kirschner & Oberwinkler (2009) confirmed the relationship between these types as sexual and asexual morphs of the same species and

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1Heterobasidiomycetes Working Group: Dominik Bergerow, Convenor; Cathie Aime, Stephan Helfer, David McLaughlin, Hai Nguyen, Maj Padamsee, Angela Schäfer, Qi-Ming Wang, and Andrey Yurkov.

International Subcommission on Rust Taxonomy: Cathie Aime, Chair; Mehrdad Abbasi, Gaddam Bagyanarayana, Reinhard Berndt, Cvetomir Denchev, José Dianese, Richard Hamelin, Stephan Helfer, Drew Minnis, Yoshitaka Ono, and Markus Scholler.
Table 1. Recommended generic names of *Pucciniomycotina* among sexual-asexual names that compete for use. The recommended name is in bold; see text for the rationale behind these recommendations. For each generic name this list provides the author, its date and place of publication, type species of the genus, its basionym, their dates of publication and the currently accepted name, if different. The action required is indicated in the last column such as approval by the Nomenclature Committee for Fungi (NCF) for those generic names that do not have priority and thus need protection.

| Recommended generic name | Synonymous alternate morph generic name(s) | Action required |
|--------------------------|------------------------------------------|----------------|
| **Basidiopycnis** Oberw. *et al.* in Mycologia 98: 639. 2006. | *Basidiopycnides* J. Reid *et al.* in Mycotaxon 103: 285. 2008. | None. |
| Type: *B. hyalina* Oberw. *et al.* 2006. | Type: *B. albertensis* J. Reid *et al.* 2008, now regarded as *Basidiopycnis hyalina* Oberw. *et al.* 2006. | |
| **Blastosphora** Dietel in Ann. Mycol. 6: 222. 1908. | *Pelastoma* M. Salazar *et al.* in Mycologia 104: 116. 2012. | None. |
| Type: *B. smilacis* Dietel 1908. | Type: *P. juruensis* (Henn.) M. Salazar *et al.* 2012, basionym: *Uredo juruensis* Henn. 1904, now regarded as *Blastosphora juruensis* (Henn.) Aime & Rossman 2018. | |
| **Camptobasidium** Marvanová & Suberkr. in Mycologia 82: 209. 1990. | *Crucella* Marvanová & Suberkr., Mycologia 82: 212, 1990. | None. |
| Type: *C. hydrophilum* Marvanová & Suberkr. 1990. | Type: *C. subtilis* Marvanová & Suberkr. 1990, now regarded as *Camptobasidium hydrophilum* Marvanová & Suberkr. 1990. | |
| **Classícula** R. Bauer *et al.* in Mycologia 95: 757. 2003. | *Naiadella* Marvanová & Bandoni in Mycologia 79: 579. 1987. | Protection needed by NCF. |
| Type: *C. fluitans* R. Bauer *et al.* 2003. | Type: *N. fluitans* Marvanová & Bandoni 1987, now regarded as *Classícula fluitans* R. Bauer *et al.* 2003. | |
| **Cronartium** Fr., Observ. Mycol. 1: 220. 1815. | *Endocronartium* Y. Hirats. in Canad. J. Bot. 47: 1493. 1969. | None. |
| Type: *C. asclepiadeum* (Willd.) Fr. 1815, basionym: *Erineum asclepiadeum* Willd. 1806, now regarded as *Cronartium flaccidum* (Alb. & Schwein.) G. Winter 1880. | Type: *E. harknessii* (J.P. Moore) Y. Hirats. 1969, basionym: *Peridermium harknessii* J.P. Moore 1884, now regarded as *Cronartium harknessii* (J.P. Moore) E. Meinecke 1920. | |
| **Elateraecium** Thirum. *et al.* in Mycologia 58: 394. 1966. | *Hiatsukamyces* Thirum. *et al.* 1975, now regarded as *Elateraecium salaciicola* Thirum. *et al.* 1966. | None. |
| Type: *E. salaciicola* Thirum. *et al.* 1966. | Type: *H. salaciicola* Thirum. *et al.* 1975, now regarded as *Elateraecium salaciicola* Thirum. *et al.* 1966. | |
| **Gerwasia** Racib. in Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 3: 270. 1909. | *Morispora* Salazar-Yepes *et al.* in Caldasia 29: 108. 2007. | None. |
| Type: *G. rubi* Racib. 1909. | Type: *M. tenella* (H.S. Jacks. & Holw.) Salazar-Yepes *et al.* 2007, basionym: *Mainsia tenella* H.S. Jacks. & Holw. 1931, now regarded as *Gerwasia tenella* (H.S. Jacks. & Holw.) Buriticá 1994. | |
| **Gymnosporangium** R. Hedw. ex DC., in Lamarck & de Candolle, Fl. franç., ed. 3: 2: 216. 1805. | *Roestelia* Rebert., Prodr. fl. neomarch.: 350. 1804. | Protection needed by NCF. |
| Type: *G. fuscum* DC. 1805, now regarded as *Gymnosporangium sabinae* (Dicks.) G. Winter 1884. | Type: *R. cancellata* (Pers.) Rebert. 1804, basionym: *Aecidium cancellatum* Pers. 1792, now regarded as *Gymnosporangium sabinae* (Dicks.) G. Winter 1884. | |
| **Helicobasidium** Pat. in Bull. Soc. Bot. France 32: 172. 1885. | *Thanatophyllum* Nees, Syst. Pilze: 148. 1816. | Protection needed by NCF. |
| Type: *H. purpureum* (Tul.) Pat. 1885, basionym: *Hypochorus purpureus* Tul. 1865. | Type: *T. crocorum* (Pers.) Nees 1816, basionym: *Sclerotium crocorum* Pers. 1801, now regarded as *Helicobasidium purpureum* (Tul.) Pat. 1885. | |
| **Hyalopynces** Höhn. in Hedwigia 60: 152. 1918. | Type: *T. crocorum* (Pers.) Nees 1816, basionym: *Sclerotium crocorum* Pers. 1801, now regarded as *Helicobasidium purpureum* (Tul.) Pat. 1885. | |
| Type: *H. hyalina* Höhn. 1918, now regarded as *Heterogastridium pycnidioideum* Oberw. & R. Bauer 1990. | Type: *T. crocorum* (Pers.) Nees 1816, basionym: *Sclerotium crocorum* Pers. 1801, now regarded as *Helicobasidium purpureum* (Tul.) Pat. 1885. | |
| **Heterogastridium** Oberw. & R. Bauer in Mycologia 82: 57. 1990. | Type: *H. pycnidioideum* Oberw. & R. Bauer 1990. | None. |
Table 1. (Continued).

| Recommended generic name | Synonymous alternate morph generic name(s) | Action required |
|--------------------------|---------------------------------------------|----------------|
| **Kriegeria** Bres. in Rev. Mycol. (Toulouse) 13: 14. 1891. Type: K. eriophori Bres. 1891. | Xenogloea Syd. & P. Syd. in Ann. Mycol. 17: 44. 1919. Type: X. eriophori (Bres.) Syd. & P. Syd. 1919, basionym: Kriegeria eriophori Bres. 1891. Zymoxenogloea D.J. McLaughlin & Doublé in Mycologia 84: 671. 1992. Type: Z. eriophori D.J. McLaughlin & Doublé 1992, now regarded as Kriegeria eriophori Bres. 1891. | None. |
| **Kuehneola** Magnus in Bot. Centralbl. 74: 169. 1898. Type: K. albida (J.G. Kühn) Magnus 1898, basionym: Chrysomyxa albida J.G. Kühn 1883, now regarded as Kuehneola uredinis (Link) Arthur 1906. | Spiirechina Arthur in J. Mycol. 13: 30. 1907. Type: S. loeseneriana (Henn.) Arthur 1907, basionym: Uredo loeseneriana Henn. 1898, now regarded as Kuehneola loeseneriana (Henn.) H.S. Jacks. & Holw. 1931. | None. |
| **Melampsorella** J. Schröt. in Hedwigia 13: 85. 1874. Type: M. caryophylleasm (DC.) J. Schröt. 1874, basionym: Uredo caryophylleasm DC. 1805. | Phragmidium (Link) J.C. Schmidt & Kunze in Deutschl. Schwämme 6: 4. 1817, basionym: Hypodermium subgen. Peridermium Link 1816. Type: Aecidium elatinum Alb. & Schwein. 1805, now regarded as Melampsorella caryophylleasm (DC.) J. Schröt. 1874. | Protection needed by NCF. |
| **Milesina** Magnus in Ber. Deutsch. Bot. Ges. 27: 325. 1909. Type: M. kriegeriana (Magnus) Magnus 1909, basionym: Melampsorella kriegeriana Magnus 1901. | Milesia F.B. White in Scott. Nat. 4: 162. 1878. Type: M. polydodi F.B. White 1878, now regarded as Milesina polydodi (F.B. White) Aime & Rossman 2018. | Protection needed by NCF. |
| **Phragmidium** Link in Ges. Naturf. Freunde Berlin Mag. 7: 30. 1816. Type: P. mucronatum (Pers.) Schltdl. 1824, basionym: Puccinia mucronata Pers. 1794. | Aregma Fr., Observ. Mycol. 1: 22., 1815. Type: A. obtusatum Fr. 1832, now regarded as Phragmidium fragariae (DC.) G. Winter 1884, basionym: Puccinia fragariae DC., 1808. Lecythea Lév. in Ann. Sci. Nat., Bot., sér. 3: 8. 1847. Type: L. miniata (Pers.) Lév. 1847, basionym: Uredo miniata squeez. 1808. | Protection needed by NCF. |
| **Prospodium** Arthur in J. Mycol. 13: 31. 1907. Type: P. appendiculatum (G. Winter) Arthur 1907, basionym: Dicaeoma appendiculata Kuntze 1898. | Canasta A.A. Carvalho & J.F. Hennen in Mycologia 102: 1096. 2010. Type: C. cruscula A.A. Carvalho & J.F. Hennen 2010, now regarded as Prospodium cruscula (A.A. Carvalho & J.F. Hennen) Aime & Rossman 2018. | None. |
| **Puccinia** Pers. in Neues Mag. Bot. 1: 118. 1794. Type: P. graminis Pers. 1794. | Aecidium Pers., Observ. Mycol. 1: 97. 1796. Type: A. berberidis Pers. 1796, now regarded as Puccinia graminis Pers. 1794. Caemna Link in Ges. Naturf. Freunde Berlin Mag. 3: 5. 1809. Type: C. berberidis (Pers.) Har. 1809, basionym: Aecidium berberidis Pers. 1792, now regarded as Puccinia graminis Pers. 1794. | None. |
| **Rhodotorula** F.C. Harrison in Proc. & Trans. Roy. Soc. Canada, ser. 3 21: 349. 1927. Type: R. glutinis (Fresen.) F.C. Harrison 1928. | Chromotorula F.C. Harrison in Proc. & Trans. Roy. Soc. Canada, ser. 3 21: 350. 1927. Type: C. kitae F.C. Harrison 1927. Rhodosporidium Banno in J. Gen. Appl. Microbiol. 13: 192. 1967. Type: R. toruloides Banno 1967, now regarded as Rhodotorula toruloides (Banno) Q.M. Wang et al. 2015. | None. |
| **Septobasidium** Pat. in J. Bot. (Morot) 6: 63. 1892. Type: S. velutinum Pat. 1892. | Johnccouchia S. Hughes & Cavalc. in Canad. J. Bot. 61: 2226. 1983. Type: J. mangiferae (Bat.) S. Hughes & Cavalc. 1983, basionym: Cladotrichum mangiferae Bat. 1956, now regarded as Septobasidium pilosum Boedijn & B.A. Steinm. 1930. | None. |
Table 1. (Continued).

| Recommended generic name | Synonymous alternate morph generic name(s) | Action required |
|---------------------------|------------------------------------------|-----------------|
| **Sporobolomyces** Kluyver & C.B. Ni el in Centralbl. Bakteriol., 2 Abt. 2: 63. 1924. | **Aessosporon** Van der Walt in Antonie van Leeuwenhoek 36: 54. 1970. | Protection needed by NCF. |
| Type: S. salmonicolor (B. Fisch. & Brebeck) Kluyver & C.B. Ni el 1924, basionym: Blastoderma salmonicolor B. Fisch. & Brebeck 1894. | Type: A. salmonicolor Van der Walt 1970, now regarded as Sporobolomyces salmonicolor (B. Fisch. & Brebeck) Kluyver & C.B. Ni el 1924. | |
| **Blastospora** B. Fisch. & Brebeck, in Fischer, Morph. Syst.: 47. 1894. | **Blastoderma** B. Fisch. & Brebeck, in Fischer, Morph. Syst.: 47. 1894. | |
| Type: B. smilacis (Henn.) Aime & Rossman, **Blastospora juruensis** (Henn.) Aime & Rossman, | **Blastoderm a** B. Fisch. & Brebeck, in Fischer, Morph. Syst.: 47. 1894. | |
| **Rhodomyces** Wettst. in Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-naturw. Kl., Abt. 1 91: 39. 1885. | **Rhodomyces** Wettst. in Sitzungsber. Kaiserl. Akad. Wiss., Wien, Math.-naturw. Kl., Abt. 1 91: 39. 1885. | |
| Type: R. kochii Wettst. 1885, now regarded as Sporobolomyces salmonicolor (B. Fisch. & Brebeck) Kluyver & C.B. Ni el 1924. | **Sporobolomyces** salmonicolor (B. Fisch. & Brebeck) Kluyver & C.B. Ni el 1924. | |
| **Sporobolomyces** Link in Centralbl. Bakteriol., 2 Abt. 2: 63. 1924. | **Sporobolomyces** johnsonii Speg. in Biblioth. Mycol 28: 46 (1930). | Protection needed by NCF. |
| Type: U. beticola (Pers.) Unger, syn. MycoBank MB824643 | **Sporobolomyces** johnsonii Speg. in Biblioth. Mycol 28: 46 (1930). | |
| **Uromyces** (Link) Unger, Exanth. Pflanzen: 277. 1833 (nom. cons.), basionym: Hypodermium subgen. Uromyces Link 1816. | **Uredo** Pers., Syn. Meth. Fung. 1: 214. 1801. | |
| Type: U. appendiculatus (Pers.) Unger 1796, basionym: Uredo appendiculatus Pers., now regarded as: Uromyces appendiculatus (Pers.) Link 1816. | Type: U. betae Pers. 1801, now regarded as Uromyces beticola (Bellynck) Boerema, Loer. & Hamers 1987. | |

clarified the terminology associated with them, thus these generic names are synonyms. Given that Basidiopycnis has priority and both generic names are monotypic and relatively obscure (GS Basidiopycnis = 37, Basidiopyc nides = 5), we follow the principle of priority and recommend the use of Basidiopycnis.

**Use Blastospora Dietel 1908 (S) rather than Pelastoma Salazar-Yepes et al. 2012 (A)**

The generic name Blastospora typified by B. smilacis includes tropical heteroecious rust fungi as summarized by Salazar-Yepes et al. (2012) who described Pelastoma typified by P. juruense for the asexual morph of B. columbiana (syn. Hemileia colombiana). Aime (2006) demonstrated that B. smilacis has affinities to Hemileia and Maravalia in the Mikronegeriaceae. Blastospora smilacis and B. itoana were considered to have asexual morphs belonging to Caeoma (Ono et al. 1986, 1987); however, the type of Caeoma is C. berberidis, a synonym of Puccinia graminis, thus Caeoma is a synonym of Puccinia. No other species of Blastospora nor the second species of Pelastoma have been sequenced. Assuming that B. columbiana is congeneric with B. smilacis, then Blastospora and Pelastoma are synonyms. At present five species are included in Blastospora and one name additional to the type has been placed in Pelastoma. Considering the fact that Blastospora has priority, a greater number of names, and is more commonly used (GS Blastospora = 567, Pelastoma = 11), we recommend the use of Blastospora for this genus.

Two new combinations are required:

**Blastospora juruensis** (Henn.) Aime & Rossman, **comb. nov.**

MycoBank MB824643

Basionym: Uredo juruensis Henri n., Hedwigia 43: 161 (1904).

Synonyms: Hemileia juruensis (Henn.) P. Syd. & Syd., Mon. Ured. 3: 219 (1915).

Hemileia jahnii Syd., Ann. Mycol. 28: 46 (1930).

Uredo jahnii (Syd.) Ritschel, Biblioth. Mycol. 200: 98 (2005).

Hemileia colombiana Buritica, Caldasia 12: 165 (1978).

**Blastospora colombiana** (Buritica) Salazar-Yepes et al., Mycologia 104: 116 (2012).

**Blastospora subneurophyla** (Speg.) Aime & Rossman, **comb. nov.**

MycoBank MB824644

Basionym: Uredo subneurophyla Speg., Anales Soc. Ci. Argent. 17: 123 (1883).

Synonyms: Puccinia subneurophyla (Speg.) Speg., Anales Mus. Nac. Hist. Nat. Buenos Aires 31: 384 (1922).

Pelastoma subneurophylum (Speg.) Salazar-Yepes et al., Mycologia 104: 116 (2012).

Uredo forsteroniae Henri n., Hedwigia 34: 99 (1895).

**Use Camptobasidium Marvanová & Suberk. 1990 (S) rather than Crucella Marvanová & Suberk. 1990 (A)**
Table 2. Recommended generic names of Ustilaginomycotina among sexual-asexual names that compete for use. The recommended name is in bold; see text for the rationale behind these recommendations. For each generic name this list provides the author, its date and place of publication, type species of the genus, its basionym, their dates of publication and the currently accepted name, if different. The action required is indicated in the last column such as approval by the Nomenclature Committee for Fungi (NCF) for those generic names that do not have priority and thus need protection.

| Recommended generic name         | Synonymous alternate morph generic name(s)                                                                 | Action required |
|---------------------------------|----------------------------------------------------------------------------------------------------------|-----------------|
| **Anthracoidea** Bref., Unters. Gesamtgeb. Mykol. 12: 143. 1895.                                    | Crotalaria Zambett. in Rev. Mycol. (Paris) 35: 164. 1970.                                              | None.           |
| Type: A. carics (Pers.) Bref. 1896, basionym: Uredo carics Pers. 1801.                               | Type: C. cintractae-fischeri Zambett. in Rev. Mycol. (Paris) 35: 164. 1970.                           | None.           |
| **Doassansia** Cornu in Ann. Sci. Nat., Bot., sér. 6 15: 285. 1883.                                | Savulescutella Cif. in Bontea et al. [eds]. Omg. Savulescu: 179. 1959.                               | None.           |
| Type: D. alismatis (Nees ex Fr.) Cornu 1883, basionym: Sclerotium alismatis Nees ex Fr. 1822.       | Type: S. alismacearum (Sacc.) Cif. 1959, basionym: Cylindrosporum alismacearum Sacc. 1880, now regarded as Doassansia alismatis (Nees ex Fr.) Cornu 1883. | None.           |
| **Doassansiopsis** (Setch.) Dietel in Engler & Prantl, Nat. Pflanzenfam.1 (1**): 15. 1897, basionym: Doassansiopsis subgen. Doassansiopsis Setch. 1891. | Doassansiella Zambett. in Rev. Mycol. (Paris) 35: 164. 1970.                                              | None.           |
| Type: Doassansiopsis deformans Setch. 1892, now regarded as Doassansiopsis deforms (Setch.) Dietel 1897. | Type: D. aquatilis (Peck) Zambett. 1970, basionym: Ramularia aquatilis Peck 1884, now regarded as Doassansiopsis hydropilia (A. Dietr.) Lavrov 1937. | None.           |
| **Entyloma** de Bary in Bot. Zeitung (Berlin) 32(7): 101. 1874.                                      | Entylomella Höhn. in Ann. Mycol. 22: 191. 1924.                                                         | None.           |
| Type: E. microsporum J. Schrötl. 1874. Although some have attributed E. microsporum to Protomyces microsporus F. Unger 1834, this name is a later homonym of P. microsporus Pass. 1833. | Type: E. ranunculi (Bonord.) Höhn. 1916, basionym: Fusidium ranunculi Bonord. 1851, now regarded as Entyloma ficariae F. Thümen ex A.A. Fischer v. Waldheim 1877. | None.           |
| **Mycosarcoma** (Oudem.) H. Scholz & I. Scholz T. antherarum (Oudem.) H. Scholz & I. Scholz 47: 71. 1988. | Pseudozyma Bandoni in J. Linn. Soc., Bot. 91: 38. 1985.                                                 | None.           |
| Type: M. maydis (DC.) Bref. 1912, basionym: Uredo maydis DC. 1815. OR                                | Type: P. prolifica Bandoni 1985, now regarded as Mycosarcoma maydis (DC.) Bref. 1912 or Ustilago maydis (DC.) Corda 1842. | None.           |
| **Ustilago** (Pers.) Roussel, Fl. Calvados, ed. 2: 4. 1806, basionym: Uredo [unranked] Ustilago Pers. 1801, Type: Ustilago hordei (Pers.) Lagerh. 1889, basionym: Uredo segetum a hordel Pers. 1801, or with a newly conserved type proposed by Thines (2016): Ustilago maydis (DC.) Corda 1842, basionym: Uredo maydis DC. 1815. | Angiosporus Thirum. & M.J. O’Brien 1974 in Sydowia 26: 201 (1974) [1972]. | None.           |
| Type: T. hyalina Fingerh. 1836, now regarded as Thecaphora seminis-convolvuli (Desm.) S. Ito 1935.   | Type: A. solani Thirum. & M.J. O’Brien 1974, now regarded as Thecaphora solani (Thirum. & M.J. O’Brien) Mordue 1988. | None.           |
| **Thecaphora** Fingerh. in Linnaea 10: 230. 1836.                                                    | Type: R. cardamines Lisa 1939, now regarded as Thecaphora thlaspeos (Beck) Vánky 2004.                | None.           |
| Type: T. hyalina Fingerh. 1836, now regarded as Thecaphora seminis-convolvuli (Desm.) S. Ito 1935.   | Type: R. cardamines Lisa 1939, now regarded as Thecaphora thlaspeos (Beck) Vánky 2004.                | None.           |
| **Tilletia** Tul. & C. Tul. in Ann. Sci. Nat., Bot., sér. 3 7: 112. 1847.                            | Type: T. antherarum (Oudem.) H. Scholz & I. Scholz 1988, basionym: Gloeosporium antherarum Oudem. 1898, now regarded as Thecaphora seminis-convolvuli (Desm.) S. Ito 1935. | None.           |
| Type: Tilletia caries (DC.) Tul. & C. Tul. 1847, basionym: Uredo caries DC. 1815, now regarded as T. tritici (Bjerk.) G. Winter 1875, basionym: Lycoperdon tritici Bjerk. 1775. | Type: T. alopecuri (Sawada) Zambett. 1970, basionym: Entyloma alopecuri Sawada 1922, now regarded as Tilletia alopecuri (Sawada) L. Ling 1949. | None.           |

- **Note:** The recommended names are in bold. The action required is indicated in the last column such as approval by the Nomenclature Committee for Fungi (NCF) for those generic names that do not have priority and thus need protection.
The generic names *Camptobasidium* and *Crucella* were described in the same article based on sexually and asexually typified morphs of the same species, thus they are synonyms and compete equally for use (Marvanová & Suberkropp 1990). Both are monotypic and have been used to the same extent, although *Crucella* is also the name of a fossil radiolarian, thus it is difficult to determine its usage as a fungus. Given the confusion about the use of the name *Crucella* and because preference has previously been given to sexual morph names, we recommend the use of *Camptobasidium*.

**Protect Classicula** R. Bauer et al. 2003 (S) over *Naiadella* Marvanová & Bandoni 1987 (A)

The monotypic generic name *Classicula* is typified by *C. fluitans*, which was described as the sexual morph of *N. fluitans* (Bauer et al. 2003), the type species of the monotypic generic name *Naiadella*, thus these names are synonyms. Neither name is frequently used (GS *Classicula* = 73; *Naiadella* = 86); however, the family *Classiculaceae*, order *Classiculales*, and class *Classiculomycetes* are based on the name *Classicula*, thus we recommend the use of *Classicula*.

**Use Cronartium Fr. 1815 (S) rather than Endocronartium Y. Hirats. 1969 (S)**

The generic name *Cronartium* is well known for species that cause stem rusts on conifers in temperate regions, often with alternate hosts on herbaceous plants. One of the most notorious species is *C. flaccidum*, cause of Scots pine blister rust, of which *C. asclepiadeum*, the type species of *Cronartium*, is a synonym (Mordue & Gibson 1978). *Endocronartium* was established for species genetically similar to *Cronartium* except for being autoecious (i.e. completing their life-cycle on a single host) and endoecytic (lacking aecia and uredinia and having aecidial telia) (Hiratsuka 1969). The type species of *Endocronartium*, *E. harknessii*, cause of western gall rust, has long been known to be indistinguishable from species of *Cronartium* except for the life-cycle reductions (Epstein & Buurlage 1988). With the change in the ICN, these generic names are synonyms and the six taxa of *Endocronartium* should be recognized in the older, commonly used genus *Cronartium*.

All species of *Endocronartium* have been shown to belong in the genus *Cronartium* either as synonyms or distinct species within that genus. Several new combinations are made below. In addition, *Endocronartium pini* (Willd.) Y. Hirats. (syn. *Peridermium pini* (Willd.) Lév.) has been shown to be a synonym of *C. flaccidum* (Hantuka et al. 2002).

Although some of the asexual morphs of species of *Cronartium* have been recognized in *Peridermium*, that generic name is now regarded as a synonym of *Melampsorrella* based on the type species, *Aecidium elatinum*, which is a later name for *M. caryophyllacearum* (see below under *Melampsorrella*). Thus, names in *Peridermium* must be recognized in the sexually typified genus in which the species belong, primarily *Cronartium* but also *Chrysomyxa* and *Coleosporium*. The following new combinations are required:

**Cronartium bethelli** (Hedgc. & Long) Aime & Rossman, **comb. nov.**

MycoBank MB824645

*Basionym:* *Peridermium bethelli* Hedgc. & Long, *Phytopathology* 3: 251 (1913).

**Cronartium kurilense** (Dietel) Y. Ono, **comb. nov.**

MycoBank MB824647

*Basionym:* *Peridermium kurilense* Dietel, *Bot. Jahrb. Syst.* 37: 107 (1905),

**Synonym:** *Endocronartium sahono var. hokkaidoense* Imazu & Kakish., *Trans. Mycol. Soc. Japan* 33: 174 (1992).

A blister rust fungus on *Pinus pumila* in the North Kuril Islands (southeast of Kamchatka, Russia) was described as *Peridermium kurilense*, distinct from *C. ribicola* (Dietel 1905). It was subsequently synonymized under *C. kantschaticum* (Jørstad 1934, Hiratsuka et al. 1992). An endoecy fungus on *Pinus pumila* distributed in northern Honshu, Japan, was named as *E. sahono* (Imazu et al. 1989), and a similar fungus on the same host species distributed in Hokkaido was separated as a variety, *E. sahono var. hokkaidoense* Imazu & Kakish. Based on the similarity in spore shape, size, surface structure, and PCR-RFLP pattern, *P. kurilense* and *E. sahono var. hokkaidoense* have been shown to be conspecific and distinct from *C. kantschaticum*, which is now considered a synonym of *C. ribicola* (Imazu et al. 2000, Kim et al. 2010). Thus, *P. kurilense* must be placed in *Cronartium*.  

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**Table 2. (Continued).**

| Recommended generic name | Synonymous alternate morph generic name(s) | Action required |
|--------------------------|-------------------------------------------|-----------------|
| *Urocystis* Raben. ex Fückel in Jahrb. Nassauischen Vereins Naturk. 23–24: 41. 1870 (nom. cons.). Type: *U. occulta* (Wallr.) A.A. Fisch. Waldh. 1867, basionym: *Erysibe occulta* Wallr. 1833. | *Paepalopsis* J.G. Kühn in Irmischia 7: 39, 1882. Type: *P. irmisciae* J.G. Kühn 1882, now regarded as *Urocystis primulae* (Rostr.) Vánky 1985. *Polycystis* Lév. in Ann. Sci. Nat. Bot., Ser. 3, 5: 269. 1846. Type: *P. pompholygodes* Lév. 1846, now regarded as *Urocystis anemones* (Pers.) G. Winter 1880. | None. |
Cronartium sahoanum (Imazu & Kakish.) Aime & Rossman, comb. nov.
MycoBank MB824648
Basionym: Endocronartium sahoanum Imazu & Kakish.
Trans. Mycol. Soc. Japan 30: 308 (1989).

Cronartium yamabense (Saho & I. Takah.) Aime & Rossman, comb. nov.
MycoBank MB824649
Basionym: Peridermium yamabense Saho & I. Takah., Trans. Mycol. Soc. Japan 22: 33 (1981).
Synonym: Endocronartium yamabense (Saho & I. Takah.) Paclt, Mitt. Deutsch. Dendrol. Ges. 77: 227 (1987).

Use Elateraecium Thirum. et al. 1966 (A) rather than Hiratsukamyces Thirum. et al. 1975 (S)
The generic name Hiratsukamyces, typified by H. salacincola, was established for the sexual morph of Elateraecium salacincola, type species of Elateraecium (Thirumalachar et al. 1966, 1975), thus these generic names are synonyms. Two names were included in Hiratsukamyces when it was described, each also having a name in Elateraecium for the asexual morph. Since then two more names have been added to Elateraecium by Gjaerum & Reid (1983). Both generic names are obscure but given the greater number of names, priority, and slightly greater use (GS Elateraecium = 12, Hiratsukamyces = 11), we recommend the use of Elateraecium.

Use Gerwasia Racib. 1909 (S) rather than Morispora Salazar-Yepes et al. 2007 (A)
Gerwasia, typified by G. rubi, is a well-known genus of autoecious rust fungi that occurs on Rosaceae, primarily in the Asian and American tropics (Cummins & Hiratsuka 2003). Twenty-two species have been described in Gerwasia of which 12 have asexual morphs that have been placed in Morispora, typified by M. tenella, a species with a sexual morph regarded as G. tenella (Salazar-Yepes et al. 2007). Thus, assuming that G. rubi and G. tenella are congeneric as indicated by Salazar-Yepes et al. (2007) but without molecular data, Gerwasia and Morispora are synonyms. All names in Morispora already have a name in Gerwasia. Given its priority, greater number of names, and widespread use (GS Gerwasia = 112, Morispora = 6), the generic name Gerwasia is recommended for use.

Protect Gymnosporangium R. Hedw. ex DC. 1805 (S) over Roestelia Rebent. 1804 (A)
The genus Gymnosporangium, based on G. fuscum, now recognized as G. sabinae, includes ubiquitous rust fungi that have been well-studied (Yun et al. 2009). Index Fungorum lists 145 names in this genus. The type species of Roestelia, R. cancellata, is a synonym of G. sabinae (Alexopoulos 1940, Kern 1973), thus these generic names are synonyms. Although 55 names have been placed in Roestelia, their sexual morphs belong primarily in Gymnosporangium. The need to protect Gymnosporangium was recognized many years ago; however, the proposal to conserve Gymnosporangium over Roestelia was rejected for lack of adequate justification (Rogers 1953). Because Gymnosporangium is by far the most commonly used name rather than Roestelia (GS Gymnosporangium = 6050, Roestelia = 598) and includes a greater number of species, we recommend the protection of Gymnosporangium.

Protect Helicobasidium Pat. 1885 (S) over Thanatophytum Nees 1816 (A) and Tuberculina Tode ex Sacc. 1880 (A)
Helicobasidium, typified by H. purpureum, includes 15 species, some of which cause plant diseases, such as H. purpureum, the cause of cosmopolitan violet root rot, and the closely related H. mompa, also causing violet root rot in Africa and Asia (Sayama et al. 1994). The asexual morph of H. purpureum has been regarded as Thanatophytum crocorum (Roberts 1999). Two species were mentioned in the protolog for Thanatophytum; Donk (1962) lectotypified this genus with T. crocorum. The generic name Tuberculina is lecto-typified by T. persicina (Clements & Shear 1931), a parasite of rust fungi. The relationship between these names all representing the same species was confirmed by Lutz et al. (2004) in which the life strategy of this unusual fungus was clarified. More specifically, they determined that T. persicina is a synonym of Helicobasidium purpureum. The commonly used name H. purpureum based on Hypochmus purpureus is herein proposed for protection over the older names Sclerotium crocorum and Tuberculina persicina. Among these three generic names, Helicobasidium is most commonly used (GS Helicobasidium = 2090, Thanatophytum = 67, Tuberculina = 487). Given the widespread use of Helicobasidium and the number of species in this genus, we recommend Helicobasidium for protection. In addition we recommend the name of the type species, H. purpureum, for protection.

Name for protection:
Helicobasidium purpureum (Tul.) Pat., Bull. Soc. Bot. France 32: 171 (1885).
Basionym: Hypochmus purpureus Tul., Ann. Sci. Nat., Bot., sér. 5 4: 295 (1865); nom. prot. prop.
Rejected names and synonyms; Tuber parasiticum Bull., Hist. champ. France 1: 81 (1791).
Sclerotium crocorum Pers., Syn. meth. fung. 1: 119 (1801).
Rhizoctonia crocorum (Pers.) DC., in De Candolle & Lamarc, Fl. franç., 3rd edn 5: 110 (1815).
Thanatophytum crocorum (Pers.) Nees, Syst. Pilze: 148 (1816) [*1816-17*].
Rhizoctonia medicaginis DC., in De Candolle & Lamarc, Fl. franç., 3rd edn 5: 111 (1815).
Tuberculina persicina Ditmar, in Sturm, Deutschl. Fl., Abt. 3 1: 99 (1817).
Tuberculina persicina (Ditmar) Sacc., Fungi italicae autogr. del. 17-28; tab. 964 (1881).
Protonema brebissonii Desm., Pl. crypt. N. France: no. 651 (1834).
Helicobasidium brebissonii (Desm.) Donk, Taxon 7: 164 (1958).
Rhizoctonia rubiae M.J. Decne., Rech. Anat. Physiol. Garance: 55 (1837).
Rhizoctonia violacea Tul. & C. Tul., Fung. hypog.: 188 (1851).
Among the extensive list of synonymous names, Helicobasidium purpureum is the name in Helicobasidium most commonly used for this important and ubiquitous
plant pathogen (GS Helicosporium purpureum = 627, H. berbissonii = 7). Although several names for this fungus have been placed in Rhizoctonia, the type species of Rhizoctonia is R. solani, which represents a genus in Agaricomycotina.

**Use** **Hyalopyns** Höhn. 1918 (A) **rather than** **Heterogastriadium** Oberw. & R. Bauer 1990 (S)
The generic name Hyalopyns is typified by H. hyalina. Hyalopyns blepharistoma, a synonym of H. hyalina, was regarded as the asexual morph of Heterogastriadium pycnidiioidium, the type of the monotypic generic name Heterogastriadium as explained by Oberwinkler et al. (1990) in describing the order Heterogastrioidales, now placed in Microbotryomycetes, Pucciniozymycotina (Aime et al. 2006, Toome & Aime 2014). Thus, the generic names Heterogastriadium and Hyalopyns are synonyms. Although the generic name Heterogastriadium has been used slightly more frequently (GS Heterogastriadium = 54, Hyalopyns = 43) and serves as the basis for the ordinal name, Hyalopyns has priority and its use circumvents the need for a name change for the only species, thus we recommend the use of Hyalopyns. Its use does not affect the ordinal name.

**Use** **Kriegeria** Bres. 1891 (S) **rather than** **Xenogloea** Syd. & P. Syd. 1919 (S) and **Zymoxenogloea** D.J. McLaughlin & Doublés 1992 (A)
The monotypic generic name Kriegeria Bres., typified by K. eriophori, was determined to be legitimate by Toome et al. (2015). Previously it has been confused with Kriegeria Höhnel 1914 and Kriegeria Rabenh. ex Seaver 1943, whose species are now placed in other genera in the ascomycete families Helotiaceae and Rutstroemiaceae. Kriegeria Bres. 1891 has also been confused with the later monotypic generic name Xenogloea typified by the same species, X. eriophori. An asexual morph of K. eriophori, as X. eriophori, was named Zymoxenogloea eriophori, monotype species of Zymoxenogloea, thus Kriegeria Bres. 1891, Xenogloea, and Zymoxenogloea are synonyms. Following Toome et al. (2015) and priority, we recommend the use of Kriegeria.

**Use** **Kuehneola** Magnus 1899 (S) **rather than** **Spirechina** Arthur 1907 (A)
The generic name Kuehneola, typified by K. albida, now regarded as K. uredinis (Ono 2015), includes about 25 species of rust fungi that occur primarily on species of Rubus and other Rosaceae (Cummins & Hiratsuka 2003). The generic name Spirechina, typified by S. leseneriana, has been used for the asexual morph of species of Kuehneola and Gerwasia. Spirechina leseneriana is regarded as the asexual morph of K. leseneriana (Jackson 1931). Although 13 species had been named in Spirechina, all have been placed in Gerwasia, Kuehneola, or Mainisia (Kirk 2017). Given its priority, greater number of names, and more frequent use (GS Kuehneola = 590, Spirechina = 42), we recommend Kuehneola for use.

**Protect** **Melampsorella** J. Schröt. 1874 (S) **over** **Peridermium** (Link) J.C. Schmidt & Kunze 1817 (A)
The type species of Melampsorella is M. caryophyllacearum, while Peridermium is typified with the conserved type, Aecidium elatium, as formally proposed by Hiratsuka (1974) and approved (Petersen 1975). Because the latter is regarded as a synonym of M. caryophyllacearum (Hiratsuka 1974), these generic names are synonyms. Melampsorella has five names in Index Fungorum. The asexually typified generic name Peridermium includes many species most of which have sexual morphs in Cronartium (Vogler & Bruns 1998). Given the relationship of species of Peridermium with both Melampsorella and Cronartium, we recommend abandoning the name Peridermium in favour of Melampsorella.

Although the type species of Peridermium dictates that this generic name is a synonym of Melampsorella, a number of names introduced in Peridermium belong in other rust genera, such as Cronartium, Colecosprium and several genera of Pucciniastaceae. An effort will be made to determine the correct generic placement of species described in Peridermium. Furthermore, an asexual morph can still be referred to as peridermium-like, using the term in a non-latinized form to describe a morphology.

**Protect** **Milesina** Magnus 1909 (S) **over** **Milesia** F.B. White 1878 (A)
The genus Milesina includes over 60 species, primarily occurring on Abies alternating with fens in several families. The type species, Milesina kriegeriana, occurs on Abies and Dryopteris in Europe and is known to have an asexual morph recognized as Milesia kriegeriana. The type species of Milesia is Milesia polypodii, recognized as the uredinial state of Milesia dieteliana (Laundon 1967), thus Milesina and Milesia are synonyms. Although Milesia is the older generic name and has about the same number of names as Milesina (72 vs. 67, respectively), Milesina is in broader use especially in recent literature (e.g. Berndt 2007, Kakishima et al. 2016, Klenke & Scholler 2015, Smith 2015, Tanese & Negrean 2007, Wingfield et al. 2004). For these reasons, we recommend the protection and use of Milesina.

One new combination is required:

**Milesina polypodii** (F.B. White) Aime & Rossman, **comb. nov.**

MycoBank MB824650

Basionym: Milesia polypodii F.B. White, Scott. Naturaist (Perth). 4: 163 (1878) [“1877-1878”]

Synonyms: Milesina dieteliana (Syd. & P. Syd.) Magnus, Ber. Deutsch. Bot. Ges. 27: 325 (1909).

Melampsorella dieteliana Syd. & P. Syd., Ann. Mycol. 1(6): 537 (1903).

**Protect** **Phragmidium** Link 1816 (S) **over** **Aregma** Fr. 1815 (S) and use rather than **Lecythea Lév. 1847 (A)
The generic name Phragmidium is applied to a group of rust species that occur on Rosaceae. Recent molecular studies have shown that Phragmidium is a well-defined genus in Phragmidiaeaceae and that the type species of Phragmidium, P. mucronatum, is distinct from the other species commonly encountered on dog rose, P. tuberculatum (Ritz et al. 2005,
Yun et al. (2011). Both those papers also demonstrated that *P. mucronatum* is congeneric but distinct from *P. fragariae*, the correct name for the type species of *Aregma, A. obtusatum*; thus, *Aregma* and *Phragmidium* are synonyms. Several species are mentioned in the protolog for *Aregma*; this genus was lectotypified by Laundon (1965).

The asexually typified generic name *Lecythea* is typified by *L. miniata*, based on *Uredo miniata*, and now regarded as a synonym of *P. mucronatum*. Although *Lecythea* includes 27 names, all but four have been placed in other genera (see Index Fungorum). Most of the 16 names in *Aregma* have been placed or have synonyms in *Phragmidium*, while 250 names have been described in *Phragmidium*; this generic name is much more commonly used than *Aregma* (GS *Phragmidium* = 3770, *Aregma* = 244). Given its common usage and greater number of names, we recommend that *Phragmidium* be protected.

Use *Prospodium* Arthur 1907 (S) rather than *Canasta* A.A. Carvalho & J.F. Hennen 2010 (A)

The generic name *Prospodium* includes about 50 species occurring on *Bignoniaceae* and *Verbenaceae* in tropical regions (Cummins & Hiratsuka 2003, Hernández & Hennen 2003). The generic name *Canasta* was established for asexual morphs of species of *Prospodium* (Carvalho & Hennen 2010), although the type species *C. cruscula* does not have a known sexual morph. Given that the other two names described in *Canasta* have sexualmorphs that are species of *Prospodium*, it seems likely that *Canasta* is a synonym of *Prospodium*. Given its priority, greater number of species and widespread use, we recommend the use of *Prospodium*. One new combination is necessary:

*Prospodium crusculum* (A.A. Carvalho & J.F. Hennen) Aime & Rossman, comb. nov.

**M**ycobank MB824651

**Basionym:** *Canasta cruscula* A.A. Carvalho & J.F. Hennen, *Mycologia* 102: 1088 (2010)

Use *Puccinia* Pers. 1794 (S) rather than *Aecidium* Pers. 1796 (A) and *Caemom* Link 1809 (A)

The generic name *Puccinia* is typified by *P. graminis*, the cause of the important wheat rust disease that has plagued this major food source throughout history (Schumann 1991). Several thousand names have been placed in *Puccinia*. The asexually typified generic name *Aecidium* is typified by *A. berberidis*, a name used for one of the alternate morphs of *P. graminis* (Cummins 1971), thus these generic names are synonyms. Prior to 2012, *Aecidium* was used when a sexual morph was lacking for rust fungi that appeared to have affinities with *Puccinia*. Before the changes in the ICN, the species could not be described in the “correct” genus (*Puccinia*) even though it was possible to determine its generic placement. The need for the generic name *Aecidium* no longer exists. The type species of *Caemom, C. berberidis*, is a synonym of *Puccinia graminis* (Laundon 1967), thus *Caemom* is a synonym of *Puccinia*. Given the ubiquitous use of the generic name *Puccinia*, it is recommended for use.

Use *Rhodotorula* F.C. Harrison 1928 (A) rather than *Chromotorula* F.C. Harrison 1928 (A) and *Rhodosporidium* Banno 1967 (S)

The type species of *Rhodotorula*, *R. glutinis*, was shown to be congeneric with *Rhodosporidium toruloides*, type of *Rhodosporidium*, by Wang et al. (2015a). They recognized the priority of *Rhodotorula* and placed *Rhodosporidium toruloides* in *Rhodotorula*. All 14 names described in *Rhodosporidium* have been placed in two genera, *Rhodosporidiobolus* and *Rhodotorula*. More than 150 names have been introduced in *Rhodotorula*. *Chromotorula*, typified by *C. kita*, was published in the same article as *Rhodotorula* and thus has equal priority to *Rhodotorula*. *Chromotorula* has long been considered a synonym of *Rhodotorula* (Statzell-Tallman & Fell 1998), and all but two of the six names in *Chromotorula* have been placed elsewhere. In agreement with Wang et al. (2015a) as well as priority, greater number of names, and most frequent use (GS *Rhodotorula* = 50 300, *Rhodosporidium* = 6130 Chromotorula = 30), we recommend the use of *Rhodotorula*.

Use *Septobasidium* Pat. 1892 (S) rather than *Johncouchia* S. Hughes & Cavalc. 1983 (A)

The monotypic generic name *Johncouchia*, typified by *J. maginiferae*, was described for the asexual morph of *Septobasidium pilosum* (Hughes & Cavalcanti 1983). *Septobasidium pilosum* and *S. velutinum*, the type species of *Septobasidium*, were determined to be congeneric by Henk & Vilgaly (2007). *Septobasidium* includes over 300 names, has priority and is widely used (GS *Septobasidium* = 1200, *Johncouchia* = 15), and so we recommend the use of *Septobasidium*.

*Septobasidium* has already been formally conserved against *Campylobasidium* Lagerh. ex F. Ludw. 1892, *Gausapia* Fr. 1825, and *Glenospora* 1849.

Protect *Sporobolomyces* Klyuyer & C.B. Niel 1924 (A) over *Blastoderma* B. Fisch. & Breback 1894 (A) and *Rhodomycetes* Wettst. 1885 (A) and use rather than *Aessosporon* Van der Walt 1970 (S) and *Sporidiobolus* Nyland 1950 (S)

The generic name *Sporobolomyces*, typified by *S. salmonicolor*, includes about 100 names and is widely used. An earlier generic name, *Rhodomycetes*, typified by *R. kochii*, is now considered a synonym of *S. salmonicolor* (Sampaio 2011). A second earlier monotypic generic name, *Blastoderma*, is typified by *B. salmonicolor*, the basionym of *S. salmonicolor*, thus these three generic names are synonyms. Another later name, *Sporidiobolus*, has six species, and is typified by *S. johnsonii*, a name now placed in *Sporobolomyces* (Wang et al. 2015a). The generic name *Aessosporon*, typified by *A. salmonicolor*, was described as the sexual morph of *Sporobolomyces salmonicolor* (Van der Walt 1970). Later authors showed that *A. salmonicolor* had the same heterothallic life-cycle and was conspecific with *S. salmonicolor* (Fell & Statzell-Tallman 1980), thus *Aessosporon* and *Sporobolomyces* are synonyms. Among these five generic names, *Blastoderma* has rarely been used. Although the name *Rhodomycetes* appears in the literature,
the three described species are not closely related to the type, as shown by Wang et al. (2015a). A second species of Aessosporon, A. dendraophilum, was described as the sexual morph of Bullera dendraophilum (van der Walt 1973), but is now regarded as Kwniella dendraophilia in Agaricomycotina (Liu et al. 2015), and unrelated to Sporobolomyces. Because Sporobolomyces has priority, includes about 100 names and is widely used (GS Sporobolomyces = 10 600 Rhodomyces = 183, Blastodermata = 523, Sporidiobolus = 2970, Aessosporon = 171), we recommend that Sporobolomyces be protected over Rhodomyces and Blastodermata, and that Sporobolomyces be used rather than Sporidiobolus and Aessosporon.

**Protect Uromyces (Link) Unger 1833 (S) over Uredo Pers. 1801 (A)**

The generic name Uromyces, typified by U. appendiculatus, includes over 800 names. When Persoon (1801) described *Uredo*, he included 30 species, one of which was *U. betae*. Laundon (1970) reviewed the history of the typification of the generic name *Uredo* and concluded that *U. betae* should be accepted as the type of the genus. *Uredo betae* is now considered a synonym of *Uromyces beticola* (Boerema et al. 1987, Simpson et al. 2006). *Uromyces appendiculatus* and *U. beticola* are regarded as congeneric, although species of *Uromyces* are interspersed within *Puccinia* in Pucciniaceae (Aime 2006, Demers et al. 2017, Maier et al. 2003, Wingfield et al. 2004), thus *Uromyces* and *Uredo* are synonyms. *Uredo* includes over 2000 names, but is not as widely cited as *Uromyces* (GS *Uromyces* = 26 400, *Uredo* 7500). Thus, we recommend that *Uromyces* be protected over *Uredo*.

The generic name *Uredo* has been used for uredinial morphs of rust fungi belonging to multiple rust families, and does not reflect the affinities of species. Prior to 2011, this generic name was used when a sexual morph was lacking and the species could not be described in the “correct” sexually typified genus according the Code even when it was possible to determine its generic placement. Now that placement of fungi in genera is no longer restricted by whether their types are asexual or sexual morphs, in theory the need for the generic name *Uredo* no longer exists. However, in reality rust fungi are often found without the sexual morph and it can be difficult to determine their affinities; the issue of genera typified by a sexual morphs is discussed further above (p. 76).

The generic name *Uromyces* is already conserved over *Coeomurus* Link ex Gray 1821 and *Pucciniola* L. Marchand 1829.

**COMPETING SEXUAL AND ASEXUAL GENERIC NAMES OF USTILAGINOMYCOTINA, BASIDIOMYCOTA AND RECOMMENDATIONS FOR USE**

**Use Anthracidea Bref. 1895 (S) rather than Crotalia Liro 1938 (A)**

The sexually typified genus *Anthracidea* in Ustilaginales includes over 200 names, of which 90 are accepted in Vánky (2012), while the asexually typified *Crotalia* has five names, all of which also have names in *Anthracidea*. The type species of *Anthracidea* is *A. caricus*. Initially the type species of *Crotalia*, *C. cintractiae-fischeri*, was considered to be the asexual morph of *Cintractia fischeri*; however, that species is now regarded as *Anthracidea fischeri* (Vánky 2012). Although *A. fischeri* was not included in Hendrichs et al. (2005), both *A. caricus* and *A. fischeri* are placed in *Anthracidea* by Vánky (2012), thus *Anthracidea* and *Crotalia* are synonyms.

Given its priority, the number of species, and more frequent citation in the literature (GS *Anthracidea* = 619, *Crotalia* = 234), we recommend the use of *Anthracidea*.

**Use Doassansia Cornu 1883 (S) rather than Savulescuella Cif. 1959 (A)**

The generic name *Doassansia*, typified by *D. alismatis*, includes about 12 species (Vánky 2012) while *Savulescuella*, typified by *S. alismacearum*, includes only three names. Vánky (2012) assumed that the asexual morph typified by *S. alismacearum* might be just “basidiospores of spores that germinated in situ”, nevertheless *Savulescuella* was validly published. Currently, *S. alismacearum* is considered a synonym of *D. alismatis*, making these names generic synonyms. Given its priority, number of species, and widespread use (GS *Doassansia* = 457, *Savulescuella* = 7), we recommend the use of *Doassansia*.

**Use Doassansiopsis (Setch.) Dietel 1897 (S) rather than Doassansialiella Zambett. 1970 (A)**

The generic name *Doassansiopsis* is typified by *D. deformans*. Sixteen additional names have been placed in this genus, most of which are accepted by Vánky (2012). The monotypic generic name *Doassansiella* is typified by *D. aqualitis* and has rarely been used. The type species is now regarded as *Doassansiopsis hydrophila* (Vánky 2012). Given the priority, number of species, and more extensive use (GS *Doassansiopsis* = 153, *Doassansiella* = 2), we recommend the use of *Doassansiopsis*.

*Doassansiopsis* in Urocystales should not be confused with *Doassansia* and *Doassinga* in the *Doassaniales* (Begerow et al. 2004).

**Use Entyloma de Bary 1874 (S) rather than Entylomella Höhn. 1924 (A)**

The generic name *Entylomella* was first mentioned by Höhnel (1916), although in that publication a description is lacking of either the genus or species although one species, *E. ranunculi*, is listed. Later in discussing *Cylindrosporum*, Höhnel (1924) mentioned *Entylomella* again as the conidial form of *Entyloma* and *Doassansia* species and two pages later provided a description of the type species as discussed by Braun (1995). *Entylomella ranunculi* is the type of *Entylomella*, which is now regarded as a synonym of *Entyloma ficariae*. The type species of *Entyloma* is *E. microsporum*. Begerow et al. (2002) demonstrated that *E. ficariae* and *E. microsporum* belong in *Entyloma*, thus *Entylomella* and *Entyloma* are synonyms. Over 400 names are listed in *Entyloma* and this generic name is well known (GS = 2410) while 59 names have been described in *Entylomella*, many of which have been placed elsewhere, and the name has been used infrequently (GS = 60). Given the priority, greater number of names, and familiarity, we recommend the use of *Entyloma*.
Use *Mycosarcoma* Bref. 1912 or *Ustilago* (Pers.) Roussel 1806 (S) rather than *Pseudozyma* Bandoni 1985 (A)

The yeast-like morphs of *Ustilaginales* have been described in the genus *Pseudozyma*. Boekhout (1995) showed that the type species of *Pseudozyma*, *P. prolifica*, was closely related or synonymous with *Ustilago maydis*, the cause of corn smut (Ainsworth 1965). While 26 names have been described in *Pseudozyma*, many of these have now been placed in diverse sexual genera such as *Anthracocystis*, *Dirkmeia*, *Kalmanonyza*, *Langdonia*, *Moesziomyces*, and *Sporisorium*. A controversy exists over which generic name to use for the species long referred to as *U. maydis*, an earlier name for *P. prolifica*. The generic name *Ustilago* had been considered to be typified by *U. hordei*, cause of barley smut (Clinton 1906, Vánky 2012). This and related species, such as *U. avenae*, *U. striiformis*, and *U. triticicola* were determined by McTaggart et al. (2016) to fall in a clade distinct from the one that included *U. maydis*, type of the resurrected generic name *Mycosarcoma*, which was based on morphological and cultural characteristics by Brefeld (1912). Based on molecular data, five names were included in *Mycosarcoma* by McTaggart et al. (2016), resurrecting *Mycosarcoma maydis* for the corn smut and closely related species. However, a proposal has been made to conserve the name *Ustilago* with *U. maydis* as the conserved type (Thines 2016). *Pseudozyma prolifica* is a name used for the asexual morph of *Mycosarcoma* or *Ustilago* depending on whether the NCF votes to conserve the name *Ustilago* with a new type. Because the generic name *Pseudozyma* is no longer available, the taxonomic treatment of several names in *Pseudozyma* (e.g. *P. alboarenica*, *P. thailandica*, *P. tsukubaensis*, *P. pruni*) is unclear as they cannot currently be placed with confidence in any sexually typified lineage. (Wang et al. 2015a; these species are therefore temporarily retained in *Pseudozyma* “pro tem.”

Use *Thecaphora* Fingerh. 1836 (S) rather than *Angiosorus* Thirm. & M.J. O’Brien 1974 (S), *Rhombiella* Liro 1939 (A) and *Thecaphorella* H. Scholz & I. Scholz 1988 (A)

The type species of *Thecaphora*, *T. hyalina*, is now regarded as *T. seminis-convolvuli* (Vánky et al. 2008). The type species of the asexually typified generic name *Rhombiella*, *R. cardamines*, is now regarded as *Thecaphora thlaspeos* (Vánky et al. 2008). The type of *Thecaphorella*, *T. antherarum*, was described as the asexual morph of *Thecaphora seminis-convolvuli* (Scholz & Scholz 1988). Begerow et al. (1997) demonstrated that *Thecaphora* represents a well-resolved genus in *Ustilaginales* including the types of *T. seminis-convolvuli* and *T. thlaspeos*; these three generic names are therefore synonyms. Similarly, Andrade et al. (2004) and Vánky et al. (2008) demonstrated that *Thecaphora* includes *T. seminis-convolvuli* and *T. solani* (syn. *Angiosorus* *solani*, type of the monotypic generic name *Angiosorus*), an economically important fungus causing potato smut (Mordue 1988). Vánky (2012) includes over 60 species in *Thecaphora*, under which he lists four sexually typified generic names as later synonyms, along with the rejected name *Sorosporium*. *Thecaphora* has priority, includes numerous species, and is well known (GS *Thecaphora* = 1420, *Rhombiella* = 5, *Angiosorus* = 128), thus we recommend the use of *Thecaphora*.

Use *Tilletia* Tul. & C. Tul. 1847 (S) rather than *Tilletiella* Zambett. 1970 (A)

The genus *Tilletia* has long been accepted as the name for bunt fungi with over 100 accepted species, some of which cause serious diseases of crops in the grass family such as common bunt and dwarf bunt of wheat (Hoffman 1982, Mathre 1996). *Tilletia*, typified by *T. caries*, and treated as *T. tritici*, is now placed in *Tilletiaceae* (*Tilletiales*, *Exobasidiumycetes*; Begerow et al. 2006). The monotypic *Tilletiella* was established as an asexually typified genus for *T. alopecuri*, but that species is now regarded as *Tilletia alopecuri* (Vánky 2012). *Tilletiella* is therefore a synonym of *Tilletia*. Given the priority, large number of species, and widespread use (GS *Tilletia* = 16 900, *Tilletiella* = 0), we recommend the use of *Tilletia*.

Use *Urocystis* Rabenh. ex Fuckel 1870, nom. cons. (S) rather than *Paepalopsis* J.G. Kühn 1882 (A)

The type species of *Paepalopsis*, *P. irmischiae*, is considered the asexual morph of *Urocystis primulae*, a species included in *Urocystis*, which is typified by *U. occulta* (Vánky 2012); these generic names are consequently synonyms. Vánky (2012) listed four sexually typified generic synonyms of *Urocystis*, including *Tubericina* Fr. 1832 nom. sanct. and *Polycystis* Lév., earlier names of *Urocystis* which has been conserved over them (Wakefield 1939). Three names have been placed in *Paepalopsis*, two of which are now regarded as species of *Urocystis*, while the third, *P. deformans*, is now placed in the ascomycete genus *Hapalosphaeria* as *H. deformans*. Vánky (2012) accepted over 160 species of *Urocystis* in his world monograph of smut fungi. Given the priority, number of species, and widespread use (GS *Urocystis* = 4920, *Paepalopsis* = 24), *Urocystis* remains the correct name for this genus.

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