Early Season Nitrogen Sources for Onions

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The majority of Treasure Valley onions are still grown with furrow irrigation. Furrow irrigation complicates effective nitrogen (N) management because nitrate-N is mobile and easily moved away from onion root systems with the wetting front. Fall and early season N applications are frequently less effective than later sidedressings because of N moved beyond onion root systems prior to the bulbing phase, when most N is needed by the plant. Applied ammonic N sources such as ammonium sulfate and urea, without stabilization, rapidly nitrify to nitrate in soil. Conventional practices may include 1 to 3 side-dressed N applications to ensure adequate N availability. The nitrate-N escaping the reach of onion roots can contribute to shallow groundwaters.

More effective early season N applications may preclude the need for one or two subsequent side-dressed N applications. Several delayed release N fertilizers are marketed with potential for improving the effectiveness of early season applied N. Information on the response of onions to

increased the percentage of tops down in 2009 for some N sources (ESN, SuperU, and Nfusion). SuperU in both years had fewer tops down than urea on some dates suggesting that early season available N may have limited early growth and plant size.

Added N increased bulb size. Consequently the yield of mediums (the smallest onions) was higher for the control than for most all N sources, but jumbo, colossal, and total yields for the control were the lowest of all treatments. The higher banded N rate for N sources did not affect the yield of mediums in 2008, but for all N sources in 2009 the yield of mediums was lower for the 120 than the 60 lb N rate. Among N sources at the 60 lb N rate, the yield of mediums was higher for the 2009 June sidedressed N than for all but SuperU and NSN. Low early season available N with delayed N applications may have limited bulb size in 2009.

Increasing the N rate from 60 to the 120 lb N rate increased the yield of jumbo or colossal sized onions for SuperU in both years, and NSN and NFusion in 2009. Jumbo or colossal yields did not differ significantly for other early banded N sources at the two N rates. Early banded N sources differed in yield in some years. At the rate of 60 lb N/A, both SuperU and NSN yielded less than urea in both years and NSN yielded less than ESN in both years. Total yield in 2009 at the 60 lb rate was higher for early banded ESN, N Fusion and urea than for June split applied uran.

Excessive N (180 lb N/A) as June side-dressings or as early season banded urea (120 lb N/A) reduced jumbo and total yield as compared to the 60 lb rate in 2008, but this did not occur with any of the enhanced N fertilizers suggesting they are safer at higher rates. In contrast, yield increased in 2009 with higher June side-dressed N. The effectiveness of June sidedressed uran in 2009 may have been limited by insufficient N during earlier growth. It is not clear why high N was detrimental in 2008 but contributed to higher yield in 2009. June 2009 was wetter and cooler than 2008.

Bed center accumulated nitrate-N was higher at bulb initiation for the early banded N applications relative to the untreated control, but did not differ among N sources. Likewise, bed center nitrates in September were higher for all applied N treatments as compared to the control. Most N sources did not differ in bed center nitrates in either June or September. Net mineralized N by September in buried bags measured over 60 ppm in 2008 and

Table 2. Onion maturity, yield, and bed center nitrate concentratio