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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 spermatogonia 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 spermatogonial 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.

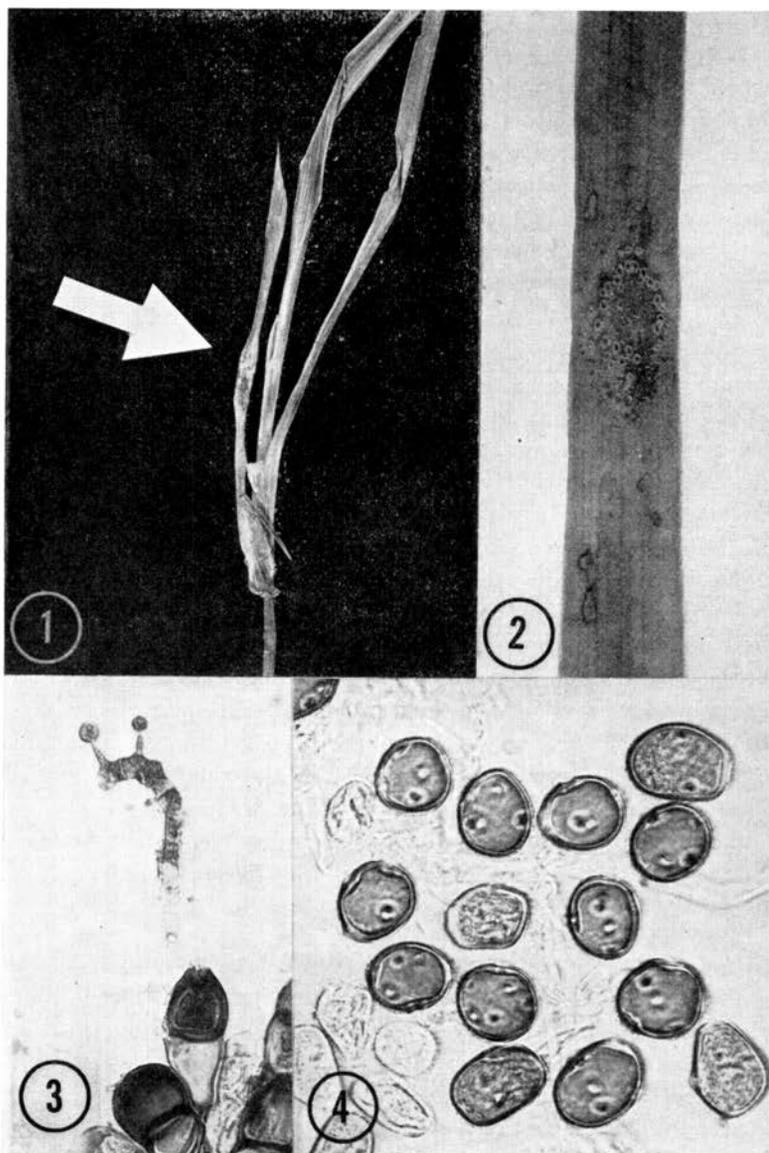


Figure Legends

Figure 1. One-month-old plant of *Yucca glauca*, showing acia produced after inoculation with teliospores of *Puccinia amphigena*. Figure 2. Leaf of six-month-old *Yucca* plant, showing acia 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.

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