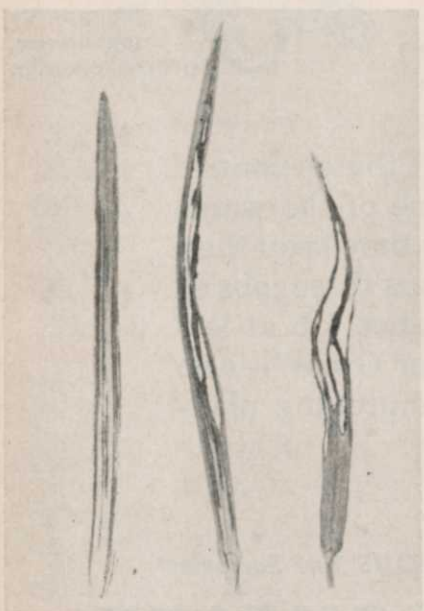
STRIPE SMUT Attacks Merion Bluegrass



Merion bluegrass leaves shown above have been shredded into ribbons by stripe smut.

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STRIPE SMUT is caused by a fungus *(Ustilago striiformis)* which has become a serious problem in bluegrass in the Northeast. The widespread use of the highly susceptible variety "Merion" has focused attention on the prevalence and destructiveness of this disease in home lawns, golf courses, and industrial turf areas.

In New Jersey, stripe smut is found on bluegrass (*Poa*), bentgrass *(Agrostis)*, orchardgrass *(Dactylis)*, quackgrass *(Agropyron)*, and timothy (*Phleum*). In creeping bentgrass (*Agrostis palustris*) the disease was observed in plots of Seaside and Penncross. Among the bluegrasses, virtually every variety or selection observed was found infected with stripe smut.

Stripes Signal Disease

Stripe smut first appears as long, narrow, grayish stripes on the leaves of grasses. These linear sori normally extend the entire length of the leaf blade. Eventually the leaf tissues rupture along these stripes releasing dark, sooty spore masses and causing the leaves to shred into ribbons. The diseased leaves then curl from the tip downward and the infected plants become ragged, withered, and unthrifty.

In plots of Merion Kentucky bluegrass, infected plants appear in early May as yellowish tufts of stunted, sick-looking grass. During the summer such weakened plants succumb readily to the adverse effects of drought, insects, nematodes, weed competition, or other bluegrass diseases.

Stripe smut is disseminated by

spores which act as "seeds" of the fungus. The spores may be carried on bluegrass seed, in seed hay, or on lawn mowers, and become associated with the soil, in which they remain viable up to one year. The spores germinate and produce hyphae which penetrate the young tillers originating at the nodes of rhizomes.

Following pentration, the fungus mycelium spreads systemically throughout the grass plant including the leaves. As long as an infected plant lives the fungus generates successive crops of smut spores which find their way back into the soil and serve as inoculum for further infection of bluegrass tillers.

Merion Is Most Susceptible

Results of bluegrass evaluation trials conducted at the Rutgers Agricultural Experiment Station indicate considerable variation in the reactions of bluegrasses to stripe smut infection (Table 1). In these trials 3 varieties were found resistant, 3 were susceptible, and one (Merion) was highly susceptible. In some plots Merion produced an average of 2540 tillers per square foot of turf of which 521 (or 20.5%) were infected with smut.

In Merion lawns stripe smut usually appears two to three years after planting and thereafter the incidence of disease progressively increases each year until ultimately the turf is severly damaged. Among bluegrasses, those varieties which produce a dense sod such as Merion, Windsor, and Prato, are generally most susceptible to stripe smut infection. In contrast, varieties with a spreading growth habit such as Dwarf, Pa.K5(47), and Park appear resistant to the disease.

Nitrogen Affects Disease

Nitrogen fertilization is a key management practice in turf production since it is related to vegetative growth, leaf density, and turf color. Claims have been made that aqueous urea as a nitrogen source is effective in reducing stripe smut in Kentucky bluegrass. Results of trials conducted at Rutgers show that both aqueous and granular fertilizers stimulated vegetative growth in early summer, resulting in a temporary lowering of stripe smut in the treated turf. However, by October, all fertilized plots showed significantly higher stripe smut counts than the untreated plots (Table 2).

Table 1. Reaction of Kentucky bluegrass varieties to infection by Stripe smut (Ustilago striiformis)

Variety	No. smutted tillers per square foot	Reaction
Dwarf *	1.1	Resistant
Park	4.2	Resistant
Pa.K5(47) *	4.7	Resistant
Delta	20.0	Susceptible
Newport	37.0	Susceptible
Cougar	46.8	Susceptible
Merion	112.2	Highly Susceptible
LSD at 5%	21.8	--

* Experimental selections not available commercially.

Control Needed

At the present time no effective chemical control measure is known for reducing the incidence of stripe smut in bluegrass turf. Trials conducted at Rutgers with the fungicides nabam and zineb applied as soil drenches were not effective in reducing disease severity.

Several new systemic fungicides are currently being evaluated for their effectiveness in controlling stripe smut in Merion bluegrass. In the interim, however, the best method for smut control appears to be through breeding for disease resistance. A number of promising experimental selections of Kentucky bluegrass presently being tested at Rutgers show good resistance to stripe smut.

Table 2. Effect of nitrogen fertilization on stripe smut incidence in Merion Kentucky bluegrass turf

Nitrogen source [1]	Number smutted tillers per square feet	
	May-June 1965	October 1965
Aqueous fertilizer		
Urea (45-0-0)	26	78
Ammonium Nitrate (33-0-0)	24	80
Control	45	42
LSD at 5%	11	27
Granular fertilizer		
Complete (10-6-4)	10	95
Control	135	35
LSD at 5%	48	32

1. All fertilizers were applied at the rate of one lb. of actual nitrogen per 1000 sq. ft. of turf per application. The granular fertilizer was applied six times during the summer; the aqueous fertilizer once.