Chinese Privet Control with Herbicide Foliar Sprays

by James H. Miller, USDA Forest Service, Southern Research Station, Auburn, AL 36849

Chinese privet (Ligustrum sinense Lour.) is probably the most problematic alien shrub in the 13-states of the southern region, widely invading forests, parks and preserves, pastures, and right-of-ways (Haragan 1996, Miller 1997, Matlack 2002). After a century of planting as an ornamental shrub following introduction in 1852 (Dirr 1998), range expansion has been rapid and far-reaching since about 1960 (NRCS website). This rapid invasion has occurred as birds feed upon abundant fruits produced in early spring and disperse seed during northern migrations. It is widely observed that the habitats most under siege are disturbed areas and bottomland forests (Dirr 1998), while upland forests and pasture margins are steadily being invaded as well. Site dominance occurs through Chinese privet’s production of abundant root suckers and clump sprouts, as well as carpets of seedlings in infested areas.

Chinese privet is but one of at least eight nonnative privet species within the region that have escaped into natural habitats. Other widely occurring privet invaders are European privet (L. vulgare L.), glossy privet (L. lucidum Ait. f.), and Japanese privet (L. japonicum Thunb.). Those locally problematic are Amur privet (L. amurense Carr.), border privet (L. obtusifolium Sieb. & Zucc.), California (originally from Japan) privet (L. ovalifolium Hassk.), and waxyleaf privet (L. quihoui Carr.), including several varieties of each. Japanese, glossy, and border privet are evergreen while the others are semi-evergreen and retain foliage depending on the severity of the winter and locale. All have opposite leaves, with white flower clusters in spring that yield black to blue-black drupes in fall and winter to spring. The fleshy one-seeded fruit characterize these members of the olive family (Oleaceae).

Herbicides are one tool that can be used to control privets as part of an integrated vegetation management approach. The objective of this investigation was to compare foliar sprays of most herbicides registered for forest use in the southern region for their effectiveness on Chinese privet.

Methods

The study site was located along a riparian area of a perennial stream in east-central Alabama. A uniformly dense stand of Chinese privet had been brush mowed on a 3-year cycle for 9 years before study initiation. The infestation had one year of regrowth, being 4 to 10 ft tall. Sixty-four, 10 x 20-ft plots were established in four blocks. Seven herbicide treatments and a non-treated control were randomly assigned to plots in each block and tested at two intervals, August and September. The first treatment was planned for July, but due to the absence of rainfall for 3 months during the summer, it was applied in August after rainfall commenced with 2 inches in 2 weeks preceding treatment.

Near maximum labeled rates were tested for each herbicide using formulations with a single active ingredient (Table 1). This approach aimed to identify the most effective active ingredients for treating Chinese privet in late-summer and early fall. Applications were by a CO₂-powered backpack sprayer with a
Table 1. Herbicide tests on Chinese privet.

<table>
<thead>
<tr>
<th>Herbicide active ingredient (ai)</th>
<th>Rate per Acre lbs a(^\d)</th>
<th>1 Year After Treatment</th>
<th>2 Years After Treatment</th>
<th>3 Years After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accord glyphosate</td>
<td>1.5 gal 6.0</td>
<td>99a(^1)</td>
<td>98a</td>
<td>97a</td>
</tr>
<tr>
<td>Arsenal AC imazapyr</td>
<td>24 fl oz 0.75</td>
<td>94a</td>
<td>89a</td>
<td>79ab</td>
</tr>
<tr>
<td>Escort metsulfuron</td>
<td>3.3 oz 0.12</td>
<td>81ab</td>
<td>79a</td>
<td>69ab</td>
</tr>
<tr>
<td>Garlon 4 triclopyr</td>
<td>1.5 gal 6.0</td>
<td>64ab</td>
<td>44ab</td>
<td>22abc</td>
</tr>
<tr>
<td>Oust sulfometuron</td>
<td>6.0 oz 0.28</td>
<td>31abc</td>
<td>32abc</td>
<td>21abc</td>
</tr>
<tr>
<td>Vanquish dicamba</td>
<td>1.5 gal 6.0</td>
<td>27abc</td>
<td>25abc</td>
<td>04abcd</td>
</tr>
<tr>
<td>Tordon K picloram</td>
<td>0.5 gal 1.0</td>
<td>12abcd</td>
<td>09abcd</td>
<td>05abcd</td>
</tr>
<tr>
<td>Transline clorpyralid</td>
<td>21 fl oz 0.5</td>
<td>00abcd</td>
<td>00abcd</td>
<td>00abcd</td>
</tr>
</tbody>
</table>

\(^1\)Product per acre. \(^2\)Pounds active ingredient per acre. \(^3\)Results of Tukey's HSD, where values with different letters are significantly different at the 5% level of probability.

Spraying Systems XR 8003 flat-fan nozzle swiveled downward on a 4-foot extended wand. A total spray mixture of 40 gallons per acre (gpa) in water was used except with Accord, which was tested with 30 gpa per label recommendations. A surfactant (Entry II) was added at 0.5 percent to all mixtures except Accord, which contains surfactant. The applicator stood in the middle of half plots and rotated about to uniformly cover all plants, while a guide outside the plot gave directions to assure uniformity (shown above).

Plots were rated 1, 2, and 3 years after treatment using visual estimates of percent volume reduction of standing shrubs. Untreated control plots in each block were used as height references during ratings, while before treatment volumes (average height X cover) were used as co-variants in the analysis. There were no significant differences between the August and September applications and thus these data were combined. According to standard procedures, percent reductions (control) were arsine square root transformed and data were analyzed using Tukey's HSD Test.

Findings

Privet control exceeded 90 percent with Accord (glyphosate) and Arsenal AC (imazapyr) the first year and did not statistically differ from Escort, which averaged 81 percent control (Table 1). Accord gave near complete control for the 3-year post-treatment period to exceed 97 percent with minimal resprouting and seedlings. Garlon 4, Oust, Vanquish, Tordon K, and Transline provided less than 65 percent control. Transline was completely ineffective on privet at these timings and rates.

The most effective herbicide, Accord, is a foliar active herbicide that is deactivated when it reaches the soil and thus presents safety to nearby unsprayed plants. This offers a treatment option to prevent harm to native cohort plants when care in application restricts spray to privet foliage only. The wand extension used in this research permitted effective treatment for privet that was 10 ft tall. The wand could be fitted with a longer extension and a projecting spray tip to treat taller privet.

The active ingredient in Accord is glyphosate, which is available in many formulations including aquatic labeled products permitted for spraying around and over water. The aquatic formulations could be used to eradicate the extensive privet infestations that occur along streamside areas and
Conclusions

Resprouted Chinese privet can be effectively controlled or even eradicated with Accord treatments or other herbicides with similar glysophosate formulations. This offers a treatment option that can be safe to applicators as well as flora and fauna when used according to label directions. Subsequent tests have shown that lower rates are equally effective, as low as 1 quart per acre. Treatments in December are most effective while those in April are only slightly less effective (Harrington and Miller 2005). Arsenal AC and Escort were less effective in this trial, but provided enough control for use in particular locations. All treatments will need to be repeated to achieve eradication, and native plant revegetation fostered to obtain restoration.

Literature


FLORIDA EXOTIC PEST PLANT COUNCIL – www.fleppc.org

Officers
Jim Burney, Chair
Aquatic Vegetation Control, Inc.
561/845-5525
LIPD@bellsouth.net
Danne Owen, Secretary
Florida Atlantic University
954-236-1095
dowen@fau.edu
Kristina Kay Serbeseke-King, Treasurer
The Nature Conservancy
561-744-6608
karesseking@tnc.org
Karen Brown, Editor
University of Florida
Center for Aquatic & Invasive Plants
352/392-1799
kpbrown@ufl.edu
Mike Bodle, Immediate Past Chair
South Florida Water Management District
561/882-6132
mbodle@sfwmd.gov
Allison Fox, Chair Elect
University of Florida
Agronomy Department
352/392-3811; Fax: 207
amfox@ufl.edu

Directors
Roger Clark (2nd year)
Lee County Parks & Recreation
321/461-7453
Roger@leegov.com
Drew Leslie (2nd year)
Florida DEP Bureau of Invasive Plant Management
905/345-2823
DrewLeslie@dep.state.fl.us
Crescenda Silvers (2nd year)
USDAAER
954/975-0541 ext. 144
csilver@sea.ars.usda.gov
Jim Duquenou (2nd year)
Florida Park Service
305/451-1126
james.duquenou@dep.state.fl.us
Scott Dimmen (1st year)
Downs Sciences
813/386-7090
scottdmm@dow.com
Jim Lane (1st year)
USDAOE Invasive Species Management
904/323-1044
Jim.J Lane@fs.fed.us
Asst.mysnail
Tony Perons (1st year)
National Park Service
Florida/Caribbean Exotic Plant Management Team
305/202-3047
Tony_Perron@nps.gov
Paul Pratt (1st year)
USDAAER Invasive Plant Research Laboratory
561/487-6469
paulpratt@sea.ars.usda.gov

Committee Chairs
By-laws
Denis Guevara
941/657-7637
Denis_Guevara@fws.gov
CAST Representative
Denis Guevara
Ken Langeland (alternate)
Editorial
Karen Brown
Education
Lesia Souto
Stormwater Management Academy
321/972-2123
Louto@usf.edu
FGA/FEPPC Liaison
Doria Cottone
University of Florida
The Nature Conservancy
352/392-5949
dgerdon@boscomail.ufl.edu
and
B Miller
St. Johns River Water Management District
miller@sfwmd.gov
Legislative
Matthew King
Palm Beach County
561/233-2400
mking@palm-beach.fl.gov
Local Arrangements
Mike Bodle
Membership
Kay Roberts
727/726-1455
kroberts@bellsouth.net
Merchandise
Tony Perons
Nominations
Mike Bodle
Outreach
Tom Funigma
CZI Inc.
561/744-7455
tom@czi.com
Plant List
Kathy Craddock Burks
Florida Natural Areas Inventory
805/242-6070 Ext. 210
kburks@fla.net
Program Chair
Daniel Clark
Florida/Caribbean Exotic Plant Management Team
340/903-8905 x 231
daniel.clark@nps.gov
Research
John Volio
Florida Atlantic University
954/336-1113
jvolio@fau.edu
Training
Jim Duquenou
Vendors
Scott Dimmen
Webmaster
Tony Perron

Task Force Chairs
Australian Pine
Robert Eggn
Habitat Restoration Resources
239/574-8173
HabitatR@ymail.com
Brazilian Pepper
Jim Cuda
University of Florida
Entomology Department
352/392-1001 Ext. 126
jcuda@sfas.ufl.edu
Carrotweed
Chris Lockhart
Habitat Specialists, Inc.
561/738-1179
chris@habitatspecialists.com
Dioscorea
Mike Bodle
Grasses
Greg MacDonald
University of Florida
Agronomy Department
352/392-1811 Ext. 218
gmacmsg@ufl.edu
Ivygourd
Amy Ferriter/Tom Funigma
Shunkvine
Brian Nelson
SWFWMD
352/796-7111
Brian_Nelson@sfwmd.state.fl.us
Chinese Tallow
Drew Leslie
Melaleuca
Francois Larochelle
South Florida Water Management District
561/682-6193
flarochelle@sfwmd.gov

SOUTHEAST EXOTIC PEST PLANT COUNCIL
www.se-eppc.org

Officers
President
Brian Bowen
Tennessee Dept Environment and Conservation
Division of Natural Heritage
615/532-0436
brian Bowen@tn.gov
Vice President
Joyce Bender
Kentucky State Nature Preserves Commission
502/573-2886
Joyce@ky.np.com
Secretary
Knut Skwatkos Allen
Richmond National Battlefield Park
804/795-5019
kallen@nps.gov
Treasurer
Tony Perron, Florida EPCC
SE-EPPC Chapters and Regional Organizations:
Alabama, Florida, Georgia, Kentucky, Mid-Atlantic, Mississippi, New England, North Carolina, South Carolina, Tennessee, USDA-Forest Service

Direct all editorial and advertising inquires to:
Karen Brown, Editor
Wildland Weeds
7922 NW 71st Street
Gainesville, FL 32657
352/392-1799; Fax: 352/392-3462
kpbrown@sfas.ufl.edu

Editorial Committee:
Mike Bodle
Kathy Craddock Burks
Jim Cuda
Tom Funigma
Ken Langeland
Michael Meisengberg

Design by JS Design Studio.
Printing by StorrierChilds,
Gainesville, FL.

On the Cover: Melaleuca turned into Mudalpeleuza when 3 inches of rain fell two days prior to the event in the Everglades buffer strip near Holiday Park. Five swamp buggies got bogged down in the mud. See article on page 9. (Photo by Ken Langeland)

An exotic plant has been introduced to Florida, either purposefully or accidentally, from a natural range outside of Florida. A naturalized exotic plant is one that sustains itself outside of cultivation (it is still exotic; it has not “become” native). An invasive exotic plant not only has become naturalized, but it is expanding its range in Florida plant communities.

Wildland Weeds (ISSN 1524-9786) is published quarterly by the Florida Exotic Pest Plant Council (FLEPPC) and the Southeast Exotic Pest Plant Council (SE-EPPC) to provide a forum for information on exotic pest plant biology, distribution and control.

Direct address changes to:
Jackie Smith
DEP - Invasive Plant Management
9737 Gumbo Limbo Lane
Jensen Beach, FL 34957
561/722-2479
jackie.s.smith@dep.state.fl.us