INDEX TO UREDINEOUS CULTURE EXPERIMENTS
WITH LIST OF SPECIES AND HOSTS FOR
NORTH AMERICA.

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(Abstract.)

Careful culture work to determine life histories of fungi or
cycles of development was initiated by De Bary in 1865. It was
continued by him in 1866 and in the same year also taken up by
Oersted and Woronin. A few years later other foreign botanists
engaged in similar work, and the list continued to the present
contains such additional names as Schroeter, Rostrup, Winter,
Schenk, Cornu, Plowright, Klehan, Hartig, Dietel, Barclay,
Fischer, Tubeuf, Soppit, Tranzschal, Eriksson, Pazschke, Juel,
Wagner, Bubak, Jacky, Shirai, Müller and Ward.

In America Dr. Farlow was the pioneer worker, publishing his
first experiments on the "Gymnosporangia or Cedar Apples of
the United States" in 1880. He continued work on the same
group in 1885, and it was supplemented (independently) by Hal-
sted in 1886–7, published in the Bulletin of the Iowa Agricultural
College. More fruitful results were obtained by Thaxter in 1887 and again in 1889,—the connection between the several species of Gymnosporangium and associated Roestelia occurring in this country being satisfactorily established, which may be found in print in the Proceedings of the American Academy of Arts and Sciences, Boston; and Bulletin 134, Conn. Agr. Exp. Sta. Pammel repeated the experiment verifying connection in case of one of the species (Ia. Hort. Soc. Rep. 1893), the same also by Stewart and Carver (Proc. Ia. Acad. Sci. for 1895, Vol. 3; same in N. Y. Exp. Sta. for 1895).

No connections between Uredineous forms were then experimentally determined—except that Howell (in 1890) showed the three stages of the Clover Rust to be genetically related, and Clinton (in 1894) the two stages of the Bramble Rust—until 1899, when extended and important work was reported by Arthur and by Carleton. The latter dealt with the Cereal Rusts only, making sowings almost exclusively of Uredospores mainly from Wheat, Oats, Barley, Rye and Maize, on the same and on different host species. The interesting results were published as Bulletin No. 16, U. S. Dept. Agr. Div. Veg. Physiology and Pathology, April 23, 1899.

Arthur communicated his first results to the public in a paper read before the A. A. A. S., Botanical Section, Columbus, Ohio, August, 1889, and the same was published in the Botanical Gazette, 29: 268–276, April, 1900. Of eleven species of Uridineae, the aecidial and teleutosporic forms were definitely connected by these cultures. In the Journal of Mycology (8: 51–6), June, 1902, he reported cultures made in 1900 and 1901—successful inoculations in eight cases, four being repetitions of previously demonstrated connections, and the complete cycle for four being reported here for the first time. Arthur’s third report (cultures in 1902) was published in the Botanical Gazette (35: 10–23) for January, 1903. The successful cultures made number eleven previously reported and seven reported for the first time.

In 1902 cultures were undertaken by Kellerman. The first case of demonstrated connection was published in the Journal of Mycology (8: 20), May, 1902, and appeared in the same periodical (9: 6–13) in February, 1903. This showed seven successful inoculations, two of these not having been previously demonstrated. The second report (continuing his work during 1903), detailing more extended cultures, was given in part in the Journal of Mycology (9: 109–10), May, 1903, and the year’s work is reported in full in the Journal, December Number, 1903.

This brief historical outline shows that as yet comparatively few American mycologists have undertaken culture work to determine life cycles of our numerous species of Uredineae.
Space precludes giving here a detailed record of work by American botanists, but the paper in full is published in the Journal of Mycology, also printed on one side of page as a separate. The following is a summary of the alternate forms whose connection has been demonstrated:

**SUMMARY OF ALTERNATE FORMS.**

- Aecidium albiperidium Arth.—Puccinia albiperidia Arth.
- Aecidium asteratum Schw.—Puccinia carices-asteris Arth.
- Aecidium berberidis Pers.—Puccinia poculiformis (Jacq.) Wettst.
- Aecidium calystegiae Desm.—Puccinia convolvuli Cast.
- Aecidium caulicolum Kellerm.—Puccinia caulicola Tr. & Gall.
- Aecidium cirsii-lanceolati Kellerm.—Puccinia circii lanceolati Schroet.
- Aecidium ellisi Tr. & Gall.—Puccinia subnitens Diet.
- Aecidium erigeronatum Schw.—Puccinia carices-erigerontis Arth.
- Aecidium euphorbiae Am. Auct.—Uromyces euphorbiae C. & P.
- Aecidium fraxini Schw.—Puccinia fraxinata (Lk.) Arth.
- Aecidium on Helianthus.—Puccinia helianthi Schw.
- Aecidium impatients Schw.—Puccinia impatients (Schw.) Arth. (P. rubigovea Auct. on Elymus virginicus.)
- Aecidium jamesianum Pk.—Puccinia jamesiana (Pk.) Arth. (P. bartholomaei Diet.)
- Aecidium on Larix decidua, see Caemona on Larix decidua.
- Aecidium lateripes Kellerm.—Puccinia lateripes B. & Rav.
- Aecidium leucospermum B. & C.—Uromyces lespedezae procumbentis (Schw.) Curt.
- Aecidium lycopi Ger.—Puccinia angustata Pk.
- Aecidium oenotherae Pk., see Aecidium peckii DeToni.
- Aecidium pammelii Trel.—Puccinia panici Diet.
- Aecidium peckii DeToni (Ae. oenotherae Pk.)—Puccinia peckii (DeToni) Kellerm. (P. carices Auct. p. p.)
- Aecidium pentstemonis Schw.—Puccinia andropogonis Schw.
- Aecidium plantaginis Ces. (?) on Plantago rugelii Dec.—Uromyces aristidae E. & E.
- Aecidium pteleae B. & C.—Puccinia windsoriae Schw.
- Aecidium postulatum Curt.—Puccinia postulata (Curt.) Arth.
- Aecidium [ranunculacearum (?)] on Anemone canadensis L.—Puccinia simplex Arth.
- Aecidium ranunculi Schw.—Puccinia eatoniae Arth.
- Aecidium ramni Pers.—Puccinia ramni (Pers.) Wettst. (P. coronata Corda.)
- Aecidium rubellum Pers.—Puccinia phragmitis Schum.
- Aecidium sambuci Schw.—Puccinia sambuci (Schw.) Arth. (P. atkinsoniana Diet., P. bolleyana Sacc.)
- Aecidium smilacis Schw.—Puccinia amphigena Diet.
- Aecidium solidaginis Schw.—Puccinia carices-solidaginis Arth.
- Aecidium on Solidago—Uromyces solidagini-caricis Arth.
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Aecidium on Strophistyles helvola—Uromyces phaseoli (Pers.) Wint.

Aecidium on Trifolium, see Uromyces trifolii (A. & S.) Wint.

Aecidium urticae Schum.—Puccinia carisic (Schum.) Reb.

Aecidium verbenicola K. & S.—Puccinia vilfae A. & H.

Caema (Aecidium) erigeronatum Schw., see Aecidium erigeronatum Schw.

Caema (Aecidium) hibisciatum Schw., see Puccinia hibisciata (Schw.) Kellerm.

Caema on Larix decidua—Melampsora medusae Thüm. [M. populina Am. Auct.]

Caema miniata Am. Auct.—Phragmidium speciosum Fr.

Caema nitens Schw., see Gymnoconia interstitialis (Schlect.) Lagh.

Caema ulmariae Thüm.—Triphragmium ulmariae (Schum.) Lk.

Gymnoconia interstitialis (Schlecht.) Lagh., aecidium (Caema nitens Schw.), and teleuto (Puccinia peckiana Howe); autoecious.

Gymnosporangium bisepatum Ell.—Roestelia botryapites Schw.

Gymnosporangium clavariaeforme (Jacq.) Rees.—Roestelia lacerata (Sow.) Fr.

Gymnosporangium clavipes Cke. & Pk.—Roestelia aurantiaca Peck.

Gymnosporangium conicum Rees.—Roestelia cornuta (Ehrh.) Fr.

Gymnosporangium ellisii (Berk.) Farl.—Roestelia transformans Ellis (?).

Gymnosporangium globosum Farl.—Roestelia globosum (“lacerata z”) Thaxter.

Gymnosporangium macropus Lk.—Roestelia pyrata Thaxter.

Gymnosporangium nidus-avis Thaxter—Roestelia nidus-avis Thaxter.

Melampsora medusae Thüm [M. populina Am. Auct.].—Caema on Larix decidua.

Melampsora populina Am. Auct., see Melampsora medusae Thüm.

Phragmidium speciosum Fr.—Caema miniata Am. Auct.

Puccinia albiperidia Arth., aecidium [albiperidium Arth.], uredo and teleuto; autoecious.

Puccinia americana Lagh., see Puccinia andropoginis Schw.

Puccinia americana Lagh.—Aecidium lycopi Ger.

Puccinia angustata Pk.—Aecidium lycopi Ger.

Puccinia atkinsoniana Diet. see Puccinia sambuci (Schw.) Arth.

Puccinia bartholomaei Diet., see Puccinia jamesiana (Pk.) Arth.

Puccinia bolleyana Sacc., see Puccinia sambuci (Schw.) Arth.

Puccinia carisic (Schum.) Reb.—Aecidium urticae Schum.


Puccinia carisic-asteris Arth.—Aecidium asteratum Schw.

Puccinia erigerontis Arth.—Aecidium erigeronatum Schw.

Puccinia carisic-solidaginis Arth.—Aecidium solidaginis Schw.

Puccinia caulicola Tr. & Gall., aecidium [caulicolum Kellerm.], uredo and teleuto; autoecious.

Puccinia cirsi-lanceolati Schroet., aecidium [cirsi-lanceolati Kellerm.], uredo and teleuto; autoecious.

Puccinia convolvuli Cast., aecidium [calystegiae Desm.], uredo and teleuto; autoecious.

Puccinia coronata Corda, see Puccinia rhamni (Pers.) Wettst.

Puccinia eatoniae Arth.—Aecidium runcunci Schw.
Puccinia fraxinata (Lk.) Arth.—Aecidium fraxinii Schw.
Puccinia graminis, see Puccinia poculiformis (Jacq.) Wettst.
Puccinia helianthi Schw., aecidium [Caeoma helianthi Schw.], uredo and teleuto; autoecious.
Puccinia hibisciata (Schw.) Keller. (P. muhlenbergiae Arth. & Holw.)—Aecidium hibisciatum Schw.
Puccinia hydnoidea (B. & C.) Arth.—Aecidium hydnoideum B. & C.
Puccinia impatiens (Schw.) Arth. (P. rubigo-vera Auct. on Elymus virginicus)—Aecidium impatiens Schw.
Puccinia jamesiana (Pk.) Arth. (P. bartholomaei Diet.)—Aecidium jamesianum Pk.
Puccinia lateripes B. & Rav., aecidium [lateripes Kellerm.], uredo and teleutospores; autoecious.
Puccinia muhlenbergiae Arth. & Hol., see Puccinia hibisciata (Schw.) Keller.
Puccinia panici Diet.—Aecidium pammelii Trel.
Puccinia peckiana Howe, see Gymnoconia interstitialis (Schlecht.) Lagh.
Puccinia peckii (DeTon) Keller. (P. caricos Am. Auct. p. p.)—Aecidium peckii DeTon (Ae. oenotherae Pk.).
Puccinia phragmitis (Schum.) Korn.—Aecidium phragmitis (Schum.) Korn.
Puccinia poculiformis (Jacq.) Wettst.—Aecidium berberidis Pers.
Puccinia pustulata (Curt.) Arth.—Aecidium pustulatum Curt.
Puccinia rubigo-vera Am. Auct. on Elymus virginicus, see Puccinia impatiens (Schw.) Arth.
Puccinia sambuci (Schw.) Arth. (P. atkinsoniana Diet., P. bolleyana Sacc.)—Aecidium sambuci (Schw.) Arth.
Puccinia simillima Arth.—Aecidium [ranunculacearum (?)] on Anemone canadensis L.
Puccinia subnitens Diet.—Aecidium ellisi Tr. & Gall.
Puccinia vilfae A. & H.—Aecidium verbenicolae K. & S.
Puccinia windsorae Schw.—Aecidium pteleae B. & C.
Roestelia aurantiaca Pk.—Gymnosporangium clavipes Cke. & Pk.
Roestelia botryapites Schw.—Gymnosporangium bisepatum Ell.
Roestelia cornuta (Ehr.) Fr.—Gymnosporangium conicum Rees.
Roestelia globosum ("lacerata z") Thaxter—Gymnosporangium globosum Farl.
Roestelia lacerata (Sow.) Fr.—Gymnosporangium clavariaeforme (Jacq.) Rees.
Roestelia nidus-avis Thax.—Gymnosporangium nidus-avis Thaxter.
Roestelia pyrata Thaxter—Gymnosporangium macropus Lk.
Roestelia transformans Ell. (?)—Gymnosporangium ellisi (Berk.) Farl.
Triphragmium ulmariae (Schum.) Lk.—Caeoma ulmariae Thüm.
Uromyces aristidae E. & E—Aecidium plantaginis Ces. (?) on Plantago rugelii Dec.
Uromyces solidaginis-caricis Arth.—Aecidium on Solidago.
Uromyces lespedezae-procumbentis (Schw.) Curt., aecidium [leucosperum B. & C.], uredo and teleuto; autoecious.
Uromyces phaseoli (Pers.) Wint., aecidium, uredo and teleuto; autoecious.
Uromyces trifolii (A. & S.) Wint., aecidium, uredo and teleuto; autoecious.