A RUST ON WOODWARDIA FIMBRIATA

J. H. FAULL

THREE RUSTS have been described on chain ferns; a fourth is recorded as having a chain fern added to its list of hosts. They are: *Uredinopsis Arthurii* Faull II [1], II [2], III on *Woodwardia virginica* (L.) Sm.; *U. Arthurii* var. *maculata* Faull II [1], II [2], III on *W. areolata* (L.) Moore; *Milesia Tobinagai* (Hirat.) Faull II on *W. japonica* Sm. (described as *Milesina Tobinagai* by Hiratsuka in Journ. Jap. Bot. 12: 271, 1936); and *Hyalopsora Polypodii* (Pers.) Magnus on *W. orientalis* Sw. *Uredinopsis Arthurii* is reported from the eastern part of North America and not elsewhere; it is recorded from Alabama to Quebec and from Bermuda to Indiana and Michigan. *Uredinopsis Arthurii* var. *maculata* is likewise known to occur in the eastern part of North America only, but in a much narrower range; it is recorded from Alabama to Maine. *Milesia Tobinagai* is from Japan; it was recorded and described from material collected on the island of Kiushû. *Hyalopsora Polypodii* on *W. orientalis* is reported from Japan; it, too, was recorded from the island of Kiushû. Besides these four there is also an unreported species; that one is on *W. fimbriata* Sm. in California. It is recorded and described below.

Before doing so, however, I should say that I have been reluctant to describe it as a new species. That is so because the urediospores (the only spores so far observed) are like those of *Milesia polypodophila* (Bell) Faull as to size, form, and the not uncommon habit of branching at or near their apices. Of course this rust may be *M. polypodophila;* but many facts have yet to be determined before the answer can be given. Thus: *M. polypodophila* has been reported from eastern North America only; as for its fern hosts there it has been reported only on *Polypodium virginianum;* its alternate host is a conifer, but the loose-broom effect on it is unique; besides that, spermogonia and peridermia are not produced until three years after its infection; it is the only known *Milesia* characterized by such a phenomenon; moreover, its spermogonia are distinctive as to size, length of period of development, abundance of spermatia and length of period of spermatial discharge. So, I have deemed it best to regard this rust on *W. fimbriata* a distinct species pending determination of all its essential features.

Milesia acuta Faull, sp. nov., II.

Spermogonia et aecia ignota. Uredia hypophylla, epidermide tecta, pustulata, rotundata, 0.15–0.5 mm. diam., peridio ex cellulis hyalinis composito cincta; urediosporae fusiformi-obovatae vel fusiformes, acutae

vel acuminatae, subsessiles, hyalinae, 12–19 × 32–62 μ, plus minusve circa 16 × 51 μ; paries sporae hyalinus, levis, tenuis. Telia ignota.

Hab. in foliis *Woodwardiae fimbriatae* in California.

O and I. Spermogonia and aecia unknown.

II. Uredia hypophyllous, subepidermal, on discolored areas of indefinite extent, pustular, round, 0.15–0.5 mm. in diameter; peridium hemispheric, peridial cells isodiametrically to irregularly polygonal, 5–11 × 5–14 μ, with walls about 1 μ thick; urediospores hyaline, abundant, extruded in tendrils or masses, very short-stalked, fusiform-obovate or fusiform, acute or acuminate at the apex, occasionally forked or branched at or near the apex, narrowed below, 12–19 × 32–62 μ, averaging about 16 × 51 μ, wall of spore thin, about 1 μ thick, smooth, with 4 to 6 germ pores in pairs towards poles or at equator.

III. Telia unknown.

HOSTS AND DISTRIBUTION:
O and I. Unknown.
II. *Woodwardia fimbriata* Sm., in California.
III. Unknown.
TYPE LOCALITY: Mt. Tamalpais, Marin County, California. II.
ILLUSTRATIONS: Text-figure 1.
SPECIMENS EXAMINED. —
CALIFORNIA: Mt. Tamalpais, Marin Co., March 31, 1926, *H. E. Parks*; TYPE. — Mt. Tamalpais, May 30, 1935, *L. Bonar*. — Big Sur, Monterey Co., August 14, 1937, *L. Bonar*. — Darlingtonia, Del Norte Co., Feb. 22, 1942, *H. E. Parks*.

The materials studied were all sent by Professor Lee Bonar; too, the specimens of the last lot were sent at the request of Mr. H. E. Parks. Included with this last lot were three microscopic slides of microtome sections made from a part of the collection. They show that the stoma of a uredium is directly under a leaf stoma; also that the opening is encircled by sharp-pointed peridial cells.

On some of the packets there is written "*Hyalopsora Woodwardiae* Jackson, n. sp." This is a *nomen nudum et ineditum*.

Examination of an abundance of urediospores from the type of *Milesia Tobinagai* shows that they are stout and that they are rounded at their apices. They measure 12–19 × 19–35 μ, and they average about 17 × 25 μ. A good description is given by Hiratsuka in his "A Monograph of the Pucciniastreae", p. 157–8, 1936. There is no likelihood of confusion between *M. Tobinagai* and *M. acuta*.

Woodwardia fimbriata, the one recognized host of *Milesia acuta*, extends northward from California into British Columbia. It has passed under the names *W. radicans*, *W. spinulosa* and *W. Chamissoi*. What the coniferous generic host is and what the comparative effects on its species are, remain for experimentation.

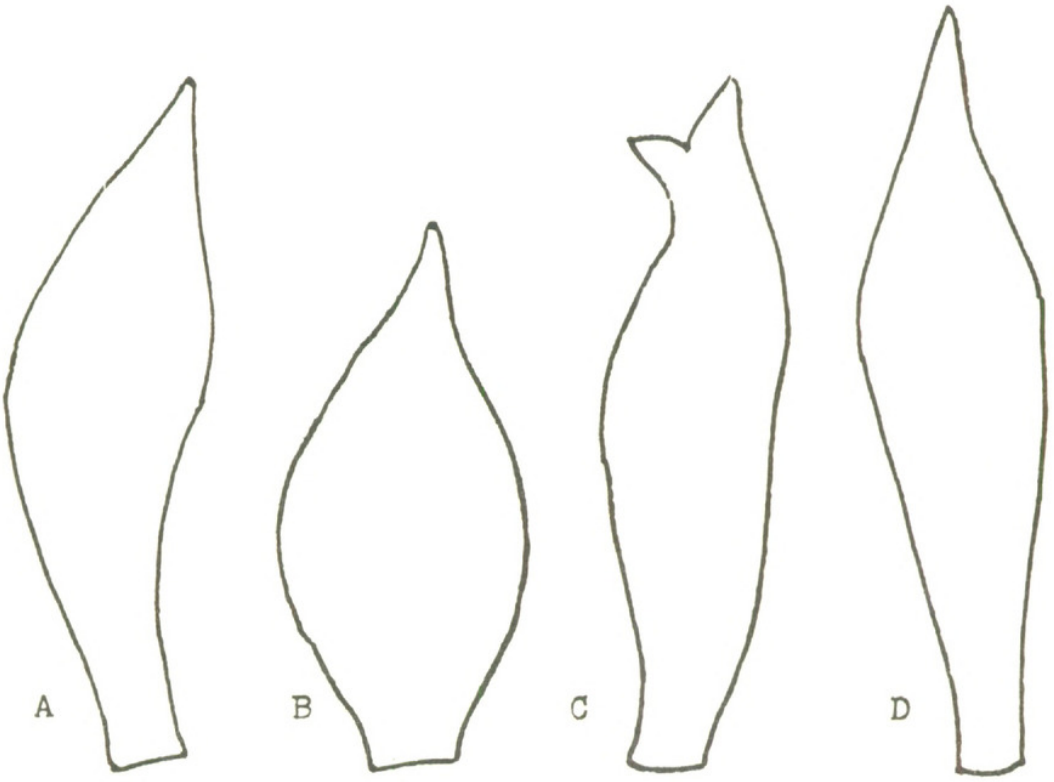

FIG. 1. *Milesia acuta*, sp. nov. Outlines of four urediospores from same microscopic mount. The one at the extreme left is about average size — 16 × 51 μ.