Growth of Bermudagrass With White Clover Or Nitrogen Fertilizer

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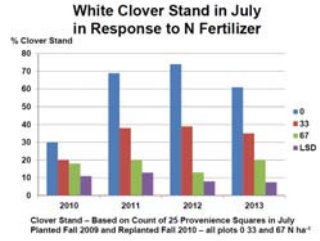
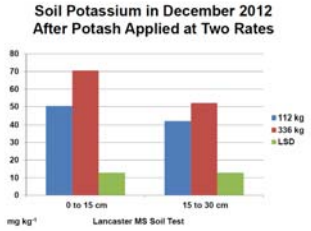
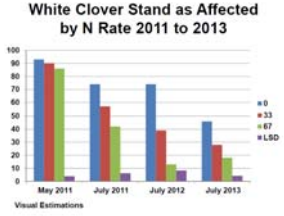
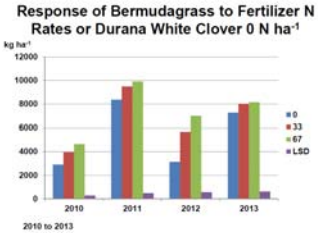
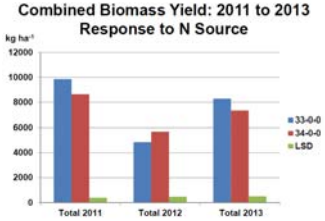
White clover (*Trifolium repens*) var 'Durana' was oversown into established bermudagrass (*Cynodon dactylon*) in 2009 and replanted in fall, 2010. Soil analysis indicated low potassium (K) and potash was added at rates of 112 and 336 kg ha^{-1} as main plots in May, 2010. Nitrogen as ammonium nitrate or an ammonium sulfate/urea blend was added at 0, 34 and 67 kg N ha^{-1} beginning in 2010 (2x), 2011 (3x), 2012 (2x) and 2013 (3x) after each harvest. Clover stands were estimated by counting the presence or absence of clover within two 0.25 m^2 quadrats divided into 25 equally spaced squares or determined visually. The contribution of white clover in the sward was determined by separating frozen hand clipped samples into white clover, bermudagrass and other species on a dry weight basis or determined visually. Plots (2x5 m) were harvested with a rotary or flail mower and grab samples were air-dried at 55 °C for 3 days to determine dry matter. Samples were ground to pass a 1-mm sieve and analyzed for protein by NIRS. Yield in 2011 with white clover as the N source was 8.4 Mg ha^{-1} compared with 9.5 or 9.8 Mg ha^{-1} for 34 and 67 kg N ha^{-1}. In 2013 the yield was 7.3 Mg ha^{-1} with white clover as the N source compared with 8.0 to 8.2 Mg ha^{-1} for 34 and 67 kg N ha^{-1}, respectively or 88 to 91 % indicating that white clover can provide up to 100 kg N ha^{-1}. However, yield with just white clover as the N source in 2012 was only 45 to 55% of the yield with nitrogen fertilizer. Yield response to potash was minimal, but statistically significant (P<0.05) each year. Ammonium sulfate/urea was also slightly more effective than ammonium nitrate in 2011 and 2013 (P<0.05), but not in 2012. White clover stand declined with increased nitrogen rate (P<0.05). The protein concentration in August harvested bermudagrass, when the white clover portion in the sward was minimal, was equal to bermudagrass fertilized with nitrogen. White clover provides a viable source of nitrogen that can reduce production costs.

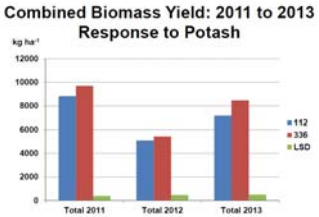


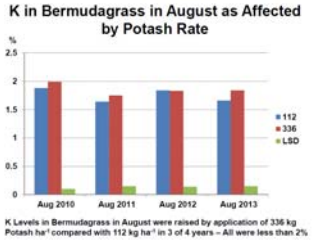


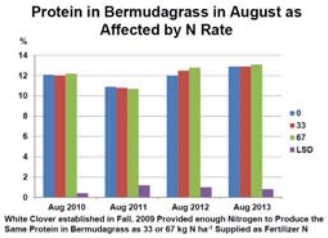


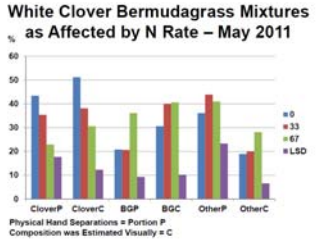












Visual estimations were slightly higher than physical separations These samples will be used to develop NIRS equations for botanical composition

Conclusions

Durana white clover persisted in bermudagrass for four (4) plus years

Nitrogen fertilizer reduced white clover stands, but white clover provided enough N to maintain protein levels in August harvested bermudagrass

Ammonium sulfate/urea provided a statistically superior N source in 2 of 3 years compared with Ammonium Nitrate as did Potash, but these differences would not be significant economically in the short term to a producer

Cox M.S. (2001) The Lancaster soil test method as an alternative to the Mehlich 3 soil test method. Soil science 166:484-489