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The St. Johns River has been identified by the state of Florida as a priority water body in need of restoration. Best Management Practices were evaluated for potato (*Solanum tuberosum* L, var. 'Atlantic') production in the Tri-County Agricultural Area to reduce nitrate run-off from approximately 9,300 hectares in production. Objectives of this study were 1) determine the influence of fertilizer source (soluble and controlled release) and timing of leaching irrigation on nitrate leaching and 2) compare yield and quality of the potato crop fertilized with either a soluble or controlled release nitrogen fertilizer in a Northeast Florida seepage irrigated production system. The experiment was a split-split plot with four replications. Main plots were irrigation events (0, 2, 4, 8 and 12 weeks after planting, WAP), nitrogen source and rates included (ammonium nitrate (AN) 224 kg ha^{-1} or controlled release fertilizer (CRF) 196 kg ha^{-1}). An approximate 7.6 cm of water was applied at each irrigation event and surface water runoff collected. Controlled release fertilizer decreased $\text{NO}_3\text{-N}$ runoff by an average of 32% compared to AN fertilizer during the 2 WAP irrigation event. Controlled release fertilizer was also found to decrease the amount of $\text{NO}_3\text{-N}$ runoff by 28 and 32 % during the 8 and 12 WAP irrigation events, respectively when compared to AN. Plants in CRF treatments had significantly higher total and marketable tuber yields (265 and 225 cwt/acre) compared to AN fertilizer treatments (244 and 205 cwt/acre), respectively. Plants in the CRF treatments also had significantly higher total and marketable yields in 2005 (246 and 209 cwt/acre) compared to AN fertilizer treatments (223 and 185 cwt/ac), respectively. Controlled release fertilizer was a good alternative to conventional soluble forms of fertilizer maintaining yields and protecting natural resources from non-point source pollution.

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