

Abstracts — Session 6: Chemical Control Strategies

The 2006 Tamarisk Research Conference: Current Status and Future Directions

October 3 & 4, 2006. Fort Collins Hilton, Fort Collins, Colorado

Session 6: Chemical Control Strategies (alphabetical by first author)

Beck, George and James R. Sebastian

Tamarisk control with sulfonyleurea herbicide tank mixes

Christy, Stephen J.

Control of individual saltcedar plants with herbicides

Franco, Jose G., Kirk McDaniel, Brent Tanzy, and Keith Duncan

Management of saltcedar regrowth with carpet-roller applied herbicide

Lee, Barney G.

Precision Application of Aerially Applied Herbicide

McDaniel, Kirk, Charles R. Hart, and Alan McGinty

Saltcedar control with rotary and fixed wing aircraft

Nissen, Scott J., Galen R. Brunk, and Dale L. Shaner

Aerial application methods to reduce imazapyr impacts on riparian restoration

Westra, Philip

Novel herbicide combinations for tamarisk control with minimal ecosystem impact

Tamarisk control with sulfonyleurea herbicide tank mixes

George Beck¹ and James R. Sebastian¹

¹Department of Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins, CO 80523. George.Beck@colostate.edu, jseb@lamar.colostate.edu

Abstract:

A great deal of research has been conducted to evaluate herbicides to control tamarisk before revegetation efforts. The most efficacious treatment to date is imazapyr (Habitat) plus glyphosate (Rodeo) at 0.5 lb ai + 0.5 lb ai/A (Habitat plus Rodeo at 1 qt + 12 fl oz/A). The cost of this treatment is about \$72/A. Sulfonyleurea herbicides have the same mechanism of action as imazapyr and might provide equivalent control and typically cost less than imazapyr. Sulfonyleurea herbicides at this time could only be applied to areas not immediately adjacent to water. An experiment was established to evaluate sulfonyleurea herbicide tank mixes to control tamarisk. The location was near Berthoud, Colorado where tamarisk surrounds a small lake about 50 acres in size. Herbicides were applied on September 16, 2005 through a CO₂ pressurized backpack sprayer at 30 gallons per acre. Tamarisk was about 4 ft tall and 100% green at application, a result of mowing 12 months earlier. Herbicides evaluated included metsulfuron plus dicamba plus 2,4-D at 1.0 oz ai + 0.87 lb ai + 2.4 lb ai (Escort plus Rangestar at 1.67 oz product plus 6.7 pt/A); metsulfuron plus triclopyr at 1.0 oz ai + 2.0 lb ai/A (Escort plus Remedy at 1 oz product plus 2 qt/A); chlorsulfuron plus triclopyr at 1.0 oz ai + 2.0 lb ai/A (Telar plus Remedy at 1.33 oz product plus 2 qt/A); imazapyr plus triclopyr at 0.5 lb ai + 2.0 lb ai/A (Habitat plus Remedy at 1 qt + 2 qt/A); and imazapyr plus glyphosate at 0.5 lb ai + 4 lb ai/A (Habitat plus Roundup at 1 qt + 4 qt/A). A crop oil concentrate was added to all treatments at 1% v/v (equivalent to 1 gallon per 100 gallons of spray solution). Herbicide treatments in this experiment cannot be used in water. At 8 months after treatments (MAT) were applied, all herbicide combinations controlled 87 to 100% of tamarisk and caused 10 to 90% injury to sedges. Treatments began to break at 11 MAT. Metsulfuron plus dicamba plus 2,4-D, metsulfuron plus triclopyr, and chlorsulfuron plus triclopyr controlled 55 to 68% of tamarisk 11 MAT and caused 20 to 40% sedge injury. Imazapyr plus triclopyr controlled 91% of tamarisk and caused 100% injury to sedges 11 MAT while imazapyr plus glyphosate controlled to 93% of tamarisk and caused 90% sedge injury at the same time frame. The sulfonyleurea herbicide tank mix treatments clearly would have to be reapplied at 12 MAT thus, adding to the expense of management. However, sedge injury from the sulfonyleurea herbicide tank mixes was much less than the imazapyr tank mixes and could save money on seed mixes for revegetation. Use of sulfonyleurea herbicides and their tank mixes need more evaluation before recommending them to control tamarisk.

Control of individual saltcedar plants with herbicides

Steve Christy¹, Alex Ogg² and Mike Wille³

¹Big Horn Basin Exotic Plant Steering Committee, Worland, WY, 82401. schristy@yahoo.com.

²Big Horn Basin Exotic Plant Steering Committee, Ten Sleep, WY, 82442. ogga@tctwest.net.

³Fremont County Weed and Pest District, Riverton, WY, 82501. mwille@wyoming.com

Abstract:

Field experiments were conducted in northern Wyoming in 2002 through 2004 to determine the best herbicide treatments for killing individual plants of saltcedar (Tamarisk). Herbicides were applied as foliar summer sprays or as dormant-season, basal-bark treatments to individual plants of saltcedar. Nontreated controls were included in all experiments and all treatments were replicated on six plants. Foliar sprays were applied to small saltcedar plants (3 to 4 feet tall with 3 to 6 stems) on July 29, 2002 using a hand-held, backpack sprayer equipped with a single cone-jet

nozzle and operated at 25 psi. Sprays were applied to wet plants thoroughly. A power sprayer equipped with a handgun nozzle and operated at 50 psi was used to apply herbicides to individual, large saltcedar plants (6 to 8 feet tall with 10 to 20 stems) on August 15, 2002. Sprays were applied to wet plants thoroughly. A handheld, backpack sprayer equipped with a single cone-jet nozzle adjusted to apply a thin stream of liquid and operated at 25 psi was used to apply dormant-season, basal-bark treatments on either November 4, 2002 or on April 8, 2003. Bark oil was used as a carrier solution for all basal-bark treatments. Saltcedar plants were 6 to 8 feet tall and had 10 to 20 stems. Sprays were applied to wet the lower 1-foot of the plant and the entire circumference of all stems. One year after application, Vista™ (fluroxypyr) applied at 2% v/v with ½% methylated seed oil (MSO), Pasturegard™ (triclopyr + fluroxypyr) at 5% v/v with ½% MSO and Arsenal™ (imazapyr) at 1.5% v/v plus 1% MSO had killed 100% of the small saltcedar plants. Pasturegard at 2% v/v + ½% MSO had killed 60% of the small plants. Only Arsenal at 1.5% v/v with 1% MSO had killed all of the large saltcedar plants one year after application. Percent kill one year after application of Rodeo™ (glyphosate) at 2% v/v with ½% nonionic surfactant, Krenite™ (fosamine) at 3% v/v with ½% MSO, and Pasturegard at 2%v/v with ½% MSO varied from 17 to 40%. Percent kill of large plants with these latter mentioned herbicides improved significantly after 2 years and varied from 60 to 83%. Pathfinder II™ (triclopyr formulated in oil) at 100% v/v, Remedy™ (triclopyr) at 25% v/v, and Pasturegard at 25% v/v applied as basal-bark treatments in November 2002 killed 100% of the saltcedar plants. Stalker™ (oil soluble formulation of imazapyr) at 7.8% v/v killed 67% to 83% of the plants after 2 years. Plants surviving the Stalker treatment were injured severely. Except for Pathfinder II, which killed all plants, and Stalker, which killed similar number of plants, all of the other herbicides applied as basal-bark treatments in April were less effective than the fall treatments.

Management of saltcedar regrowth with carpet-roller applied herbicide

Jose G. Franco¹, Kirk McDaniel¹, Brent Tanzy², and Keith Duncan³

¹Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM, 88003. jgfranco@nmsu.edu, kmcdanie@nmsu.edu. ²USDI Bureau of Reclamation, Truth or Consequences, NM. 87901. btanzy@uc.usbr.gov. ³Cooperative Extension Service, Artesia, NM. 88210. erbc@nmsu.edu

Abstract:

A carpet-roller (7 ft. wide and 6 inch diameter) mounted rearwards on a Ford 7610 farm tractor was used to apply imazapyr to the foliage of 3 to 7 ft. tall saltcedar re-growth. This application method is being investigated as a possible alternative to costly mowing while preserving understory vegetation. This study was initiated in 2005 and is located in a 5000 acre area that has been mowed annually for approximately 40 years by the Bureau of Reclamation. The study area was placed on the upper reach of Caballo reservoir which is fed by the Rio Grande in southern New Mexico. Treatments were placed in a randomized split plot design with 3 application dates (mid-June, July and August), 4 herbicide rates, 3 reps and either one or two passes with the carpet-roller over the saltcedar. Our four main effect treatments were a control, a high rate of imazapyr (1.0 lb a.i./ac), a medium rate (0.5 lb a.i./ac), and a low rate (0.25 lb a.i./ac). Pre-treatment data was collected within a week of application and post-treatment data was collected in October 2005 and May 2006 with a final evaluation scheduled in October 2006. Measurements taken relate saltcedar response to the herbicide treatments by various plant size characteristics including height, number of stems per plant, plant volume, density, and canopy cover. Initial estimates suggest that the high and medium rates were effective in defoliating saltcedar whereas the low rate provided less than 50% defoliation. Larger and more robust plants experienced

higher defoliation than lower growing plants for the June treatment date. Further evaluations one and two years post treatment are needed to determine conclusive herbicide efficacy results.

Precision application of aurally applied herbicide

Barney G Lee¹

¹North Star Helicopters, Inc. North Star VMS. 16049 North Windsor Ave. Gardendale, TX 79758. blee222@hotmail.com

Abstract:

Why should land managers care about aerial application technology? Precision application improves our ability to address problems with the least effects on our environment. With advancements in equipment, we can improve productivity as well as improve the environment. When most people think of aerial application, they only think of helicopters and airplanes. However, ground support equipment has also seen great improvements too. Trucks with DOT spec 406 certification, provides the highest standards in case of an accident or roll over. Doubled walled tanks, measuring devices and rinse capabilities all contribute to quality application. Additional support technology that has benefited the application industry comes from the use of computers in the field. Lap tops and hand held GPS units on the ground complement the GPS systems used by the pilots in the air. Aerial GPS systems, flow meters, flow controllers using ground speed calibrations, and the use of avoidance zones, gives us the precision application needed today. Improvements in boom and nozzle configurations give us more control of where and how herbicides are applied. By using the USDA computer drift model in conjunction with the improved system set up, we are able to minimize the potential of herbicides being applied outside the target area. In most cases using a helicopter with the specifically configured equipment, potential drift can be reduced to approximately .33% of the total spray volume. In conclusion, by the incorporation of all the available technology, we can effectively and safely apply herbicide by the aerial method.

Saltcedar control with rotary and fixed wing aircraft

Kirk C. McDaniel¹, Charles R. Hart², and Alan McGinty³

¹Department of Animal and Range Sciences, New Mexico State University, Las Cruces, NM, 88003. kmcdanie@nmsu.edu. ²Stephenville Research and Extension Center, Texas A&M University, Stephenville, TX, 76401 cr-hart@tamu.edu. ³San Angelo Research and Extension Center, Texas A&M University, San Angelo, TX, 76901. mcginty@tamu.edu

Abstract:

Rotary-and fixed-wing aircraft have been compared in various research, demonstration and commercial trials on saltcedar since the late 1980's in Texas and New Mexico. For this presentation saltcedar control data following treatments with imazapyr or imazapyr + glyphosate spray mixtures are standards for comparison. Success and failure in controlling saltcedar have occurred with both aircraft types. Two specific trials in Texas and two conducted in New Mexico that directly compared spray results from these aircraft suggest that results are easily influenced by the experimental protocol. This is especially true when experiments are applied in situations that are favorable or advantageous to one platform or the other.

Experience gained from comparative spray trials indicate that aircraft model and its guidance system, coupled with how the spray delivery system is configured, directly influence spray results. Application timing and plant coverage with the optimal herbicide mixture are key reasons

for success. Plant coverage is enhanced when medium to large sized droplets (750 -1000 μ m) are applied with a relatively high spray volume (7 to10 gpa fixed wing; 15 gpa rotary). Saltcedar control using either platform has varied by year, weather conditions at the time of spraying, pilot/operator experience and various logistical factors. Fixed-wing aircraft are suited to relatively large monoculture saltcedar stands where the swath overlap pattern provides maximum herbicide coverage. Rotary-aircraft are well suited to areas requiring precise coverage such as along river edges, spraying among desired vegetation and areas where few swaths can be made. Economics is an important consideration but choice of which aircraft to employ for spraying saltcedar should be determined mainly by the type of work to be undertaken.

Aerial Application Methods to Reduce Imazapyr Impacts on Riparian Restoration

Scott J. Nissen¹, Galen R. Brunk¹, and Dale L. Shaner¹

¹ Department of Bioagricultural Sciences and Pest Management, Colorado State University, Fort Collins, CO and USDA-ARS, Fort Collins, CO. snissen@lamar.colostate.edu, dale.shaner@ars.usda.gov, pwestra@lamar.colostate.edu, gbrunk@lamar.colostate.edu

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 μ m 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.

Novel Herbicide Combinations for Tamarisk Control With Minimal Ecosystem Impact

Philip Westra, Weed Scientist, Dept. of Bioagricultural Sciences and Pest Management, Colorado State University

Abstract:

Relatively few novel herbicides or herbicide combinations are evaluated specifically for the control of salt cedar. This may be partially due to the perception that such herbicide use represents a relatively small market, or there may be concerns regarding adverse desirable plant impacts in riparian ecosystems. However, herbicides that completely defoliate salt cedar within 1 month of herbicide application could simulate the defoliation provided by biocontrol agents, thereby weakening the plants over time and minimizing water use by salt cedar. In the summer and fall of 2005, two studies were initiated on the St. Vrain river to evaluate the potential utility of herbicides or herbicide combinations that included Escort (a sulfonylurea herbicide), Krenite, Glyphosate as different formulations, Vengeance Plus (which contains garlon plus two PGR herbicides), Edict, and Arsenal. Treated plants were clumps of 10-20 large shoots ranging in size from ½" to 2" in diameter arising from a common crown. Most treated plants were 15 to 20 feet tall. Mixtures containing Vengeance Plus or Arsenal generally provided the longest control of salt cedar. Several treatments provided greater than 90% control 1 year or more after application. Several treatments provided control of older stems that were leafed out at the time of application, but in some cases, profuse new 2006 growth came from the crown area of treated plants. Several treatments had minimal effect on understory plants while providing good control of salt cedar. Many of the novel treatments in this study completely eliminated salt cedar flowering and seed production in 2006.