

Pest Alert

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Florida Department of Agriculture and Consumer Services, Division of Plant Industry
Charles H. Bronson, Commissioner of Agriculture

Stripe Rust of Wheat in Florida, *Puccinia striiformis*

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INTRODUCTION: In Florida, the common bread wheat/spring wheat, *Triticum aestivum* L., is typically planted in late fall (November to early December) and harvested in late spring (late April to May), predominantly in the panhandle counties of Florida. Wheat occupied approximately 10,000 acres in 2003 growing season. Unusually cool and wet spring weather has encouraged a scattered outbreak of stripe rust of wheat on susceptible varieties. The disease is caused by the foliar fungal pathogen *Puccinia striiformis* Westend. f.sp. *tritici* Eriksson. (*Pst*). *Pst* was first noticed on experimental lines of wheat (Fig. 1 and Fig. 4) planted by the Institute of Food and Agricultural Sciences (IFAS) spring wheat breeder at North Florida Research & Educational Center (NFREC) in Quincy, Florida in early February 2003. This constitutes the first documented report of stripe rust of wheat in Florida, though other neighboring states have suffered occasional damage. The disease has never been reported in Florida, probably due to the warm and dry weather conditions that usually prevail during wheat growing season. Therefore, Florida wheat breeders and growers have had little reason to be concerned about this rust in the wheat cultivars grown in Florida.

HOST RANGE AND DISTRIBUTION: *Pst* only infects members of the Poaceae family, with wheat, barley (*Hordeum vulgare*), rye (*Secale cereale*) and triticale (*X Triticosecale*) being the primary hosts. Several wild grasses [*Agropyron* (wheat grass); *Bromus* (bromegrass); *Dactylis glomerata* (orchardgrass); *Elymus* (Virginia wild rye)], all of which are found in Florida, are less important hosts (CABI 2002). The disease is worldwide in distribution in wet areas with cool temperatures, especially in mountainous and upland areas. In the United States, stripe rust frequently occurs in Western states like Washington and Oregon (Chen *et al* 2002).

FAVORABLE WEATHER FOR DISEASE: Temperatures of 10-15°C and a relative humidity of 100% are optimal for spore germination, penetration and production of new, wind-dispersed urediniospores. Under optimum conditions, it takes 7 days to complete a life cycle.

PATHOGEN AND SYMPTOMS: *Pst* produces two known spore stages: uredinial and telial. Urediniospores are responsible for the repeating and overwintering stages, and are produced in a sorus. The teliospores are produced in telial sori. The telial stage has no known role in the annual recurrence of rust. Therefore, stripe rust is microcyclic, lacking an alternate host. Linearly arranged stripe-like orange or yellow-colored uredinial pustules on leaves are diagnostic for stripe rust identification in the field (Fig. 2 and Fig. 3).

PLANT PARTS AFFECTED AND ANNUAL RECURRENCE: Seedlings, leaves, leaf and stem sheaths, and inflorescences (glumes) can be infected. Overwintering urediniospores produced on the host range listed above are responsible for annual recurrence of the disease.

LOSSES: Yield losses can be severe if the rust appears at flag leaf (boot) or anthesis stage, since the flag leaf is known to contribute 30-40% of the grain filling (yield).

CONTROL: Stripe rust impact in Florida is likely to be minimal, but only time will tell. For disease management, start with resistant varieties with multiple genes for both seedling and adult plant resistance. Several foliar systemic and contact fungicides are EPA registered for stripe rust on wheat. If fungicides are warranted, application should begin at the first sign of disease. A last resort would be to remove wild hosts to reduce inoculum, especially that which overwinters.



Florida Department of Agriculture and Consumer Services
Adam H. Putnam, Commissioner

REFERENCES:

CAB International. 2002. *Crop Protection Compendium, 2002 edition. Puccinia striiformis.* CAB International, Wallingford, Oxon, UK. CD version.

Chen, X. M., M. Moore, E. A. Milus, D. L. Long, R. F. Line, D. Marshall and L. Jackson. 2002. *Wheat stripe rust epidemics and races of Puccinia striiformis f.sp. tritici in the United States in 2000.* *Plant Disease* 86:39-46.



Fig 1. Stripe rust on wheat in Quincy, North Florida.



Fig. 2. Close-up of linearly arranged uredinal sori of *Puccinia striiformis*.



Fig. 3. Close-up of linearly arranged uredinal sori of *Puccinia striiformis*.



Fig. 4. Wheat breeding lines infected with *Puccinia striiformis* at Quincy, North Florida.