

temperatures between 64°F and 72°F. Temperatures exceeding 77°F halts powdery mildew development. Fungal infection can occur as low as 85 percent up to 100 percent relative humidity. Small grains are most susceptible to powdery mildew during periods of rapid growth. Heavy nitrogen fertilization, dense plant stands, susceptible varieties, high humidity, and relatively cool temperatures favor powdery mildew infection and development. Under ideal conditions powdery mildew symptoms appear from 7 to 10 days after infection.

Control. Powdery mildew is best controlled using the following strategies:

- Powdery mildew resistant small grain varieties are the preferred means for controlling powdery mildew. Unfortunately, powdery mildew devel-

op races that overcome resistant small grain varieties over time. So small grain varieties resistant to powdery are constantly changing. For a list of resistant varieties, refer to the "Small Grain Variety Report" and Extension Circular ANR-458, "IPM Small Grains."

- Maintain the recommended nitrogen-potassium balance in small grains. High nitrogen rates promote rapid growth, increasing small grain susceptibility to powdery mildew.

- Maintain recommended plant population rates. Overcrowded plants increase humidity within the canopy which favors powdery mildew infection.

- Destroy small grain stubble and volunteer plants that carry over powdery mildew spores to next year's crop.



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Use chemicals **only** according to the directions on the label. Follow all directions, precautions, and restrictions that are listed.

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Plant Disease Notes **Powdery Mildew Of Small Grains**

Powdery mildew is a fungal disease that can cause serious losses to wheat and other small grains in Alabama. This disease damages small grain crops by taking nutrients from the host plant, affecting the plant's photosynthesis, respiration, and transpiration. Plants lose vigor and growth with subsequent impairment of seed filling at heading. Losses to this disease vary from year to year depending on prevailing weather conditions. Yield losses occur as the result of poorly filled grain and a reduction of the amount of grain produced.

Several factors such as weather, time of infection, population density, fertility levels, and variety selection influence the degree of powdery mildew damage to small grain production. Cool, wet weather (64°F to 72°F) favors powdery mildew infection. Overcrowded plant populations and excessive nitrogen and low potassium increase small grain susceptibility to powdery mildew.

Powdery mildew, *Erysiphe graminis*, is an obligate parasite which means it can only survive on living plants and is host specific. Powdery mildew (*Erysiphe graminis* f. sp. *tritici*) is specific to wheat and does not attack other small grains. Other powdery mildews of small grains are host specific to their small grain host exclusively. Within those host crops, the

powdery mildew fungus forms races that attack some varieties but not others.

Symptoms. Powdery mildew first appears on the upper surface of the lower leaves as superficial, white powder-like patches (fungal mats). If conditions remain ideal for powdery mildew development, these patches increase in size, run together and eventually cover a large portion of the leaf. The white, powdery growth turns a dark yellow-gray with age. Numerous dark specks resembling grains of pepper (powdery mildew fruiting bodies) form in these patches later in the summer. Yellow, necrotic lesions appear on the lower leaf surface directly beneath the patchy areas of the mildew. Under favorable conditions, the powdery mildew will move from the lower leaves to the upper leaves and the flag leaf. On rare occasions, powdery mildew will even move to the head.

Persistence and Spread.

Powdery mildew can infect small grains at most stages of their development. Plants infected early in the season are damaged more than plants infected later in the season after the head has formed. Fungal spores survive in small grain debris or on volunteer small grain plants that are blown by the wind to the new crop. Powdery mildew infects and develops on small grains at

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