

Aerial Application Methods to Reduce Imazapyr Impacts on Riparian Restoration

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Abstract:

Imazapyr (Habitat™, BASF) is the most commonly used herbicide for large-scale tamarisk management. The most consistent control has been achieved by applying two quarts of imazapyr in a carrier volume of 15 gallons per acre by helicopter. This technique results in spray droplets in the range of approximately 800 to 1000 µm and was adopted to minimize drift to non-target riparian species. We evaluated the impact of this application technique on imazapyr retention by tamarisk by placing five cm petri dishes within a closed tamarisk canopy and in areas without tamarisk to estimate spray retention. We then collected and analyze soil samples from replicated helicopter applications at three different research sites near Florence, CO. The initial herbicide applications were made late September 2004 and soil samples were taken in October 2004 and October 2005. Control soil collected from one of three research sites near Florence was used to conduct laboratory dissipation studies to establish a half-life for imazapyr. Imazapyr was extracted from petri dish and soil samples with water and analyzed using reverse phase HPLC with UV detection.

The recommended helicopter application technique resulted in tamarisk retaining only 42% for applied herbicide, while the remaining 58% passed through the canopy. This finding was subsequently verified by collecting soil samples within and outside the tamarisk canopy. Across the three research sites there was no statistical difference between imazapyr residues in the upper six-inch soil layer within and outside the plant canopy. Imazapyr residues ranged between 113 and 337 ng/g (ppb). One year after application imazapyr residues decreased by 70 to 87%, but the trend was for less dissipation within the tamarisk canopy. Our initial laboratory study indicates an imazapyr half-life of approximately 28 days, which is at the lower end of published range of 25-142 days.

Our initial working hypothesis was that the tamarisk canopy would intercept and retain a large portion of the applied imazapyr; therefore, passive restoration efforts could begin with more herbicide tolerant warm season grasses perhaps as early as the spring following application. We found that a significant amount of herbicide reaches the soil surface even in a closed canopy and this will negatively affect restoration efforts. Changes to this high volume application technique could result in much greater herbicide retention by the tamarisk canopy, less herbicide reaching the soil surface, reduced application costs and more rapid restoration.