



Western Range &
Wildlands Edition
SPRING 2015

TechLine

INVASIVE PLANT NEWS

INNOVATIVE RESEARCH, SUCCESS STORIES, AND TIPS FOR INVASIVE PLANT MANAGERS

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ABOUT TECHLINE

TechLine Invasive Plant News aims to provide an objective communication tool for on-the-ground natural resource managers who face common management challenges so they may share the successes of their programs and learn from one another.

Print newsletters are published twice per year and delivered free of charge. This and past issues can be downloaded from www.techlinenews.com.

Editor, Celestine Duncan
Copy Editor/Design, Melissa Munson
Circulation, Darby Bramble
Learn more: www.techlinenews.com
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SPRING GUIDE ISSUE

Resources to help managers meet the demands of a busy field season.

Tolerance of Desirable Grasses to Milestone® and Perspective Herbicides

Common Tansy Identification & Management

Proper Application Timing to Maximize Control

Essential Online Resources To Kick Off Your Field Season



JAN SAMANEK, BUGWOOD.ORG

EDITOR'S NOTES



GET READY FOR SPRING

AN INVASIVE PLANT MANAGER'S WORK IS NEVER DONE! No sooner do you get your equipment cleaned and stored, field data organized, and reports summarized then it is time to plan for the upcoming field season. Your dedication, perseverance and knowledge as a natural resource manager is critical to protect lands from invasive plants, and enhance or restore grasslands, forests, and other natural areas. Sustainable land management is complex and involves tough decisions that

involve diverse natural resources, land use, politics, budget constraints and more.

Our goal with TechLine Invasive Plant News is to provide you and your program with new ideas, concepts, and resources for managing invasive plants.

In this issue, you'll find research on the tolerance of desirable grasses to Milestone® and Perspective herbicides, and management recommendations for common tansy and other important species. We've also included some key resources on crew training, sprayer calibration and application equipment that will help you gear up for spring.

Thank you for supporting and sharing TechLine Invasive Plant News.

Celestine Duncan

PLEASE EXCUSE OUR ERROR

In the Western Range & Wildlands Edition, Fall 2014 issue, Tables 1 and 2 were mislabeled within the Tree of Heaven: Devil in Disguise article. The corrected article can be accessed at <http://techlinenews.com/articles/2014/tree-of-heaven-a-devil-in-disguise>.



2015 TECHLINE SWEEPSTAKES WINNINGS HELP EXTEND BUDGET FOR RAMSEY COUNTY, MN CWMA COORDINATOR

Ramsey County (MN) Conservation District's CWMA Coordinator Carole Gernes had a wish list in mind when we told her she'd won \$200 to support her weed management program. "I have a pretty small budget, so this will really help."

Carole educates and trains Invasive Plant Patrol volunteer monitors, creates removal events and blitzes, works with land owners, and coordinates invasive plant management within Ramsey County, Minnesota. Her program's main goals are early detection and rapid response to prevent infestation of 11 invasive plant target species including wild parsnip, Japanese knotweed, Oriental bittersweet and invasive Phragmites.

Her winnings paid for a foaming herbicide applicator, foaming agent, and two Parsnip Predators (digging tools). "This will allow me to dedicate more of my budget to boot brushes for spread prevention."

Congratulations, Carole!

LEARN MORE about Ramsey County's Cooperative Weed Management Area on their website (<https://www.co.ramsey.mn.us/cd/cwma.htm>) or follow them on Facebook.

This year's sweepstakes winner was selected at random from over 550 entries. Monthly quizzes and surveys provide opportunities for TechLine readers to enter the sweepstakes multiple times. One entry for each survey or quiz is eligible for the drawing.

LEARN MORE about the annual sweepstakes: <http://techlinenews.com/sweepstakes>

NEW MANAGEMENT GUIDE!

PRAIRIE AND GRASSLAND MANAGEMENT

is a new guide that provides a suite of resources to natural resource managers so they can better understand how and when to integrate herbicides into prairie and grassland management programs.

The guide includes information on herbicide use rates, herbicide selectivity on desirable forbs and grasses, seeding options and guidelines, invasive woody and herbaceous plant control, and other useful tips.

Available late Spring 2015 at: techlinenews.com/prairieguide



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MONTHLY E-NEWSLETTER

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INVASIVE PLANT MANAGEMENT GUIDE

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Tolerance of Desirable Grasses

TO MILESTONE® and PERSPECTIVE HERBICIDES

By Celestine Duncan

NOTE: INFORMATION IN THIS ARTICLE WAS PUBLISHED IN THE 2014 WESTERN SOCIETY OF WEED SCIENCE RESEARCH PROGRESS REPORT.



JANE MANGOLD

NATIVE PERENNIAL GRASSES SUCH AS BLUEBUNCH WHEATGRASS (*Pseudoroegneria spicata*) are ecologically and economically important in the Intermountain, Great Basin and Northern Great Plains Regions. In grassland and shrubland habitat, bluebunch wheatgrass may occupy as much as 60 percent of the plant community. These habitat types are also highly susceptible to invasion by noxious weeds including knapweeds (*Centaurea* sp.) and leafy spurge (*Euphorbia esula*). Herbicides are often used to control these and other invasive broadleaf weeds; therefore, understanding the tolerance of desirable grass species to herbicide treatments is important for land managers.

METHODS

A field experiment established on native rangeland in western Montana measured the tolerance of cool-season bunchgrass to applications of Milestone® herbicide compared to Perspective herbicide. Perennial native grasses on the site were dominantly bluebunch wheatgrass (45%), Idaho fescue (*Festuca idahoensis*) (15%), and Junegrass (*Koeleria cristata*) (10%). Noxious weeds were absent within the study area; however, native forbs including lupine (*Lupinus* sp.) and buckwheat (*Eriogonum* sp.) occupied about 25 percent cover. Grazing livestock were excluded from the site during the season of herbicide application and for two years following treatment. Soils are sandy loam and elevation is 4,320 feet.

Individual plots were 10 by 20 feet in size and arranged in a randomized complete block design, with three replications per treatment. Herbicides were applied with a CO₂-pressurized backpack sprayer at 13.5 gallons per acre in late spring (June) or fall (September) (Table 1). Application timing was typical for broadleaf weed control in the Intermountain Region.

Milestone herbicide was applied at two rates: the maximum broadcast label rate of 7 fluid ounces per acre¹ (fl oz/A) ap-

plied in spring and fall, and the spot treatment rate of 14 fl oz/A (spring only). Perspective herbicide was applied in both spring and fall at the noxious weed control rate of 4.75 ounces of product per acre (oz/A)² and 9.5 oz/A, which is less than the maximum broadcast label rate of 11 oz/A. Herbicides were applied with a non-ionic surfactant (NIS) at 0.25% v/v.

Visual evaluations of perennial grass injury were collected approximately 30 and 60 days after spring application, and one and two years after treatment (YAT). Herbicide symptoms that were evaluated included epinasty (twisting, drooping, weakened leaves or stems), chlorosis (yellowing), and visual stunting compared to plants in non-treated plots.

Perennial grass was also harvested at peak growth by clipping a 0.5 square meter frame within each plot about one and two years after treatment. Bluebunch wheatgrass was separated from other perennial grasses during clipping because of significantly higher visual injury to this species. The second year after treatment, bluebunch wheatgrass was selectively harvested from a 0.5 square meter frame in each plot. Harvested grasses were dried for seven days in a greenhouse, weighed to the nearest gram, and weight converted to pounds per acre (lb/A). Data were analyzed by analysis of variance.

TABLE 1. SITE CONDITIONS AND HERBICIDE APPLICATION INFORMATION

Application Date (2011)	Grass growth state at application	Air Temperature (F)	Relative Humidity (%)	Wind (direction-mph)	Soil Moisture
June 11	Idaho fescue and Junegrass seed heads emerged. Blue bunch wheatgrass 80% boot stage; 20% early seed-head emergence.	60	67	NW-1	moist
September 28	Seed heads shattered; few green leaves remained on perennial grass; no fall basal regrowth present.	54	43	0	dry

¹ 7 fl oz/A of Milestone® herbicide is equal to 1.75 ounces active ingredient per acre (oz ai/A) of aminopyralid.

² 4.75 oz product/A of Perspective herbicide is equal to 1.88 ai/A aminocyclopyrachlor plus 0.75 oz ai/A chlorsulfuron.

RESULTS

SEASON OF APPLICATION

No injury was noted on grasses 30 days after application with any herbicide treatment. Slight injury, including weakened stems and bending seed heads, was observed on bluebunch wheatgrass and Junegrass (<7% injury) 60 days after spring application with Milestone® at 14 fl oz/A and Perspective at 9.5 oz/A. No visual injury was noted on Idaho fescue the year of treatment with any herbicide.

ONE AND TWO YEARS AFTER TREATMENT

Bluebunch wheatgrass was significantly impacted by Perspective herbicide one and two years after treatment. Visual injury to bluebunch wheatgrass was greatest with Perspective at 9.5 oz/A (Table 2); however, even the recommended noxious weed rate of 4.75 oz/A of Perspective herbicide significantly reduced bluebunch wheatgrass biomass one and two years after treatment (Figure 1). Injury and biomass reduction to bluebunch wheatgrass was significantly greater with Perspective than with Milestone herbicide. Injury symptoms on bluebunch wheatgrass included a reduction in plant growth height, overall plant vigor, and reduced plant density with applications of Perspective herbicide. There was no visual injury noted on either Idaho fescue or Junegrass one year following treatment for any herbicide.

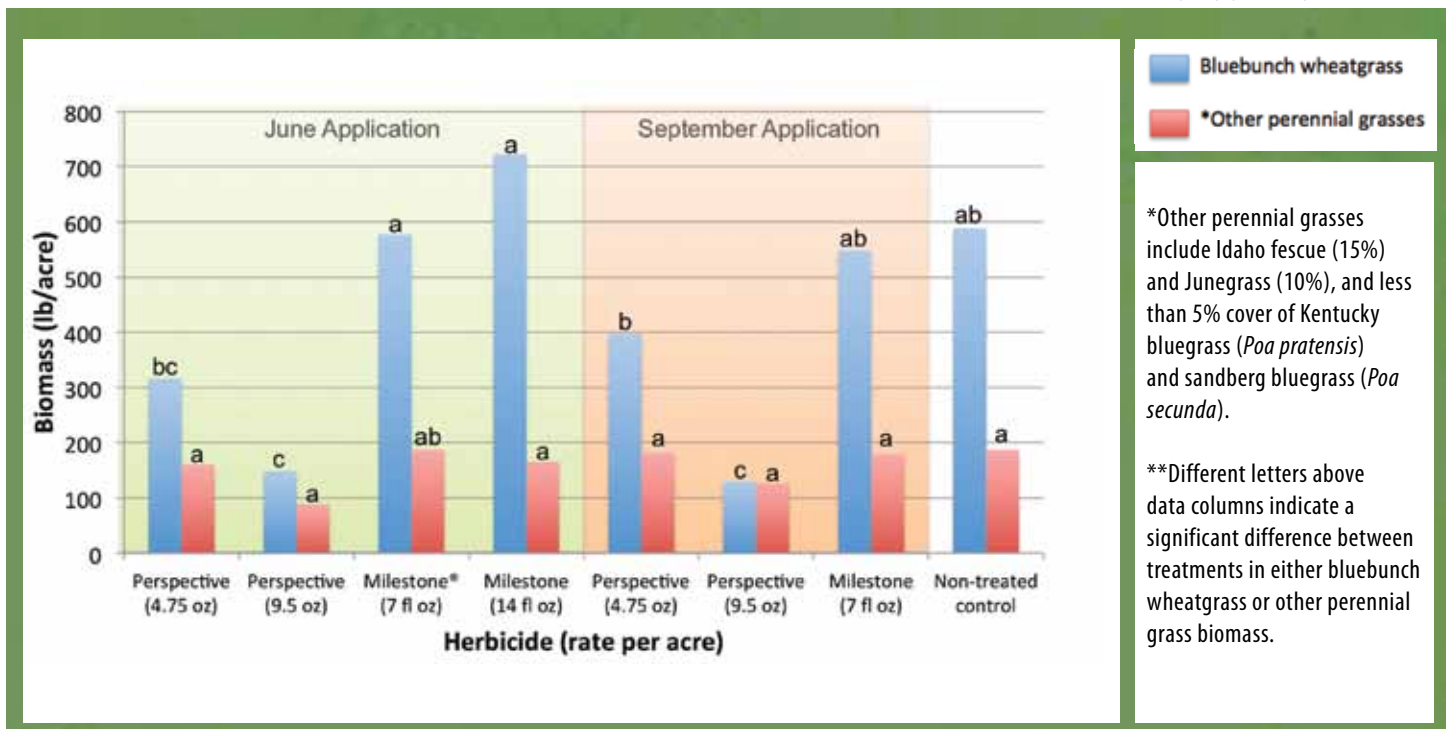
CONCLUSION

The application of Perspective herbicide shifted the plant community from a site dominated by bluebunch wheatgrass to one dominated by Idaho fescue, Junegrass, and tolerant forbs (primarily buckwheat). The change in plant community structure caused by removal of bluebunch wheatgrass could have long-term ecological implications to the rangeland resource, and result in overall reduction in productivity of the site.

TABLE 2. VISUAL PERCENT INJURY TO BLUEBUNCH WHEATGRASS ONE AND TWO YEARS AFTER TREATMENT (YAT) WITH MILESTONE® HERBICIDE COMPARED TO PERSPECTIVE HERBICIDE APPLIED AT VARIOUS RATES IN JUNE OR SEPTEMBER (P=0.10). Different letters following data indicate a significant difference between treatments.

Herbicide	Application		Visual Percent Injury	
	Rate (per acre)	Date (2011)	1 YAT	2 YAT
Perspective	4.75 oz	6/11	21c	13c
	9.5 oz		38b	78a
Milestone®	7 fl oz		3.3e	0.0d
	14 fl oz		12d	0.0d
Perspective	4.75 oz	9/28	23c	33b
	9.5 oz		45a	70a
Milestone	7 fl oz		12d	0.6d
Non-treated control	--		--	0.0e

FIGURE 1. BIOMASS PRODUCTION OF BLUEBUNCH WHEATGRASS AND OTHER PERENNIAL GRASSES* ONE YEAR AFTER TREATMENT (YAT) (P=0.10)**



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DOWNLOAD A PDF OF THIS ARTICLE AT:

<http://techlinenews.com/herbicides/2014/tolerance-of-desirable-grasses-to-milestone-and-perspective-herbicides>

Common Tansy

Identification and Management

COMMON TANSY (*TANACETUM VULGARE* L.), ALSO KNOWN AS GARDEN TANSY AND GOLDEN BUTTONS, IS A PERENNIAL FORB THAT REPRODUCES BY SEED AND RHIZOMES. It was first introduced to the United States from Europe in the 1600s. Cultivation for traditional folk medicines and ornamental plantings accelerated its spread throughout temperate regions of North America (Figure 1). Common tansy is currently listed as noxious in four western states and Minnesota.

Common tansy is an aggressive plant that can form dense vegetative colonies, especially on disturbed lands. The plant often occurs in association with other noxious weeds including knapweeds (*Centaurea* sp.) and Canada thistle (*Cirsium arvense*). Sites most susceptible to invasion include roadsides, fence rows, pastures, vacant lands, irrigation ditches, stream banks, and waste areas.

Common tansy displaces desirable grasses and forbs, impacting livestock grazing and wildlife habitat. The plant also contains alkaloids that can be toxic to both humans and livestock if consumed in large quantities. However, volatile oils produced in the leaves and flowers deter grazing by cattle and horses.

FIGURE 2. COMMON TANSY PLANTS HAVE FLAT-TOPPED CLUSTERS OF SMALL, BUTTON-LIKE, YELLOW FLOWERS THAT LACK RAY PETALS. LEAVES ARE ALTERNATE AND PINNATELY COMPOUND AND IRREGULARLY LOBED.



CELESTINE DUNCAN



FIGURE 1. OCCURRENCE OF COMMON TANSY IN THE UNITED STATES AND CANADA ([HTTP://PLANTS.USDA.GOV](http://plants.usda.gov))

Identification and Spread

Mature common tansy plants are easy to recognize by the flat-topped clusters of small, button-like, yellow flowers that lack ray petals (Figure 2). Plants are herbaceous and 3 to 5 feet tall with erect stems. Leaves are alternate and pinnately compound (leaflets arranged on both sides of a common stalk) and irregularly lobed with leaves becoming smaller towards the tip of the stalk. Leaves and stems are strongly aromatic when crushed.

Common tansy reproduces by seeds and rhizomes. Flower heads remain intact and can hold seeds through the fall until they are physically dislodged from dried flower heads. Seeds are spread by both wind and water. Established plants also spread by brown, creeping rhizomes forming dense patches.

Management with Herbicides

Field trials were established at two locations in western Montana to determine effectiveness of various herbicide treatments on common tansy (Duncan et al. 2011). Sites included either common tansy alone or growing in a complex with spotted knapweed (*Centaurea stoebe*). Herbicide treatments included Milestone® at 5 and



JAN SAMANEK, BUGWOOD.ORG

DOWNLOAD A PDF OF THIS ARTICLE AT:
<http://techlinenews.com/articles/2014/common-tansy-identification-and-management>

TABLE 1. AVERAGE PERCENT CONTROL OF COMMON TANSY AND SPOTTED KNAPWEED 12 AND 27 MONTHS AFTER TREATMENT (MAT) WITH THREE HERBICIDES APPLIED AT TWO LOCATIONS IN WESTERN MONTANA (P=0.05)

Herbicide	Application Rate (product per acre)	% Control			
		Common Tansy		Spotted Knapweed	
		12 MAT	27 MAT	12 MAT	27 MAT
Milestone®	5 or 7 fluid ounces	0b	0c	100a	100a
Opensight®	1.5 fluid ounces	95a	80b	100a	100a
	2.5 fluid ounces	99a	99a	100a	100a
	3.3 ounces	97a	97a	100a	100a
metsulfuron	0.50 ounces	99a	98a	0b	0b

7 fluid ounces of product per acre (fl oz/A), Opensight® at 1.5, 2.5 and 3.3 ounces of product per acre (oz/A) and metsulfuron at 0.5 oz/A. Plots were visually evaluated for percent control 12 and 27 months after treatment (MAT).

Results from the field studies indicate that Opensight at all rates applied provided greater than 95 percent common tansy control 12 MAT. This high level of control was maintained for 27 MAT with Opensight rates greater than 2.5 oz/A. Milestone® did not provide acceptable control of common tansy. Although Opensight and metsulfuron provided similar control of common tansy, Opensight provided more than 95 percent control of both common tansy and spotted knapweed. Conclusions from the study indicate that on sites having a complex of weeds such as common tansy, knapweeds, and thistle, Opensight® herbicide at rates of 2.5 to 3.3 oz/A provide excellent control of the weed complex compared to either metsulfuron or Milestone herbicide alone.

Other Management Methods

PHYSICAL

Hand digging can control small newly established infestations of common tansy. Rhizomes must be completely removed to effectively control the plant.

MECHANICAL

Common tansy is normally controlled in cultivated cropping systems. Tillage alone or in combination with herbicide application must be conducted periodically since common tansy can regenerate from rhizomes and seed.

Mowing, if applied pre-bloom, will reduce flowering and seed production. Mowing height should be a minimum of four-inch stubble height to maintain vigor of desirable plant species, which may replace common

tansy over time with repeated mowing. Mowing after flowering and seed set may increase the spread of common tansy seeds.

LIVESTOCK GRAZING

Common tansy is reported to be toxic to livestock, and abortions in cattle were reported from the midwestern United States. However, most classes of livestock and some wildlife have been observed to eat common tansy with no known adverse effects. Sheep have been used to manage common tansy in Montana. Long-term impacts of repeated sheep grazing on common tansy population size and plant community dynamics are not known, but observations suggest common tansy populations may be decreased and grass populations increased with consecutive years of season-long sheep grazing (Jacobs 2008).

Applying cultural practices that strengthen the competitiveness of the plant community, such as prescribed grazing and forage harvest management will help prevent establishment of common tansy. Treatment of small satellite populations before plants become well established and spread should be a high management priority. Re-vegetation with desirable competitive plants will improve the longevity of common tansy control practices on disturbed sites.

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PROPER APPLICATION TIMING MAXIMIZES INVASIVE PLANT CONTROL



SPRING AND EARLY SUMMER can be excellent times to control actively growing invasive plants with herbicides. Applying herbicides to the target plant at the optimum growth stage is important to maximize control. The following guidelines provide information on the best application timing and rate to control key invasive plants.

CANADA THISTLE (*CIRSIUM ARVENSE*)

Late spring and early summer applications of Milestone® on Canada thistle should be made after all plants have emerged and basal leaves are expanded. It is better to wait until some of the plants are at the bud growth stage to be sure that all plants are emerged before applying Milestone at 5 to 7 fluid ounces per acre (fl oz/A). Use the 7 fl oz/A rate at later growth stages.

<http://bit.ly/canadathistle>

BIENNIAL THISTLES:

BULL (*CIRSIUM VULGARE*)

MUSK (*CARDUUS NUTANS*)

PLUMELESS (*CARDUUS ACANTHOIDES*)

Milestone at 3 to 5 fl oz/A can be applied in spring and early summer from rosette to early flower growth stage. Use the 5 fluid ounce rate at the late bolt to early flower growth stage.

<http://bit.ly/biennialthistle>

SPOTTED and DIFFUSE KNAPWEED

(*CENTAUREA STOEBE* AND *C. DIFFUSA*)

Milestone at 5 to 7 fl oz/A may be applied any time during the growing season when plants are actively growing. Applications made during the late bud to bloom stage will not stop seed production the year of treatment.

<http://bit.ly/spottedknapweed>

RUSSIAN KNAPWEED

(*ACROPTILON REPENS*)

Applications of Milestone at 5 to 7 fl oz/A should be delayed until Russian knapweed has bolted and is in the early bud to flower growth stage; applications can be made through the fall. It is important to remember that herbicide efficacy symptoms do not always show on Russian knapweed the season the treatment is made.

<http://bit.ly/russianknapweed>

LEAFY SPURGE (*EUPHORBIA ESULA*)

The optimum time to treat leafy spurge with most herbicides is at the true flower growth stage, which is after the yellow bract is formed (late spring to early summer). Apply Tordon® 22K alone at 1 to 2 quarts of product per acre (qt/A) at true flower. When applying Tordon 22K at rates less than 1 qt/A add 2,4-D at 1 qt/A (1 lb ae/A). The addition of OverDrive herbicide at 4 oz/A may improve leafy spurge control by up to 20%. For suppression of leafy spurge on sensitive sites apply a tank mix of 7 fl oz/A Milestone® plus 1 qt/A 2,4-D plus 4 oz/A of OverDrive.

<http://bit.ly/leafyspurge>

KNOTWEEDS (*FALLOPIA* SPP.)

Preventing knotweed establishment is the highest priority for management. Once established, eradication is extremely difficult. Optimum suppression of invasive knotweeds with Milestone herbicide at 9 to 14 fl oz/A is obtained when applications are made to plants that are at least 3 to 4 feet tall. On Bohemian knotweed, total application volume of 100 gallons per acre or greater increased control. Multiple applications will be necessary to provide long-term control.

<http://bit.ly/knotweeds>



Explore control recommendations for more invasive plant species at:
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ESSENTIAL ONLINE RESOURCES FOR INVASIVE PLANT MANAGERS

TRAINING OPPORTUNITIES & RESOURCES



TURN AROUND, LOOK AROUND

A presentation to use for spring training programs for private, commercial, and government herbicide applicators and staff. The downloadable PDF includes over 40 slides highlighting important guidelines applicators should follow before, during and after herbicide application.

<http://bit.ly/turnaroundlookaround>

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UNDERSTANDING HERBICIDES



With spring just around the corner, now is the time to improve your skills and expand your understanding of the science behind selecting, applying, and assessing the effects of herbicides.

Explore these and more articles with technical and practical information about using herbicides at:

<http://techlinenews.com/herbicides>

HERBICIDE EDUCATION SERIES

- [Effective Herbicide Use Starts With the Label](#)
- [Introduction to Herbicide Formulations](#)
- [Factors Affecting Herbicide Performance](#)
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TOLERANCE OF NON-TARGET SPECIES TO HERBICIDE

- [Native Forb and Shrub Tolerance to Milestone® Herbicide](#)
- [Tolerance of Warm and Cool Season Grasses to Milestone® Herbicide](#)
- [Possible Effects of Herbicides to Honeybees](#)

PRODUCT INFORMATION

- [Answers to FAQs about Control of Saltcedar and Russian Olive with Garlon® 3A vs Garlon 4 Ultra](#)
- [Answers to FAQs about Milestone Herbicide Labels, MSDS, and Additional Information](#)



SELECTING, MAINTAINING & CALIBRATING EQUIPMENT

SMART WAND TECHNOLOGY

The "Smart" spray wand with GIS and GPS capability is a precision tool for treating invasive plants on wild land sites, and can simplify invasive weed management.

<http://bit.ly/1Cvy8ao>

TIPS FOR SELECTING, MAINTAINING, AND CALIBRATING BACKPACK SPRAYERS

Learn key features to consider before purchasing a backpack sprayer, maintenance guidelines, and TechLine reader-reviews of backpack sprayer equipment.

<http://bit.ly/sprayerselection>

SELECTING ATV OR UTV HERBICIDE SPRAYER PLATFORMS FOR WILDLAND AND NATURAL AREA MANAGEMENT

We asked 10 public and private invasive plant management professionals which ATV and UTV herbicide application platforms they recommend and why. Learn about the equipment they endorse based on experience.

<http://bit.ly/atvutvplatform>

CALIBRATION GUIDELINES FOR SMALL (BACKPACK) AND LARGE VOLUME (ATV-, TRUCK-MOUNTED BOOM AND BOOMLESS) HERBICIDE SPRAYERS

How do I make the most of my herbicide spot treatments? How much herbicide do I put in my tank?

The answers to these questions plus step-by-step procedures for calibrating your large and small volume sprayers are included in this article.

<http://bit.ly/techlinecalibration>

UNDERSTANDING PERFORMANCE OF YOUR ATV-MOUNTED BOOMLESS SPRAY NOZZLES

A summary of field studies by Robert Woolf and others at Kansas State University to evaluate the effectiveness of spray nozzles on all-terrain vehicles (ATVs).

<http://bit.ly/boomless>



SUCCESS STORIES FROM THE ARCHIVES *of techlinenews.com*

PROTECTING WATERSHED VALUES IN SOUTHEAST WYOMING



Wyoming counties unite to control Russian olive and saltcedar along the North Platte River

<http://techlinenews.com/articles/2013/1/25/protecting-watershed-values-in-southeast-wyoming>

WALLOWA CANYONLANDS PARTNERSHIP USES A SCIENCE-BASED APPROACH FOR MANAGING NOXIOUS WEEDS



Diligence and planning are keys to successful cooperative weed management area in northeast Oregon.

<http://techlinenews.com/articles/2013/1/25/wallowa-canyonlands-partnership-uses-a-science-based-approach-for-managing-noxious-weeds>