WISCONSIN– Italian Ryegrass Management in High-Production Dairy Systems

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IR treatments with various sources and rates of manure in late summer 2021.

Italian ryegrass (IR) rose in popularity in 2021. Desired for its excellent quality and exceptional growth in cool conditions, IR is especially sought after in the dairy regions consisting of poorly drained soils where alfalfa does not consistently perform well. Low lignin and high fiber digestibility make IR comparable to alfalfa as a high-production dairy forage. Like other cool-season grasses, it is responsive to N applications – increasing N can improve yield and CP content. However, this has created some challenges. Forage-quality-focused decisions can easily lead to nutrient overapplication and unintended environmental consequences. CP of IR can match that of alfalfa by applying very high N rates, but such rates for an entire season far exceed nutrient management standards. The current WI recommendation (UW- Ext. Pub. A2809) for N fertilizer application to cool-season grasses for hay or pasture is 130-160 lbs N/ac/yr. However, higher N applications are being made. This emphasizes the need for additional research to evaluate impacts of N fertility on IR forage yield and quality.

Figure 1. Italian ryegrass DM yield by cutting per treatment.

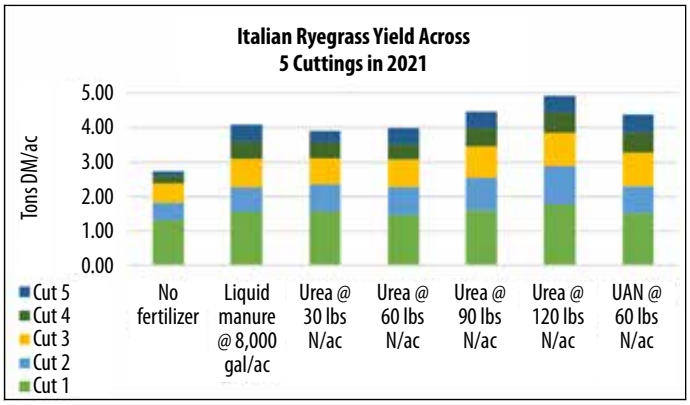
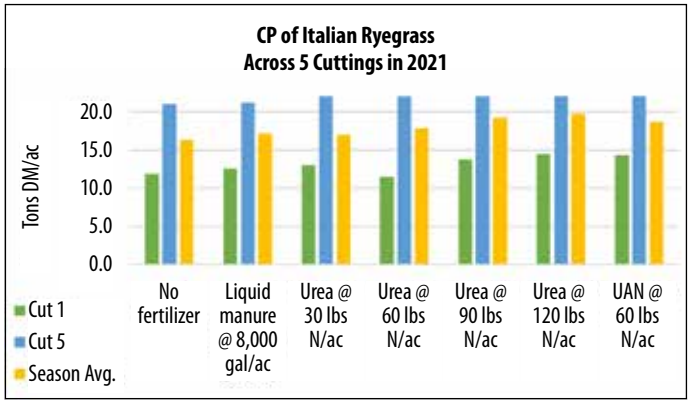


Figure 2. Italian ryegrass CP by treatment for early season, late season, and season average.



Trials were conducted at the Marshfield ARS (Stratford, WI) in 2020 and 2021 to explore the potential of IR when managed for forage quality goals. Plots were established each spring in early May by planting IR (Allegro, Byron Seeds) at 20 lbs/ac. Treatments were expanded for the trials, 2nd year through funding from the UW Dairy Innovation Hub. IR was managed under an intense cutting (5x) schedule and 7 different fertilization regimes (sources, rates, application methods). Treatments: no fertilizer, 8,000 gal/ac of surface-applied liquid dairy manure (40 lbs N/ac), urea (46-0-0) broadcast at 30, 60, 90, and 120 lbs/ac, and liquid UAN (32-0-0) applied with a stream bar at 60 lbs/ac. Fertilizer treatments received an application for each cutting (5x) while manure treatment received applications between each cutting (4x). Cutting intervals were 23, 28, 22, and 22 days, respectively. Applications of N improved yield across all treatments compared to no N applied (2.7 tons DM/ac). Total yields were highest for the 120 lbs N/ac rate (4.9 tons DM/ac) with slightly lower yield for 90 lbs N/ac (4.5 tons DM/ac), UAN at 60 lbs N/ac (4.4 tons DM/ac), and manure treatment (4.1 tons DM/ac). With current fertilizer-N prices, it is estimated high N rates increase production cost up to 75% compared to manure. It is unlikely the slight improvement in yield and protein (compared to manure) justifies the additional cost, especially when compared to other dairy ration supplemental protein sources. Furthermore, the elevated soil nitrate levels and poor N-efficiency resulting from the higher rates puts the environment at risk. While IR boasts high yield and quality, it is likely the most feasible recommendation for farmers to set moderate goals achievable with moderate inputs (i.e., manure).