

DISTRIBUTION OF ERGOT (*Claviceps purpurea*) AMONG KENTUCKY BLUEGRASS GROWN FOR SEED.*

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Abstract

Ergot (*Claviceps purpurea*) is an important-flower infecting fungus that reduces seed yield in Kentucky bluegrass (*Poa pratensis* L.) by replacing the seed with a fungal sclerotium (ergot). Distribution, incidence, and severity of ergot on Kentucky bluegrass were evaluated in 1991 and 1992 in central and eastern Oregon. Samples (454 g) of both combine-run and clean seed were obtained from 160 fields. Ergot was detected in 23 out of 160 fields sampled in 1991, all but three of which were in the southern portion of the grass seed growing region. In eastern Oregon the disease occurred throughout the region. Ergot was found in 8 of 30 varieties surveyed. Germination for small (approximately the size of Kentucky bluegrass seed), medium, and large (four times the size of Kentucky bluegrass and larger) sclerotia was 23, 58, and 89 percent, respectively. Ergot in weed grasses was assessed in central Oregon by sampling 127 sites selected at random in the region. Grass species and number of ergot sclerotia of each grass were determined. Weed grasses supporting ergot included brome (*Bromus spp.*), cereal rye (*Secale cereale*), tall fescue (*Festuca arundinacea*) and Kentucky bluegrass. Infected weed grasses were also located in the southern area of the region.

Introduction

Ergot (*Claviceps purpurea*), is an important pathogen of Kentucky bluegrass grown for seed in central Oregon. The disease can reduce yield through seed replacement by sclerotia, reduce the value of seed cleanings as feed, decrease harvest efficiency due to honeydew, and induce animal illness through alkaloids present in the ergot. In spite of frequent losses to ergot, the disease is believed to be suppressed by post-harvest open field burning (Hardison, 1980). With the increased awareness of air quality, post-harvest open field burning may be decreased or eliminated. Understanding the occurrence, distribution, and intensity of ergot in a period before the anticipated decrease in field burning could be helpful in comparing any subsequent changes in incidence after open field burning is curtailed, and for evaluation of future alternative control measures.

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In a survey conducted in central Oregon in 1989 ergot was detected in 7 percent of the fields (Alderman, 1989). This survey was part of a one year study that also included the Willamette Valley. Blind seed disease and seed gall nematode were also assessed, and none were observed in central Oregon. Alderman's survey is the only reported assessment of incidence and severity of these diseases in the central Oregon area.

Incidence levels of ergot can range from little to high, depending on the year and associated climatic variability. Factors affecting yearly variations of ergot are not well understood, although rainy conditions at the time of flowering are believed to promote ascospore production and subsequent infection (Calvert and Muskett, 1945; Harper and Seaman, 1980; Johnston et al., 1964; Mantle and Shaw, 1976). The objectives of the study were to: (1) determine the distribution, incidence, and severity of ergot in central Oregon; (2) determine distribution of infected weed grasses; (3) compile currently used management practices and examine the feasibility of possible control strategies.

Methods and Materials

Ergot evaluation in fields

A list of grass seed production fields was obtained from a computer data base established by the Oregon Seed Certification Service. One hundred and sixty fields were randomly selected for the survey. Copies of aerial photographs were obtained for each field, to identify sampling locations. In 1991, 400 seed heads were collected from each field just prior to harvest. In 1992, a 454 g sample was collected from local seed companies. From these samples, sub samples were analyzed for incidence and severity of ergot.

Ergot evaluation of grass weeds

In 1991, an assessment of ergot in weed grasses was done in June at peak flowering time of Kentucky bluegrass, and in August after the harvest of bluegrass seed. Sample sites were selected at random across the entire bluegrass growing region in central Oregon. A total of 127 sites were selected. The sample area was two square meters, along roadways or field edges. Ergot was evaluated for each site and notes were taken on the type of weed grass infected and quantity of disease.

Management practices

Grower management practices including irrigation type and timing, fertilizer rate and timing, soil type, post-harvest burning and fungicides were obtained for all the sampled fields, infected and non-infected areas for cause and/or persistence of the disease. Post-harvest burning was broken down into three categories depending on the completeness of the residue removal.

Results

The 1992 data has not been completely analyzed at this point. Preliminary results obtained from 1991 survey include the following: (1) the main distribution of ergot is in the Culver-Metolius area. (2) 14.7 percent of the fields surveyed were infected with ergot. (3) 43 percent of the varieties sampled had ergot. (4) Ergot among weed grasses was found only in the Culver-Metolius area. (5) Of the weed grasses found with ergot, four species were infected brome, rye, tall fescue, and bluegrass.

In 1992, ergot was found in 48 out of 102 samples of Kentucky bluegrass from central Oregon and in 50 out of 113 samples from northeastern Oregon. Levels of ergot are variable ranging from one to greater than 250 sclerotia per 18 g sample.

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