

THE UREDINALES OF INDIANA III.<sup>1</sup>

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The following report on the rusts of Indiana is supplementary to lists published in the Proceedings of the Indiana Academy of Science for 1915 and for 1917.<sup>2</sup>

The present paper is divided into two parts. In the first part an attempt has been made to list all the unrecorded hosts for species included in the 1915 and 1917 lists. Most of these host records represent new collections. Some of them, however, are corrections to previous determinations, while others represent collections which were overlooked. In a few cases the determination of the rust has been found to be incorrect and corrections of such have also been made. No attempt has been made to list the large number of collections which have been made on hosts already recorded. The number preceding the species name in this paper is the same used for that species in previous lists. The nomenclature, however, is not the same. In the 1915 list the nomenclature used was that proposed by Dr. J. C. Arthur and based largely on life histories. In the present list the more familiar generic names *Puccinia* and *Uromyces* are retained. In each case, however, the name used in the 1915 list is given as a synonym.

In the second part, twelve rust species which are new to the flora of Indiana are recorded. These are numbered consecutively with the two previous lists and bring the total number of species for the state to 167 (Nos. 36 and 70 are to be dropped so that the real total is 165).

In order that the series may be more useful to collectors a complete host index has been prepared by Miss Evelyn Allison and is appended.

Acknowledgment is gratefully made to all those who have contributed specimens. The name of the collector is given for each collection except where made by the writer. Special acknowledgment is due Mr. C. C. Deam who through his keen observations and knowledge of the state flora has made many notable additions. Mrs. Agnes Chase, Mr. K. K. Mackenzie and Mr. Paul C. Standley have determined many of the hosts.

All of the collections recorded are represented in the Arthur herbarium at the Purdue University Agricultural Experiment Station.

## ADDITIONS AND CORRECTIONS TO PREVIOUS LISTS.

6. *COLEOSPORIUM SOLIDAGINIS* (Schw.) Thüm.

ON *SOLIDAGO BICOLOR* L.

Two miles east of Corydon, Harrison Co., Oct. 6, 1920, C. C. Deam 33455.

ON *SOLIDAGO ERECTA* PURSH.

North of St. Joe, Clarke Co., Oct. 25, 1916, C. C. Deam, 22468.

ON *SOLIDAGO JUNCEA* AIT.

One-half mile south of West Lafayette, Tippecanoe Co., Oct. 30, 1920.

<sup>1</sup>Contribution from the Department of Botany, Purdue University Agricultural Experiment Station.

<sup>2</sup>Jackson, H. S. The Uredinales of Indiana. Ind. Acad. Sci. Proc. 1917: 429-475. 1916. The Uredinales of Indiana II. Ind. Acad. Sci. Proc. 133-137 1918.

## 8. COLEOSPORIUM VERNONIAE B. &amp; C.

ON VERNONIA ILLINOENSIS GLEASON.

Bank of Iroquois river, north of Kentland, Newton Co., Aug. 30, 1916,  
C. C. Deam 21529.

## 12. MELAMPSORA BIGELOWII Thüm.

The specimen reported on *Salix Wardi* Bebb. in the 1915 list has been  
examined by Dr. C. R. Ball who determines it as on *S. cordata* Muhl.

## 15. PUCCINIASTRUM AGRIMONIAE (Schw.) Trautz.

ON AGRIMONIAE ROSTELLATA WALLR.

One mile northwest of Tunnelton, Lawrence Co., July 16, 1919, C. C.  
Deam 28146.

## 21. PUCCINIA BARDANAE Corda.

*Bullaria Bardanae* (Corda) Arth.

The host for all collections in Indiana should be *Arctium minus* Schk.  
not *A. Lappa* L.

## 25. PUCCINIA HIERACII (Schum.) Mart.

*Bullaria Hieracii* (Schum.) Arth.

ON HIERACIUM CANADENSE MX.

One mile east of Kantz, Porter Co., Sept. 13, 1919, C. C. Deam 29824.

## 26. PUCCINIA KUHNIAE Schw.

*Bullaria Kuhniae* (Schw.) Kern.

This species has been previously recorded as on *Kuhnia eupatorioides* L.  
All Indiana collections, according to Mr. Deam, are more properly referred  
to *K. glutinosa* Ell. In the 1915 list this was recorded from Harrison and  
Tippecanoe counties. Specimens are now at hand also from Greene Co.

## 29. PUCCINIA ASTERIS Duby.

*Dasyispora Asteris* (Duby) Arth.

ON ASTER LATERIFLORUS (L.) BRITTON.

One-half mile southeast of Shelby, Lake Co., Oct. 14, 1920.

ON ASTER SALICIFOLIUS AIT.

Franklin, Johnson Co., Oct. 7, 1915, F. J. Pipal.

36. The specimen on which the record for *Puccinia Ranunculi* Seym. was  
based (c. f. Underwood, Proc. Ind. Acad. Sci. 1893:55) has recently been  
examined and the rust proves to be *Polythelid fusca* (Pers.) Arth. (c. f. no.  
135) and the host *Ancmona quinquefolia* L.

The error in determination has been perpetuated through all the previous  
lists of Indiana rusts. There is some discrepancy in the records but  
there seems to have been but one collection involved, which was made  
in Montgomery County in June, 1893, by E. W. Olive and A. A. Hughart,  
or it was collected by Hughart and communicated to Underwood by Olive.

*Puccinia Ranunculi* Seym. is therefore to be stricken from the Indiana  
flora. It is a very rare rust known in North America only from the type  
collection, which is now interpreted as on *Ranunculus septentrionalis* Poir.  
made by Dr. J. C. Arthur at Riverside, Chicago, Ill., June 2, 1883, and one  
from Mexico on *Ranunculus* sp.

The name *Puccinia Ranunculi* Seym. (1884) is untenable as Blytt used it in 1882 for another rust. Recent studies made by the writer indicate that the species is identical with *P. andina* Diet. & Neger (1899) collected in Chile, South America and that this name should replace *P. Ranunculi* Seym.

## 42. PUCCINIA ANDROPOGONIS Schw.

*Dicacoma Andropogonis* (Schw.) Kuntze.

I ON PENSTEMON PENSTEMON (L.) BRITTON.

Wooded limestone slope, 3 miles north of Milltown, Crawford Co., May 28, 1919, C. C. Deam 27698.

## 43. PUCCINIA ANGUSTATA Peck.

*Dicacoma angustatum* (Peck) Kuntze.

ON KOELLIA VIRGINIANA (L.) MACM.

Lafayette, Tippecanoe Co., June 13, 1899, J. C. Arthur.

## 48. PUCCINIA CANALICULATA (Schw.) Lagerh.

*Dicacoma canaliculatum* (Schw.) Kuntze.

ON CYPERUS SPECIOSUS VAHL.

Freedom, Owen Co., Sept. 22, 1917, C. C. Deam.

The record of this rust on *C. Engelmannii* Steud. made in the 1915 list is found to have been based on an error in host identification. The host is now interpreted as *C. strigosus*. Some of the collections recorded in the previous papers are now separated as *Puccinia Cyperi* Arth. and are relisted as No. 162 of the present list.

## 49. PUCCINIA SEYMOURIANA Arth.

*Dicacoma Cephalanthi* (Seym.) Jackson.

I ON APOCYNUM CANNABINUM L.

Four miles south of Corydon, Harrison Co., June 26, 1916, C. C. Deam 20497.

## 51. PUCCINIA CLEMATIDIS (DC.) Lagerh.

*Dicacoma Clematidis* (DC.) Arth.

I ON ANEMONE VIRGINIANA L.

Lafayette, Tippecanoe Co., 1894, K. E. Golden.

III ON AGROPYRON SMITHII RYDB.

Along Wabash railroad, near Wea Creek, Tippecanoe Co., Sept. 15, 1920, with E. B. Mains.

## 52. PUCCINIA CONOCLINI Seymour.

*Dicacoma Conoclini* (Seym.) Kuntze.

ON EUPATORIUM INCARNATUM WALT.

Wooded ridge, 8 miles southeast of Cannelton, Perry Co., Oct. 1, 1920, C. C. Deam 33185.

The host is a rare plant, collected for the first time in Indiana by Mr. Deam in 1919. The rust is known on this host otherwise only from Louisiana. Specimens are now at hand of this rust on *E. coelestinum* from Bartholomew, Perry, Crawford and Orange Counties.

## 56. PUCCINIA ELEOCHARIDIS Arth.

*Dicacoma Eleocharidis* (Arth.) Kuntze.

ON ELEOCHARIS OBTUSA (Willd.) Schr.

One and one-fourth miles east of Palmyra, Harrison Co., Oct. 13, 1916, C. C. Deam 22415.

61. PUCCINIA ASTERUM (Schw.) Kern.

*Accidium Asterum* Schw.

*Puccinia extensicola* Plowr.

*Dicoma extensicola* (Plowr.) Kuntze.

I ON ASTER PUNICEUS L.

Howe, Lagrange Co., May 23, 1912, J. C. Arthur.

ON BRACHYCHAETA SPIRACELATA (Raf.) BRITTON.

Wooded bluff of Ohio river, six miles east of Cannelton, Perry Co., May 20, 1918, C. C. Deam 24987.

ON ERIGERON PULCHELLUS MICHX.

Lafayette, Tippecanoe Co., May 29, 1894, K. E. Golden (formerly reported as on *Solidago flexicaulis* L.).

III ON CAREX ABDITA BICKNELL.

One-half mile southwest Chestnut Ridge, Jackson Co., May 11, 1913, C. C. Deam 12716.

ON CAREX MUSKINGUMENSIS SCHW.

One-half mile south of Wilders Station, Laporte Co., Oct. 5, 1920.

ON CAREX NORMALIS MACK.

West Lafayette, Tippecanoe Co., June 22, 1912, C. R. Orton.

ON CAREX STIPATA MUHL.

Lafayette, Tippecanoe Co., July 9, 1898, L. Snyder.

ON CAREX TRIBULOIDES WAHL.

French Lick, Orange Co., Dec. 28, 1913, Arthur & Ludwig; Winona Lake, Kosciusko Co., June 26, 1914, G. N. Hoffer.

ON CAREX VARIA MUHL.

Everton, Fayette Co., May 1, 1915, C. A. Ludwig; North Madison, Jefferson Co., Apr. 23, 1916, J. B. Demaree.

The collections recorded under *Solidago canadensis* L. in the 1915 list should all be referred to *S. altissima* L. Collections are at hand on *S. canadensis*, however, from Lafayette, Tippecanoe Co., May 15, 1901, and April 25, 1902, collected by J. C. Arthur.

The collections recorded in the 1915 list as on *Carex conoides* Schk. and *C. tetanica* Schk. (now referred to *C. blanda* Dewey) are now considered to be *Puccinia Grossulariae* (Schum.) Lagerh. (c. f. No. 63).

62. PUCCINIA FRAXINATA (Lk.) Arth.

*Cacomia fraxinatum* Lk.

*Dicoma fraxini* (Schw.) Arth.

I ON FRAXINUS PROFUNDA BUSH.

In swamp ten miles southwest of Mt. Vernon, Posey Co., June 15, 1918, C. C. Deam 25426.

63. PUCCINIA GROSSULARIAE (Schum.) Lagerh.

*Dicoma Grossulariae* (Schum.) Kern.

I ON GROSSULARIA HIRTELLA (MICHX.) SPACH.

Lagrange Co., June 8, 1915, C. C. Deam.

ON RIBES AMERICANA MILL.

Two miles northwest of Rochester, Fulton Co., June 7, 1920, C. C.

Deam 31023; one-half mile east of St. Joe, DeKalb Co., May 25, 1920. C. C. Deam 30392.

ON RIBES VULGARE LAM.

Royal Center, Cass Co., May, 1912. comm. C. H. Baldwin.

III ON CAREX CEPHALOPHORA MUHL.

Lafayette, Tippecanoe Co., June 24, 1898, L. Snyder.

ON CAREX CONOIDEA SCHK.

Lafayette, Tippecanoe Co., July 21, 1900, Wm. Stuart; Oct. 26, 1901, J. C. Arthur; Oct. 11, 1914, July 18, 1914, F. D. Fromme; June 24, 1914, Pipal, Orton. Fromme; Mattsville, Hamilton Co., Aug. 8, 1905, G. W. Wilson.

ON CAREX LUPULIFORMIS SARTW.

South Bend, St. Joseph Co., Sept. 24, 1917. E. Bartholomew (N. Am. Ured. 1942).

ON CAREX PUBESCENS MUHL.

Lafayette, Tippecanoe Co., April 30, 1901. J. C. Arthur.

ON CAREX SPARGANIOIDES MUHL.

Lafayette, Tippecanoe Co., Oct. 7, 1896, L. Snyder.

The collections referred in the 1915 list to *Carex digitalis* Willd., *C. laxiflora* Lam. and *C. tetanica* Schk. are now all to be considered as on *C. blanda* Dewey.

The collection recorded above on *C. pubescens* was included in the 1915 list as on *C. hirtifolia*, of which *C. pubescens* was then considered a synonym. The two host species are now considered distinct and the Indiana collection is on *C. pubescens*.

64. PUCCINIA HELIANTHI Schw.

*Dicaeoma Helianthi* (Schw.) Kuntze.

ON HELIANTHUS DECAPETALUS L.

West Lafayette, Tippecanoe Co., Sept. 4, 1915, C. A. Ludwig (Barth. N. Am. Ured. 1550), Sept. 11, 1915 (Barth. N. Am. Ured. 1402), Oct. 3, 1915, H. C. Travelbee, Oct. 1, 1916.

ON HELIANTHUS LAETIFLORUS PRES.

Rust garden, south of West Lafayette, Tippecanoe Co., Oct. 3, 1915.

ON HELIANTHUS SCABERRIMUS ELL.

Paoli, Orange Co., Sept. 28, 1915.

66. PUCCINIA HIBISCIATA (Schw.) Kellerm.

*Dicaeoma hibisciatum* (Schw.) Arth.

ON MELICA MUTICA WALT.

Lafayette (Elston), Tippecanoe Co., July 28 and Oct. 22, 1899, Wm. Stuart, May 13 and 29, 1903, J. C. Arthur.

ON MUEHLENBERGIA RACEMOSA (MICHX.) B. S. P.

West Lafayette, Tippecanoe Co., Dec. 3, 1901, Wm. Stuart.

ON MUEHLENBERGIA SOBOLIFERA (MUHL.) TRIN.

Lafayette, Tippecanoe Co., Oct. 2, 1896, L. Snyder.

69. PUCCINIA MAJANTHAE (Schum.) Arth. & Holw.

*Dicaeoma Majanthae* (Schum.) Arth.

ON IRIS VERSICOLOR L.

DeMotte, Jasper Co., June 22, 1915. J. C. Arthur.

The connection of the Accidium on *Iris versicolor* with telia on *Phalaris*

*arundinacea* L. was established in this laboratory in 1917, based on field observations made in 1916 by Prof. H. H. Whetzel and the writer in the vicinity of N. Spencer, New York.

70. The collection on *Melica nutica* Walt. recorded as *Dicucoma Melicae* (Syd.) Arth. under this number is now referred to *Puccinia hibisciata* (Schw.) Kellerm., *Dicucoma hibisciatum* (Schw.) Arth. See No. 66. *Puccinia Melicae* Syd. is now considered a synonym of *Dicucoma Rhamni* (Pers.) Kuntze (*P. coronata* Corda) (See No. 86 of 1915 list) and is known in North America only on *Melica purpurascens* from Wisconsin.

71. PUCCINIA MENTHAE PERS.

*Dicucoma Menthae* (Pers.) S. F. Gray.

ON KOELLIA FLEXUOSA (WALT.) MACM.

Three miles south of Marengo, Crawford Co., Oct. 5, 1920, C. C. Deam 33403.

ON MONARDA PUNCTATA L.

Fair Oaks, Jasper Co., May 12, 1904, J. C. Arthur.

76. PUCCINIA OBTECTA Pk.

*Dicucoma oblectum* (Pk.) Kuntze.

I ON *Bidens frondosa* L.

One-half mile northeast of Dayton, Tippecanoe Co., July 5, 1920.

ON *BIDENS TRICHOSPERMA* (MICHX.) BRITTON.

One-half mile northeast of Dayton, Tippecanoe Co., July 5, 1920.

79. PUCCINIA HIERACIATA (Schw.) Jackson.

*Accidium hieraciatum* Schw.

*Dicucoma patruclis* (Arth.) Jackson.

The collection recorded in the 1915 list as on *Lactuca floridana* is now referred to *L. canadensis*.

80. PUCCINIA PECKII (DeToni) Kellerm.

*Accidium Peckii* DeToni.

*Dicucoma Peckii* (DeToni) Arth.

ON *CAREX LAEVICONICA* DEWEY.

DeMotte, Jasper Co., Nov. 6, 1913, J. C. Arthur & F. D. Kern.

ON *CAREX LUPULIFORMIS* SARTW.

One mile southwest of Shelby, Lake Co., Oct. 14, 1920.

ON *CAREX WILLDENOVII* SCHK.

State Reservation, Clark Co., May 11, 1910, C. C. Deam 5875.

81. PUCCINIA POCULIFORMIS (Jacq.) Wettst.

*Puccinia graminis* Pers.

*Dicucoma poculiforme* (Jacq.) Kuntze.

III ON *AGROPYRON REPENS* (L.) BEAUV.

Wolcottville, Lagrange Co., Aug. 1, 1919, L. S. Cheney.

ON *ALOPECURUS ARISTULATUS* MICHX.

Lakeville, St. Joseph Co., Aug. 9, 1919, L. S. Cheney.

ON *BROMUS PURGANS* L.

North of West Lafayette, Tippecanoe Co., Oct. 1, 1916.

ON *ELYMUS CANADENSIS* L.

Commersville, Fayette Co., Sept. 11, 1919, L. S. Cheney.

ON ELYMUS VIRGINICUS L.

Paoli, Orange Co., Sept. 27, 1915: Wilders Laporte Co., Oct. 1920.

ON FESTUCA ELATIOR L.

Angola, Steuben Co., Aug. 18, 1919, L. S. Cheney.

Most of the above collections were made in connection with a national investigation of overwintering of stem rust. No overwintering of urediniospores was found to occur in Indiana during 1919.

In the 1915 report only a single collection of the aecidium of this species on *Berberis vulgaris* was recorded. In connection with the barberry eradication campaign for the control of stem rust, which is being conducted co-operatively between Purdue University and the U. S. Dept. of Agriculture, a large number of collections and observations have been made showing that this aecidium may develop in abundance on the barberry in all parts of the state. Specimens collected in 1918 and 1919 are now preserved in the Arthur herbarium from the following counties in Indiana: Allen, Franklin, Henry, Jay, Lagrange, Laporte, Noble, St. Joseph, Vanderburgh, Wabash and Wayne.

86. PUCCINIA RHAMNI (Pers.) Wettst.

*Dicaeoma Rhamni* (Pers.) Kuntze.

I ON RHAMNUS ALNIFOLIA L'HER.

In a tamarack swamp 2 miles north of Porter, Porter Co., June 3, 1916. C. C. Deam 20027.

III ON ALOPECURUS ARISTULATUS MICHX.

Lakeville, St. Joseph Co., Aug. 9, 1919, L. S. Cheney.

88. PUCCINIA SAMBUCI (Schw.) Arth.

*Dicaeoma Sambuci* (Schw.) Arth.

I ON SAMBUCUS PUBENS MICHX.

The Shades, Montgomery Co., May 26, 1899, J. C. Arthur.

III ON CAREX LUPULIFORMIS SARTW.

One mile southeast of Shelby, Lake Co., Oct. 14, 1920.

89. PUCCINIA MARYLANDICA Lindr. Medd. Stockh. Högsk. Bot. Inst. 4<sup>o</sup>:2, 1901.

This was previously recorded as *Dicaeoma Saniculae* (Grev.) Kuntze (*Puccinia Saniculae* Grev.) and has been commonly referred to that species by American authors. *P. Saniculae*, however, is not an American species.

Collections have been made on *Sanicula canadensis* L.? in Montgomery and Washington Counties. The Montgomery Co. specimens made by Rose and reported by Underwood (Proceedings Ind. Acad. 1893:55) have not been seen.

90. PUCCINIA SMILACIS Schw.

*Dicaeoma Smilacis* (Schw.) Kuntze.

ON SMILAX BONA-NOX L.?

Wooded bank of Ohio river, south of Leavenworth, Crawford Co., Oct. 5, 1920, C. C. Deam 33411.

94. PUCCINIA URTICAE (Schum.) Lagerh.

*Dicaeoma Urticae* (Schum.) Kuntze.

ON CAREX TRICHOCARPA MULL.

Lafayette, Tippecanoe Co., April 13, 1906, G. W. Wilson & F. D. Kern;  
West Lafayette, Tippecanoe Co., Sept. 29, 1914, C. A. Ludwig.

The collections reported in the 1915 list on *Carex stricta* Lam. are now all to be considered as occurring on *C. Emoryi* Dewey.

95. PUCCINIA VERBENICOLA (Eh. & Kellerm.) Arth.  
*Dicaeoma verbenicolum* (Eh. & Kellerm.) Arth.

I ON VERBENA HASTATA L.

One-half mile northwest of Dayton, Tippecanoe Co., July, 5, 1920.

97. PUCCINIA VEXANS FARL.  
*Dicaeoma vexans* (Farl.) Kuntze.

ON ATHEROPOGON CURTIPENDULUS (MICHX.) FOURN.

It was stated in the 1915 list that the specimen on which this record was based (Lafayette, Tippecanoe Co., May 22, 1902, Wm. Stuart) was not available and the determination was doubtful. The specimen has since been located and deposited in the Arthur herbarium. It is found to be correctly determined. An earlier collection, which was overlooked, was made at Lafayette, July 11, 1900, by Wm. Stuart and distributed in Arthur & Holway's Uredineae Exsiccati et Icones, No. 58a and 58d.

Collections were also made by the writer in 1920 at two different points on Wea Creek, south of Lafayette, on Sept. 15 and Oct. 23.

98. PUCCINIA VIOLAE (Schum.) DC.  
*Dicaeoma Violae* (Schum.) Kuntze.

ON VIOLA MISSISSOURIENSIS GREENE.

Waveland (Shades), Montgomery Co., May 16, 1913, J. C. Arthur.

102. GYMNOSPORANGIUM GERMINALE (Schw.) Kern.

I ON AMELANCHIER LAEVIS X HUMILIS (according to K. M. Wiegand).

Wooded dune bordering Lake Michigan, east of Waverly beach, Porter Co., June 10, 1920, C. C. Deam 31498.

III ON JUNIPERUS VIRGINIANA L.

North Madison, Jefferson Co., May 10, 1916, J. B. Demarce.

103. GYMNOSPORANGIUM GLOBOSUM FARL.

I ON CRATAEGUS ANDUENNAE SARG.

South bank of St. Mary's river, south of Fort Wayne, Allen Co., Sept. 23, 1916, C. C. Deam 22095.

105. The rust on *Polcatilla canadensis* L. so common throughout the state and recorded as *Kuehneola obtusa* (Strauss) Arth. in the 1915 list has been restudied and its affinities determined to be with *Phragmidium* rather than *Kuehneola*. It is a brachy-*Phragmidium* and on this account, Dr. Arthur has erected the genus *Frommea* (Bull. Torrey Club 44:503, 1917) to include this and one other species. The name is written *Frommea obtusa* (Strauss) Arth. (*Phragmidium Tormentillae* Fekl.). European authors in general do not consider the American species identical with the European. Those who accept this view should write the name of the American species *Phragmidium triarticulatum* (B. & C.) Farl. (*Aecygmia triarticulatum* B. & C.).



113. UROMYCES HEDYSARI-PANICULATI (Schw.) Farl.  
*Nigredo Hedysari-paniculati* (Schw.) Arth.  
 ON MEIBOMIA MICHAUXII VAIL.  
 Seven miles southeast of Cannelton, Perry Co., Sept. 24, 1918, C. C. Deam 26705.
115. UROMYCES HYPERICI-FRONDOSI (Schw.) Arth.  
*Nigredo Hyperici-frondosi* (Schw.) Arth.  
 ON HYPERICUM PROLIFICUM L.  
 Northwest of Corydon, Harrison Co., Oct. 6, 1920, C. C. Deam 33465;  
 Osgood, Ripley Co., Nov. 13, 1920, comm. C. Griffiths.
119. UROMYCES PERIGYNIUS Halsted.  
*Nigredo perigymia* (Halst.) Arth.  
 I ON RUBECKIA LACINIATA L.  
 Near Soldiers' Home, West Lafayette, Tippecanoe Co., June 16, and 24,  
 1914, C. R. Orton, et al.  
 III ON CAREX ASA-GRAYI BAILEY.  
 Clear Pond, Gibson Co., Aug. 29, 1915, G. N. Hoffer and C. C. Deam.
122. UROMYCES POLEMONII (Peck) Barth.  
*Nigredo Polemonii* (Peck) Arth.  
 I ON PHLOX MACULATA L.  
 Norris marsh, southeast of Lake Maxinkuckee, Marshall Co., June 7,  
 1920, C. C. Deam 30939.  
 This is the first record of this rust on this host in North America.
124. UROMYCES RHYNCHOSPORAE (Ellis) Arth.  
 ON RYNCHOSPORA GLOMERATA (L.) VAHL.  
 Michigan City, Laporte Co., Sept. 13, 1916, with E. B. Mains.
125. UROMYCES SCIRPI (Cast.) Burrill.  
*Nigredo Scirpi* (Cast.) Arth.  
 ON SCIRPUS FLUVIATILIS (Torr.) A. Gray.  
 One mile northwest of Thayer, Newton Co., Oct. 14, 1920.
139. TRANZSCHELIA PUNCTATA (Pers.) Arth.  
 I ON ANEMONE QUINQUEFOLIA L.  
 Mongo, Lagrange Co., May 27, 1920, C. C. Deam 30451; Lake Wabec,  
 southeast of Milford, Koseiusko Co., June 3, 1920, C. C. Deam 30614.  
 ON THALICTRUM DIOICUM L.  
 Happy Hollow, north of West Lafayette, Tippecanoe Co., May 22, 1918,  
 E. B. Mains.  
 III ON PRUNUS SEROTINA (EHRH.) AG.  
 Four miles west of West Lafayette, Tippecanoe Co., Sept. 15, 1918, with  
 F. J. Pipal.
140. TRIPHragMIUM ULMARIAE (Schum.) Link.  
 ON FILIPENDULA RUBRA (HILL) BRITTON.  
 This rust has been known to occur in North America only in a small  
 swamp located about three-fourths of a mile south of West Lafayette along  
 the south river road known locally as the "rust garden". It was first col-

lected May 16, 1899, and has been repeatedly collected there, especially from 1902 to 1908, by different people. About 12 different collections are deposited in the Arthur herbarium from this locality. During the past 12 years, however, no collections have been made, though it has been repeatedly searched for, and we have feared that the species was extinct in this locality. It was, therefore, with considerable interest that the writer made collections of this rust on July 5 and Sept. 2, 1920 in a small swamp about one-half mile northeast of Dayton in Tippecanoe Co.

143. *UREDINOPSIS ATKINSONII* Magn.  
ON *FILIX BULBIFERA* (L.) UND.  
Pine Creek, Warren Co., Aug. 11, 1918.
149. *UROMYCES SEDITIONOSUS* Kernl.  
ON *ARISTIDA GRACILIS* Ell.  
Oakland City, Gibson Co., Oct. 5, 1916.  
ON *ARISTIDA OLIGANTHA* Michx.  
Paoli, Orange Co., Oct. 6, 1916.

## SPECIES NEW TO INDIANA.

## UREDINACEAE.

156. *PUCCINIASTRUM MYRTHILLI* (Schum.) Arth. Résult. Sci. Congr. Bot. Vienne 337. 1906.  
*Accidium* (?) *Myrthilli* Schum. Enum. Pl. Saell. 2:227. 1803.  
*Uredo minimum* Schw. Schr. Nat. Ges. Leipzig 1:70. 1822.  
*Peridermium Peckii* Thüin. Mitth. Forstl. Vers. Oest. 2:320. 1880.  
*Pucciniastrum minimum* Arth. Résult. Sci. Congr. Bot. Vienne 337. 1906.  
I ON *TSUGA CANADENSIS* (L.) CARR.  
Wooded bluff about 5 miles southwest of Grantsburg, Crawford Co., C. C. Deam 27782.  
The uredinia and telia of this species occur on Ericaceae and should be found in Indiana on *Gaylussacia* or *Vaccinium*.  
The collection cited above is abundant and aecia are on both leaves and cones.
157. *UREDINOPSIS STRUTHOPTERIDIS* Störmer, Bot. Notiser 1895:81. 1895.  
ON *ANCHISTEA VIRGINICA* (L.) PRESL. (*Woodwardia virginica* (L.) J. E. Smith).  
In an *Aronia melanocarpa* swamp one and one-half miles north of Millcreek, Laporte Co., Aug. 25, 1920, C. C. Deam 32406.  
This is a rare form known otherwise on this host only from Vermont and Michigan.

## PUCCINIACEAE.

158. *GYNOSPORANGIUM EXTERNUM* Arth. & Kernl. Mycologia 1:254. 1909.  
I ON *GILLENIA STIPULATA* Nutt.  
Wooded ridge 8 miles southeast of Cannelton, Perry Co., June 3, 1918, C. C. Deam 25080.

The specimen is largely immature consisting mostly of pycnia, though a few aecia are present.

The telial stage has not yet been collected in Indiana, but develops on the branches of *Juniperus virginiana* and has been collected only in the vicinity of Mammoth Cave, Kentucky. Aecia have been collected, however, also in Missouri, Kentucky and Virginia.

The connection between the telia on *Juniperus* and the aecia on *Gillenia* was established by Arthur (Mycologia 1:253. 1909;2:231. 1910).

159. *KUNKELIA NITENS* (Schw.) Arth. Bot. Gaz. 63:504. 1917.

*Aecidium nitens* Schw. Schr. Nat. Ges. Leipzig 1:69. 1822.

ON *RUBUS ALLEGHENIENSIS* PORTER (R. *NIGROBACCUS* BAILEY).

Madison and Wirt, Jefferson Co., May 6 and 7, 1910, A. G. Johnson.

ON *RUBUS OCCIDENTALIS* L.

Bourbon, Marshall Co., May 22, 1889, J. H. Parks.

ON *RUBUS PROCUMBENS* MÜHL.

Greencastle, Putnam Co., May, 1893, L. M. Underwood (Ind. Biol. Sur. 19); Lafayette, Tippecanoe Co., May 21, 1899, Wm. Stuart; Brookville, Franklin Co., May 8, 1915, C. A. Ludwig; Pine Creek, Warren Co., May 18, 1917, J. C. Arthur.

ON *RUBUS SATIVUS* (BAILEY) BRAIN.

Daleville, Delaware Co., June 8, 1914, L. Shoemaker.

The specimens listed above were in part included in the 1915 list under No. 101, *Gymnoconia intersitialis* (Schlecht.) Lagerh. Recent studies by Kunkel have shown that there are two forms of the orange rust of blackberries and raspberries, one a *Caeoma* with an *Endophyllum*-like life history and the other an *opsis-Puccinia*-like form. The former has been separated by Dr. Arthur (l. c.) as a new genus, *Kunkelia*. For the sake of emphasis this name is used above, though it should be recognized that there is considerable difference of opinion as to the relationship of the two forms, especially in view of very recent investigations by Kunkel (Jour. Agr. Res. 19:501-512. 1920) and Clinton (Conn. Agr. Exp. Sta. Bull. 222:469-473. 1920). The writer is inclined to believe that we have here a rust which is in an advanced stage of an evolutionary transition from a long to a short cycled form, the transition taking place in the direction of the aecium and the long cycled form surviving in certain regions and on certain hosts.

160. *PUCCINIA ANOMALA* Rostr.: Thümen, Flora 1877:92. 1877.

ON *HORDEUM VULGARE* L.

Lafayette, Tippecanoe Co., July 2, 1918, with E. B. Mains.

This, the leaf rust of barley, was collected for the first time in Indiana as indicated above. A number of other collections in various counties of the state have since been made, indicating that the rust was not uncommon in 1918, but was not present in severe form. Usually the infection was very slight and required careful search to find it.

Tranzschel has shown that this rust in Russia has its aecia on *Ornithogalum umbellatum* and *O. narbonense* (Myc. Cent. 4:70. 1914). Aecia have not been collected in North America.

## 161. PUCCINIA CIRSIII Lasch.

ON CIRSIUM UNDULATUS (NUTT.) SPRENG.

Winona Lake, Kosciusko Co., June 26, 1914, G. N. Hoffer.

## 162. PUCCINIA CYPERI Arth. Bot. Gaz. 16 :226. 1891.

*Dicacoma Cyperi* Kuntze. Rev. Gen. 3<sup>2</sup>:466. 1898.

ON CYPERUS FILICULMIS VAHL.

Lafayette, Tippecanoe Co., Oct. 2, 1896, L. Snyder; Michigan City, La-  
porte Co., Sept. 13, 1916, with E. B. Mains.

ON CYPERUS SCHWEINITZII TORR.

Crawfordsville, Montgomery Co., Oct. 7-9, 1893, L. M. Underwood;  
Michigan City, Laporte Co., Sept. 13, 1916, with E. B. Mains.

ON CYPERUS STRIGOSUS L.

Fern, Putnam Co., Oct. 1893, L. M. Underwood.

This species was formerly confused with *P. canaliculata* (Schw.) Lagerh., which has aecia occurring on Ambrosia and Xanthium. The Indiana specimens listed above were in part included with that species as No. 48 of the 1915 list. Kern (Mycologia 11:134-147, 1919) has recently pointed out the distinction between the two species.

The aecidium of this species is unknown.

163. PUCCINIA PIMPINELLAE (Strauss) Link, in Willd. Sp. Pl. 6<sup>2</sup>:77. 1825.*Uredo Pimpinellae* Strauss, Ann. Wett. Ges. 2:102. 1810.

ON OSMORRHIZA LONGISTYLIS (TORR.) DC.

Seven miles north of Zanesville, Allen Co., May 26, 1916, C. C. Deam  
19820.

## 164. PUCCINIA POLEMONII Diet. &amp; Holw. Bot. Gaz. 18:255. 1893.

ON POLEMONIUM REPTANS L.

In a low flat woods on the south side of Half Moon Pond, about 10 miles  
southwest of Mt. Vernon, Posey Co., April 19, 1919, C. C. Deam 26992.

A second collection was made by Mr. Deam in the same spot, Sept. 26,  
1920, (Deam 33050).

This species, at the time the first collection listed above was made, was otherwise known only from the type collection made on *P. caceruleum* L. (*P. occidentale* Greene?), Kootenai Co., Idaho, J. H. Sandberg, July 1892. Another collection has since been made on *P. occidentale* at Lake Tahoe, California, Aug. 23, 1920, E. Bethel. The sori in the specimens collected by Deam occur on the petioles and leaf blades, often at the margin and are cinereous from the abundant germination of the teliospores. It is a leptopuccinia. No pycnia were observed.

## 165. UROMYCES GRAMINICOLA Burrill, Bot. Gaz. 9:188. 1884.

*Uromyces Panici* Tracy, Jour. Myc. 7:281. 1893.*Nigredo graminicola* (Burrill) Arth. Résult. Sci. Congr. Bot. Vienne  
343. 1906.

III ON PANICUM VIRGATUM L.

One mile southeast of Shelby, Lake Co., Oct. 14, 1920.

## 166. UROMYCES HORDEI Tracy, Jour. Myc. 7:281. 1893.

*Nigredo Hordei* Arth. N. Am. Flora 7:228. 1912.

ON HORDEUM PUSILLUM NUTT.

Mt. Vernon, Posey Co., May 11, 1916; Cynthiana, Posey Co., July 17, 1918, comm. E. P. Melborn.

The latter collection was secured from a specimen of the grass which was sent to the Botanical Department of the Purdue University Agricultural Experiment Station for identification. The rust is a southern one and occurs also on *Festuca octoflora*, having a range from Indiana and Nebraska to Mississippi and Texas.

The aecial stage has been shown through field cultures by Long and greenhouse cultures by Arthur to be on *Nothoscordium bivalve* (Mycologia 8:139-140. 1916) and should also be found in southern Indiana.

167. UROMYCES POROSUS (Pk.) Jackson. Brooklyn Bot. Gard. Mem. 1:281 1918.

*Aecidium porosum* Pk. Bot. Gaz. 3:34. 1878.

*Uromyces coloradensis* E. & E. Erythraea 1:204. 1893.

*Uromycopsis porosa* Arth. Résult. Sci. Congr. Bot. Vienne 345. 1906.  
I ON VICIA AMERICANA MUIHL.

One mile east of Christman, Porter Co., June 3, 1916, C. C. Deam 20059.

This is an autoecious rust possessing aecia and telia only. It is a western form, the present collection being the most eastern one known. The aecia are from a distributed mycelium and hence easily separated from the more common *U. Fabac*, which occurs on the same host.

#### HOST INDEX.

Each species is given a number and these are consecutive for the three papers. The 1915 list includes nos. 1-141; the 1917 list nos. 142-155 and the present list nos. 156-167. In the first part of the present list the numbers refer to the same species as in the 1915 and 1917 lists. Numbers in black faced type indicate that the host is mentioned in the present paper. Numbers in ordinary type indicate that the host is mentioned only in one of the two previous papers. Synonyms are in italics.

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