Title: STEM RUST - FUTURE ENEMY?

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Interpretive Summary:
Technical Abstract: Since 1974, wheat in the United States has been protected from stem rust by the combined effects of barberry eradication, use of early maturing winter wheat cultivars in the central Great Plains, and breeding wheat cultivars with multiple genes for resistance. Eradicating barberry eliminated the sexual cycle of the stem rust fungus and removed local sources of stem rust inoculum in the northern U.S. after about 1925. Severe stem rust epidemic continued to occur periodically, because the stem rust fungus can overwinter in its asexual stage in the Southeast and in southern Texas and it spreads north through the Great Plains when weather conditions are favorable. Early maturing winter wheat cultivars developed in Oklahoma and Kansas after 1940 generally escape damage, because they mature before stem rust becomes severe. After 1955, spring wheat cultivars with multiple genes for resistance prevented further epidemics in the northern Plains. Effective stem rust resistance was bred into winter wheat cultivars in Nebraska after 1965 and the Southeast after 1974. Most resistance to stem rust in wheat is race-specific, but it has remained effective for decades because: 1) eliminating the stem rust sexual stage curtailed production of new races every year; and 2) use of resistant wheat has reduced the stem rust population to such a low level that only a few races are left, which can be contained by continued resistance breeding. However, barberry bushes are beginning to reappear in Minnesota and Wisconsin, and intense efforts to breed scab resistance in wheat are diluting existing stem rust resistance. Scab resistance comes from rust-susceptible sources. Stem rust could reemerge as a devastating disease of wheat if efforts to control it are relaxed.