

Use of Milestone Herbicide to Target Invasive Skunk Vine and Restore Native Vegetation in Florida: Implications for Future Forest and Range Management

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Nathan Lovstrand applies Milestone™ herbicide.

Resource managers are often tasked with maintaining or restoring land to native plant communities. Removal of invasive plants is key to the success of restoration efforts because these exotics can displace native flora. Managers must decide how to remove these invasive plants while not impacting the native flora. Herbicides are often used to accomplish this goal.

When using a herbicide it is just as important to know which plants the product will not harm as which plants it will effectively control. The purpose of this project was to gain more information about the effects of Milestone™ herbicide on local forest and range plant species while treating skunk vine (*Paederia foetida*).

Skunk vine was brought to the Brooksville, FL area from Asia prior to 1897 as a potential fiber crop (Morton 1976) and is now found in many areas of the southeastern United States including Texas, Louisiana, North and South Carolina, Georgia and Florida (EDDMapS 2014). Large areas of forest are currently infested with this species. It is found creeping across the ground, covering small shrubs and climbing large trees. It spreads out after reaching the canopy and robs native vegetation of sunlight. Milestone™ is registered in Florida by the EPA and Florida Department of Agriculture and Consumer Services for use in forest and range plant control. Early trials with this product have shown promise for the control of skunk vine (Nelson 2010).

Methods

Areas were chosen where skunk vine was growing in abundance over and among other plants. Corner stakes were set to mark four 1,000 sq. ft. study plots (25' x 40' each). Two of the study plots were on a forested plot of private property five miles north of Brooksville that had been partially cleared ten years prior and selectively mowed of small trees and shrubs one year prior. Because this area was slated for fairly high picnicking and camping use, other native plants that were considered undesirable included poison ivy, and dog fennel (see Table 1 for botanical names). Selective removal of green briar, wild grape, Virginia creeper, Carolina jessamine, passion vine, trumpet creeper, and false pennywort (a common yard weed) was also desired. These plants were targeted only where they caused access problems in high use areas or impacted other, more desirable, species.

Most other native plant species were considered desirable. Many ground cover and herbaceous species are found on the parcel, including partridge berry, bracken fern, sedges, milkwort, dewberry and grasses (*Panicum* spp. and wiregrass).

Tree and shrub species found on the property include wild cherry, water oak, laurel oak, live oak, pignut hickory, sweet gum, loblolly pine, and cabbage palm, yaupon holly, gallberry, arrowwood viburnum, Walter's viburnum, American beautyberry, sparkleberry and saw palmetto.

Table 1: Sensitivity of plant species to Milestone™ herbicide based on visual observations.

VINES		
Common Name	Scientific Name	Sensitivity
Skunk vine	<i>Paederia foetida</i>	4
Creeping cucumber	<i>Melothria pendula</i>	4
Morning glory (3 species)	<i>Ipomoea</i> spp.	4
Passion vine	<i>Passiflora incarnata</i>	4
Virginia creeper	<i>Parthenocissus quinquefolia</i>	4
Poison ivy	<i>Toxicodendron radicans</i>	4
Wild grape vine	<i>Vitis</i> spp.	3
Carolina jessamine	<i>Gelsemium sempervirens</i>	0
Trumpet creeper	<i>Campsis radicans</i>	0
Green briar	<i>Smilax</i> spp.	0
GROUND COVERS		
Milkwort	<i>Polygala nana</i>	4
Dichondra	<i>Dichondra caroliniana</i>	0
Partridge berry / Twinberry	<i>Mitchella repens</i>	0
GRASSES & SEDGES		
Basketgrass / Woodsgrass	<i>Oplismenus hirtellus</i>	1
Nutsedge	<i>Cyperus</i> spp.	1(a)
Panicum grass	<i>Panicum</i> spp.	0
Tall nutgrass / whip nutrush	<i>Scleria triglomerata</i>	0
Thin paspalum	<i>Paspalum setaceum</i>	0
Wiregrass	<i>Aristida</i> spp.	0
HERBACEOUS ANNUALS / PERENNIALS		
Beggarticks	<i>Bidens alba</i>	4
Spanish needle	<i>Bidens bipinnata</i>	4
Bloodleaf	<i>Iresine diffusa</i>	4
Ciliate wild petunia	<i>Ruellia ciliosa</i>	4
Coastal bedstraw	<i>Galium hispidulum</i>	4
Florida hedgenettle / betony	<i>Stachys floridana</i>	4
Hitchhikers/Creeping beggarweed	<i>Desmodium incanum</i>	4
Germander	<i>Teucrium canadense</i>	4
Stinging/Bull nettle	<i>Cnidocolus stimulosus</i>	4
Spotted beebalm	<i>Monarda punctata</i>	4
Tropical bushmint	<i>Hyptis mutabilis</i>	4
Wild tantan	<i>Desmantus virgatus</i>	4
Goldenrod	<i>Solidago</i> spp.	0

FERNS		
Common Name	Scientific Name	Sensitivity
Bracken fern	<i>Pteridium aquilinum</i>	2
Downy maiden / shield fern	<i>Thelypteris dentata</i>	1
Spleenwort	<i>Asplenium</i> spp.	0
Southern grape fern	<i>Botrychium biternatum</i>	0
SHRUBS		
American beauty berry	<i>Callicarpa americana</i>	4
Common buttonbush	<i>Cephalanthus occidentalis</i>	4
Dog fennel	<i>Eupatorium capilifolium</i>	4
Dewberry	<i>Rubus trivialis</i>	4
Wax myrtle/Southern bayberry	<i>Myrica cerifera</i>	4
Winged sumac	<i>Rhus copallinum</i>	4
Sesbania	<i>Sesbania drummondii</i>	4
Sparkleberry	<i>Vaccinium arboreum</i>	4
Arrowwood viburnum	<i>Viburnum acerifolium</i>	4
Flatwoods plum / Hog plum	<i>Prunus umbellata</i>	3
Mock buckthorn	<i>Sagetetia minutiflora</i>	3
Coralbean / Cherokee bean	<i>Erythrina herbacea</i>	2
Gallberry	<i>Ilex glabra</i>	1
Yaupon holly	<i>Ilex vomitoria</i>	1
Walter's viburnum	<i>Viburnum obovatum</i>	1
Saltbush	<i>Baccharis halimifolia</i>	0
Saw palmetto	<i>Serenoa repens</i>	0
TREES		
Red bay	<i>Persea borbonia</i>	4
Loblolly pine	<i>Pinus taeda</i>	4
Carolina laurelcherry	<i>Prunus caroliniana</i>	4
Wild cherry	<i>Prunus serotina</i>	4
Red cedar	<i>Juniperus virginiana</i>	2
Laurel oak	<i>Quercus laurifolia</i>	0
Live oak	<i>Quercus virginiana</i>	0
Pignut hickory	<i>Carya glabra</i>	0
Sweetgum	<i>Liquidambar styraciflua</i>	0
Water oak	<i>Quercus nigra</i>	0
Cabbage palm	<i>Sabal palmetto</i>	0

0=None 1=Slight 2=Weak 3=Strong 4=High (a)=growth regulation

The other 2 study plots were located within Fort Cooper State Park in Inverness, Florida. The park has had an ongoing skunk vine removal program for several years and 2 plots were set in the worst areas of the infestation, up from a lake edge in a relatively undisturbed oak hammock. The Fort Cooper plots included many different native plant species from the previous site. Species tested here included three morning glory species, wild petunia, wild tantan, spleenwort fern, creeping cucumber, saltbush, Florida hedgenettle, coralbean, beggarticks, Spanish needle, spotted beebalm, tropical mintbush, germander, goldenrod, downy maiden fern, common buttonbush, Sesbania, bloodleaf, basketgrass, coastal bedstraw, tall nutgrass, thin paspalum, mock buckthorn, red cedar, red bay, Carolina laurelcherry, winged sumac, flatwood plum/hog plum.

A solution of 4.8ml Milestone™ herbicide /4gal water (7oz/acre) with 5oz of a non-ionic surfactant was evenly applied over each plot. The private property plots were treated during the spring season while the state park plots were treated during the summer to increase the number of species tested. Also, to test the product on yet additional species, certain species outside of the plots were spot treated with the same mixture. They were flagged so they could be located for evaluation at later dates.

Observations were noted and photography was used to document any changes in plant condition. The plots were monitored on a weekly basis through the first 28 days and a final evaluation was made 40 days after application. Photos taken on day 0, day 7, day 14, day 21, day 28, and day 40 were used to verify observations. These photos were used to analyze the effect of Milestone™ on each plant species. Plants were allowed to grow throughout the spring and summer and then evaluated to assess plant recovery

Results and Discussion

Table 1 shows the effects of Milestone™ herbicide on each plant species after a forty-day time period. A rating of 0 to 4 was used to describe the effectiveness of the herbicide. The numbers indicate an even progression of effectiveness from 0 to 100%.

Approximately half of the plant species showed a response to the Milestone™ treatment of none, slight or weak (a rating of 0 to 2) including trumpet creeper, Carolina jessamine, dichondra, all grasses, nut sedge, goldenrod, spleenwort, partridge berry, green briar, saw palmetto, saltbush, gallberry, Walter's viburnum, youpon holly, sweet gum, all the oak trees, pignut hickory and cabbage palm. Milestone™ acted as a growth regulator on nut sedge which turned darker green and stopped growing for approximately one month. Southern grape fern, by day 28, seemed to be showing signs of decline. However, when the plant was compared with other southern grape ferns outside the plot, they appeared very similar. It is therefore assumed that the poor plant condition noted was associated with a

normal seasonal die back of the above ground portion of this species. The mock buckthorn was completely defoliated by day 14 but was beginning to leaf out on the larger stems by day 40.

Plant species that were considered effectively controlled (a sensitivity rating of 3 or 4) included skunk vine, poison ivy, Virginia creeper, wild grape, passion vine, creeping cucumber, three morning glory species, all the herbaceous annuals/perennials (except goldenrod and dog fennel), American beauty berry, common buttonbush, *Lantana*, *Sesbania*, sparkleberry, blackberry, arrowwood viburnum, winged sumac, hog plum, red bay, loblolly pine, redbud, wax myrtle, Carolina laurelcherry and wild cherry. Milkwort was showing a very slow but continuous decline beginning at day 28 and continuing through day 40. It was checked again on day 55 and pronounced dead.

One confounding situation in the study was that since two plots had been mowed a year earlier, several of the tree and shrub species were re-growing from substantial root bases. With reduced foliage-to-root ratio to absorb the herbicide, these plants had a better chance of survival. For example, at the end of the 40 day observation period, the arrowroot viburnum plants that had been mowed still showed some green, but withered and curled, foliage. However, the plants that had not been mowed were found to be without foliage, and completely dead by day 40.

Of the 4,000 square feet represented within the plots at six months post-treatment, skunk vine occupied less than 3% of the area, and non-susceptible native plants were thriving.

Conclusion

Milestone™ herbicide is effective in controlling skunk vine and several other species. The herbicide is selective and can be used to control skunk vine without harming many desirable plant species that skunk vine uses for structural support. Even where skunk vine grows within the canopies of tree and shrub species, it can be killed without harming many of the supporting species. However, managers must still use caution to avoid overspray on susceptible neighboring plants they wish to keep.

References

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