Notes on Iowa Rusts

John W. Baxter
Iowa State College

Recommended Citation
Available at: https://scholarworks.uni.edu/pias/vol62/iss1/9

This Research is brought to you for free and open access by UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.
Notes on Iowa Rusts

By JOHN W. BAXTER

This paper reports the results of experiments with two heteroecious species of the Uredinales occurring on prairie grasses in Iowa. _Aecidium yuccae_ Arth. is shown to be connected with _Puccinia amphigena_ Diet., and evidence is presented indicating a connection between _Aecidium aesculi_ E. & K. and _Puccinia andropogonis_ Schw. This paper also records the occurrence in Iowa of _Puccinia amphigena_ Diet. and _Puccinia flaccida_ B. & Br. A check of lists compiled by Arthur (1926), Gilman and Archer (1929) and Gilman (1931, 1949) has shown that these species have not been reported from the state.

**Aecidium Yuccae and Puccinia Amphigena**

_Aecidium yuccae_ was described in 1922 from a specimen on _Yucca glauca_ Nutt. collected near Crawford, Nebraska. The rust was known only from the type locality until 1952, when the writer found it occurring near Merriman, Nebraska. In September, 1953, while collecting fungi on the loess bluffs near Little Sioux, Iowa, the writer observed what appeared to be remnants of aecia on leaves of _Yucca glauca_. A search of the area for a possible alternate host revealed abundant telia of _Puccinia amphigena_ on _Calamovilfa longifolia_ (Hook) Scribn., a new rust record for Iowa. This rust is known to have aecial stages on _Leucocrinum montanum_ Nutt. and species of _Smilax_. According to Morrill 1953, the flora of the loess bluffs does not include these hosts. _Yucca glauca_, therefore, appeared to be a probable aecial host for _Puccinia amphigena_ in that area.

Telial material of _P. amphigena_ was overwintered and used the following spring to inoculate young plants of _Yucca glauca_ grown from seed in the greenhouse. Three one-month-old and two six-months-old plants were used in the experiment. These plants were sprayed with water and placed in a moist chamber. Pieces of the overwintered grass leaves, bearing germinating teliospores of _P. amphigena_, were suspended above the plants. Five additional plants were sprayed with water and kept in a separate moist chamber as uninoculated checks.

The plants were placed in the moist chambers on May 3 and were removed three days later. On May 15 spermagonia appeared on the inoculated plants, followed by aecia on and after May 25. No infection occurred on the check plants. Outdoor inoculations, using six-months-old _Yucca_ plants, also resulted in the production of aecia.
Aecidium Aesculi and Puccinia Andropogonis

Aecidium aesculi, which occurs on the buckeye, Aesculus glabra Willd., was known only from Kansas and Nebraska until 1952, when a collection was made near Shenandoah, Iowa by O. F. Hobart. The area was visited in May, 1953 by the writer, who found aecia occurring abundantly on a group of young buckeye trees. Aecia were collected and the aeciospores were used to inoculate possible telial hosts. Oats, Avena sativa L., sorghum, Sorghum vulgare Pers., and gama grass, Tripsacum dactyloides L., were inoculated with negative results.

In September, 1953 a search was made for uredia and telia on possible alternate hosts in the area in which the aecia had been found. The presence of telia of Puccinia andropogonis on Andropogon gerardi Vitman suggested the possibility of a connection between that rust and the Aecidium on Aesculus glabra. Telial material was overwintered and used at Ames the following spring to inoculate a young buckeye tree which had been free of rust for at least two years. The inoculations were made on May 2, 1954, during a rainy period. Pieces of the grass leaves, bearing teliospores of P. andropogonis in germinating condition, were soaked in water for one hour and were then fastened to leaves of the buckeye with paper clips. On May 13 a single cluster of spermatogonia was observed on one inoculated leaf. Frequent observations during the next three weeks revealed no additional infections. There was no development of aecia in the single spermagonial cluster obtained in the inoculation. The writer feels, however, that the results obtained strongly indicate a connection between the aecial stage on Aesculus glabra and Puccinia andropogonis on andropogon gerardi.

Puccinia Flaccida

On October 17, 1954, while collecting near the Des Moines river in Dolliver State Park, the writer found Puccinia flaccida occurring on Echinochloa pungens (Poir.) Rydb. The only previous record of a rust on the genus Echinochloa in Iowa, according to Arthur (1926), is that of a collection of Puccinia graminis Pers. on Echinochloa crus-galli (L.) Beauv.

Additional specimens of P. flaccida were collected in Dolliver State Park on October 31. Microscopic examination of these specimens showed that only the uredial stage was present; no teliospores were observed in spore samples taken from twenty sori. It is possible that under Iowa conditions the fungus overwinters in the uredial stage.
Figure Legends

Figure 1. One-month-old plant of Yucca glauca, showing aecia produced after inoculation with teliospores of Puccinia amphigena. Figure 2. Leaf of six-month-old Yucca plant, showing aecia produced after inoculation with teliospores of Puccinia amphigena. Figure 3. Germinating teliospore of Puccinia andropogonis. Figure 4. Germinating urediospores of Puccinia flaccida.
Urediospores of *P. flaccida* from *Echinochloa pungens* were used on November 7 to inoculate *Echinochloa crus-galli*. Abundant production of uredia was obtained on this host. Attempts to induce teliospore formation, using methods described by Waters 1928, were unsuccessful.

**Literature Cited**


