Effect of Infection by Ustilago striiformis var. agrostidis on Inflorescence Development on Agrostis palustris

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ABSTRACT

Ustilago striiformis var. *agrostidis* partially inhibited production of inflorescences on *Agrostis palustris* 'Seaside'. Inflorescences on plants affected with stripe smut failed to produce seed and were often distorted. Sori were produced in rachises, glumes, and anthers but not in other organs of spikelets.

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Numerous cultivars of creeping bentgrass, *Agrostis palustris* Hud., are infected by *Ustilago striiformis* (West.) Niessl var. *Agrostidis* (Davis) Thir. & Dick. (1, 2, 3). The pathogen perpetuates itself in the host by infection of nodes, and subsequently by growing in association with developing axillary buds (4). The ability of the pathogen to colonize nodes and to become quiescent within stolons during periods of high temperature provides it with an efficient means of survival and dissemination in *A. palustris* cultivars that are vegetatively propagated (5). Some cultivars of *A. palustris*, however, are propagated via seed; the ability of these cultivars to produce inflorescences and seed on smutted plants is unknown. This study was initiated to determine the effect of infection by *U. striiformis* var. *agrostidis* on the development of inflorescences and on production of seed.

Agrostis palustris 'Seaside' was used for the study. Healthy and smutted plants (20 of each) were vegetatively propagated from stolon pieces, each

Fig. 1-3. Symptoms of inflorescences produced on *Agrostis palustris* infected with the stripe smut pathogen, *Ustilago striiformis* var. *agrostidis*. **1)** Distorted rachis of panicle on stripe-smutted plant. **2)** Stripe-smutted panicle with short primary branches and sori in glumes. **3)** Sorus in glume.

possessing an axillary bud. Plants were grown in a steamed 2:1 loam-peat mixture in 4-inch clay pots. All plants were propagated in late September and grown in a greenhouse at 10 to 13 C under natural day-length. In April, all plants were grown at 10 to 24 C and provided an 18-hr daylength by supplementing the natural light with incandescent lighting. The experiment was conducted in September 1969 and again in 1970. All plants were observed for inflorescence development, seed set, and inflorescence symptomatology.

Ustilago striiformis partially inhibited development of inflorescences on *A. palustris*. Diseased plants produced 19 inflorescences (8 and 11 for 1969 and 1970, respectively). Control plants produced 64 inflorescences (22 and 42 for 1969 and 1970, respectively). No seed was produced on inflorescences of smutted plants. Most florets on inflorescences of healthy control plants failed to produce seed; the reason for poor seed set was not determined. Of the 449 seeds collected from healthy plants, 64% germinated.

Inflorescences produced on smutted plants were shorter than those on control plants, and primary branches of panicles did not expand as much as those on healthy plants. Rachises and primary branches of panicles on smutted plants were often distorted and twisted (Fig. 1). Sori occurred in rachises, glumes, and anthers (Fig. 2, 3), but were not observed in other organs of spikelets.

The effect of *U. striiformis* on inflorescence production on *A. palustris* is similar to that reported for *Poa pratensis* (6). Inflorescence development is inhibited on both species; some seed, however, is produced by stripe-smutted inflorescences on *P. pratensis*. It is probable that in addition to vegetative dissemination of the pathogen in stolons (4, 5), smutted floral structures such as rachises and glumes may contaminate seed lots, or that teliospores may be borne on the surface of seed.

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