Differences in grain yield were detected between years and sites but were not detected between treatments with an average of 28.3 bu/ac. Similar results were discovered in grain protein and test weight. Economic return over nitrogen costs were greater with the fall treatment averaging $79.80/ac compared to $72.50/ac with the spring treatment due to lower fall fertilizer prices. Overall fall nitrogen applied late had no negative impact on yield and grain quality, giving producers opportunities to improve time management and capture lower fertilizer prices with limited nitrogen movement below the root zone.

Phosphorus and Seeding Rate Management to Improve Yields of Late-Planted Winter Wheat in the Low Rainfall Zone

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Dryland wheat growers in the low rainfall zone of eastern Washington commonly employ winter wheat-tillage fallow rotations. Annual cropping or chemical fallow reduces wind erosion in this susceptible area. However, late seeding is often required in these situations due to a lack of seed zone moisture at normal planting times. The objective of this study was to determine if phosphorus (P) and/or seeding rates could be altered to improve late seeded wheat yield in recrop or chemical fallow situations. Winter wheat was grown at three locations in eastern Washington in 2004-05 and two locations in 2005-06. One site was chemical fallow and the others winter wheat stubble (recrop) at the time of seeding. Seeding rates of Eltan winter wheat were 40 and 70 lb/acre. Phosphorus rates were 0, 20, 40, 60, and 80 lb P₂O₅/acre in 2004-05, and 0, 10, 20, 40, and 60 lb P₂O₅/acre in 2005-06. The chemical fallow site also had both early and late seeding dates. There was a small but uneconomical increase in grain yield with P application, and no positive effect of increasing seeding rates, at recrop sites. At the chemical fallow site there was a 9.6 bushel/acre (25%) yield response to 20 lb P₂O₅/acre in 2004-05 and a linear response (7 lb P₂O₅/bushel yield increase) to applied P at the 40 lb/ac seed rate, but no response at 70 lb seed/ac, in 2005-06. Responses to P fertilizer occurred in chemical fallow even though soil test P levels were marginal or adequate. Increasing the seed rate from 40 to 70 lb/acre increased yield by 3 bu/acre regardless of planting date at the chemical fallow site. Overall, results indicate a potential to improve wheat yields with P application and, to a lesser extent, increased seeding rates, in chemical fallow regardless of early or late seeding date. The ability to increase yields with P fertilizer or higher seeding rates in an annual cropped system are limited.

Soil Acidity and Lime Responses in Eastern Washington

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Soil quality and conservation is improved with minimum or no-tillage farming practices. Soils of the Palouse region of Washington, Oregon, and Idaho have developed stratified layers of acidity when tillage is reduced or eliminated. Some soil pHs have become relatively acidic (pH < 5.0) in the surface 6 inches; however, it is not known whether this acid layer is impacting crop yields. The objective of this research was to determine the influence of lime rate on wheat, pea, and other rotational crop yields and, if necessary, to develop lime recommendations for cropping systems in the Palouse region. On-farm studies were established in fields under continuous no-till or reduced-tillage management. Treatments include a non-treated control, elemental sulfur application at 2,000 lb/acre (to accelerate acidification), and applications of pelletized lime at rates of 2,000, 4,000 and 10,000 lb/acre. Initial soil samples were collected at depths of 0 to 6 and 6 to 12 inches, and in ½-inch increment to a depth of 6 inches to characterize initial soil pH conditions. Soil pH (0 to 6-inch depth) ranged from 4.9 to 5.6. Detailed sampling indicated an acidic band at the 1 to 3-inch depth in no-till systems. Soil pH in this acidic band is as low as 3.9 at some locations. Even though soil pH is apparently below critical levels for crops grown in the Palouse area, yield responses to lime have been inconsistent. Recent evidence suggests this may be due to high organic matter levels in reduced tillage systems that reduce the incidence of aluminum toxicity associated with low soil pH. Monitoring of these long term trials is ongoing.