

Increasing the Demand: The Impact of Regular Cutting on Vegetative Buffer ^{15}N Uptake. (4541)

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Abstract:

This study used ^{15}N -labeled KNO_3 to quantify the effects of regular cutting on vegetative buffer effectiveness based on the theory that regular cutting would increase N demand and sequestration by encouraging new plant growth. Ten adjacent buffer plots were established within a flood-irrigated pasture: vegetation in five of the buffers was cut monthly and residues were removed from the site. The other five buffers were not cut. The cutting effect was not significant in the first few weeks following ^{15}N application, but over the irrigation season, above-ground vegetation in the cut buffers sequestered 2.3 times the ^{15}N of vegetation in the uncut buffers corresponding to an increase in above-ground biomass following cutting. In contrast, the uncut buffers showed very little change in ^{15}N sequestration or biomass, suggesting senescence and a corresponding decrease in N demand. Cutting also affected surface water runoff ^{15}N concentration: runoff from the uncut buffers had higher ^{15}N concentrations than the cut buffers, regardless of N form (NO_3 , NH_4 or DON). The doubling of plant ^{15}N uptake in the cut buffers together with the decrease in ^{15}N concentration in runoff from the cut buffers confirms that regular cutting of buffer vegetation increases buffer effectiveness.

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