# Weed Control Using the "Burch" Wet Blade Mower

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## Introduction

Weed control in pastureland, rangeland, and roadsides remains one of the greatest challenges to land managers in Florida. Conventional weed control has included the application of herbicides with tractor mounted or pulled broadcast sprayer, application of concentrated herbicide mixes directly to the plant surface by using wick applicators, or even treatment of individual plants or small groups of plants with hand carried equipment. Weed control can be achieved with all of these application technologies, but applicators must be concerned with effectiveness, herbicide drift or runoff damaging non-target species, and applicator safety.

One problem that all of these methods of application share is that the herbicide is applied to the waxy surface of the plant and must move into the plant's vascular system to be effective. This generally will increase the amount of herbicide that must be applied per acre and leaves the chemical vulnerable to washing off into the environment and impacting non-target species. A recently developed technology circumvents this bottleneck by placing the herbicide in direct contact with the plants vascular system. The Burch Wet Blade®1 applies a thin film of chemical directly to the underside of the rotary cutter blade. When the blade cuts, the herbicide is applied directly to the surface of the cut stem and minute quantities of the chemical are absorbed directly into the plant's vascular system. By combining this technology with computerized metering system, rates as low as 1 gallon per acre (gpa) can be applied. This technology offers the combined advantages of lower herbicide rates, reduced herbicide contact with non target species, and greater applicator safety.

Studies in the western US with the Burch Wet Blade® have demonstrated its effectiveness in controlling leafy spurge, Canadian thistle, dalmation toad flax, and rubber rabbit bush. In the eastern US, wet blade technology has been tested as a method for 'releasing' planted hardwood trees in plantation settings from competition from volunteer sweetgums and blackberry briars. These studies suggested that this new herbicide technology could be useful for controlling both herbaceous and wood species under Florida conditions. A series of studies were initiated at the Southwest Florida Research and Education Center in Immokalee, Florida, evaluating wet blade technology against such common Florida weeds as melaleuca, wax myrtle, and tropical soda apple.

## Melaleuca and Wax Myrtle Studies

The objective of this study was to evaluate the effectiveness of wet blade technology compared to conventional cut stem herbicide application (melaleuca) or broadcast spray (wax myrtle). For the melaleuca study, five concentrations (0, 2.5, 5, 10, and 20%) of Arsenal® were used. For the wet blade, the herbicide concentrations were applied at the rate of 2.5 gpa of solution. Treatments were applied in early October 1998 and again to a separate area in October 1999. Herbicide efficacy was based on percent control vs. a mowed only

[1]Registered product names used in this paper are for the benefit of the reader and do not constitute an endorsement by University of Florida, Institute of Food and Agricultural Sciences or USDA, ARS.

control or the number of living stems in the stem cut treatment at 8 (1999) or 12 (1998) months after treatment.

In the wax myrtle study, treatments were applied with the wet blade at an application rate of 2.5 gpa of formulated solution per acre or at the broadcast rate of 25 gpa of formulated solution. Herbicides tested and concentrations are listed in Table 1. Treatments were applied in September 1998 and again to a separate area in September 1999. Treatment efficacy was based on the percentage of dead wax myrtle plants in each plot at 6 and 12 months after treatment.

In 1998, all but the lowest rate of Arsenal® produced >90% melaleuca control for the wet blade applicator (Fig. 1). In contrast, the cut stem method resulted in a maximum of 80% control at the highest rate of Arsenal®. In 1999, either method of application was equally effective at controlling melaleuca. That year there was a similar linear response to increasing concentrations of Arsenal® with essentially 100% of the plants rated as controlled at concentrations equal to or greater than 10% regardless of method of application (Fig. 2).

In the wax myrtle study, wet blade application was relatively less effective at 6 and 12 month after application than the broadcast spray regardless of herbicide treatment, particularly in 1998 (Tables 2 and 3). There was an apparent difference in efficacy of the herbicides or combinations tested when the rating at 12 months after application was averaged over the two years. For the wet blade, only Arsenal® at 0.5 lb ai (active ingredient)/acre, Vanquish® at 2 lb ai/acre, and the combination of Arsenal® 0.5 lb ai/acre + Garlon 3A® 1.5 lb ai/acre provided better control for wax myrtle than just mowing. In contrast, the Arsenal® and Vanquish® treatments were the only ones that did not provide effective wax myrtle when applied as a broadcast spray. Surprisingly when application methods were compared based on the amount of regrowth at 12 months after application, there was evidence of less regrowth for wet blade-treated material than broadcast spray-treated plants. This rather uniform response across different treatments suggests that there might be a less variable introduction of the chemicals into the wax myrtle plants, but the quantity was still not sufficient to kill a high percentage of the plants present.

These studies showed successful (90-100%) melaleuca control was achieved by applying Arsenal® at 1 pint/acre (5% concentration). Landowners should consider the wet blade technology as management tool for controlling young melalueca trees. In contrast, although wet blade technology reduced the rate of wax myrtle regrowth, this application method was generally less effective than broadcast spray for controlling (killing) wax myrtle. These studies also show that, as with all methods of herbicide application, when perennial species are the target, repeated herbicide applications will be necessary.

## Tropical Soda Apple Study

Two studies looked at wet blade technology for controlling tropical soda apple. In 1997, herbicides and rates listed in Table 6 were applied at the rate of 2.5 gpa of formulated solution. The number of tropical soda apple plants per plot were counted prior to herbicide application and again every 30 days for 120 days after herbicide application. In 1999, a study looking at the effect of Vanquish® or Weedmaster® at 0.5, 1.0, and 2.0 quart/acre compared to a mowed only control was conducted. In this study, wet blade technology was compared to similar herbicide rates applied as a broadcast spray. Treatment efficacy was based on comparison of control achieved in mowed only controls at 7 months after

application.

In the first study, only Banvel®, Weedmaster®, or Velpar® provided 90% or greater tropical soda apple control at 120 days after herbicide application. Pasture grass coverage for these treatments was 90 to 95% at 120 days after herbicide application. In the second study, all rates of either herbicide tested provided >70% control of tropical soda apple when applied with wet blade technology, but only the highest rate of Vanquish resulted in >90% control (Table 7). Control achieved with broadcast spray generally was similar to or lower than that achieved with equivalent herbicide-rate combinations when applied with the wet blade, except for Vanquish at 1.0 and 2.0 quart/acre.

## Summary and Future Work

These studies indicate that wet blade technology can effectively control some of the most important weeds present in south Florida pastureland, range sites, and roadsides. Wet blade technology has several advantages over traditional methods of herbicide application. These include site specific herbicide application, potential for less non-target species damage, and less drift. All of these factors contribute to wet blade technology being more environmentally friendly. Further studies are needed to determine the efficacy of wet blade technology for controlling other common pasture, rangeland, and roadside weed species such as blackberries, cogongrass, smutgrass, etc., and to determine the economics of using wet blade technology vs. conventional herbicide application methods.

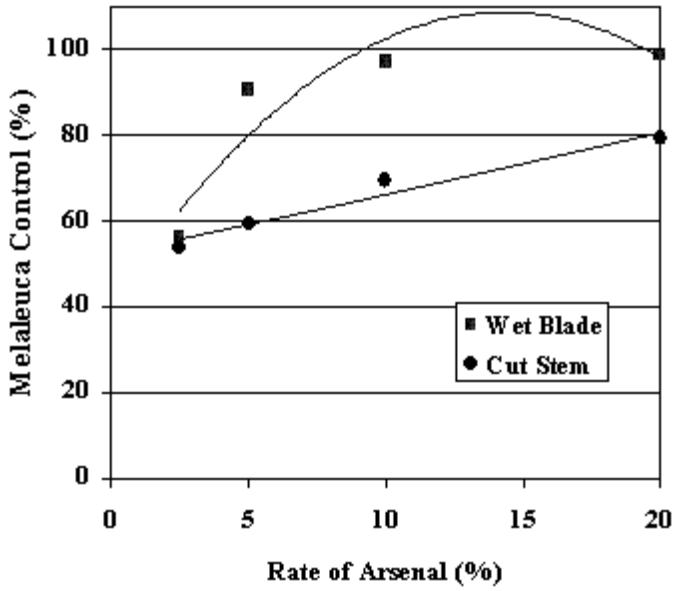


Fig. 1. Melaleuca control from selected rates of Arsenal® 12 month after application in 1998. (Wet Blade $y = 40.66 + 9.52x - 0.33x^2$, $r^2 = 0.84$; Cut Stem $y = 52.13 + 1.42x$, $r^2 = 0.84$).

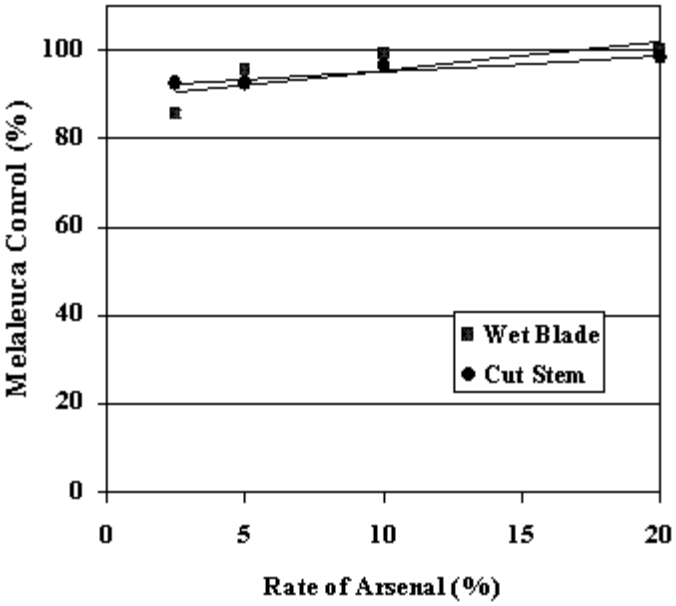


Fig. 2. Melaleuca control from selected rates of Arsenal® 8 month after application in 1999. (Wet Blade $y = 88.9 + 0.65x$, $r^2 = 0.60$; Cut Stem $y = 91.5 + 0.30x$; $r^2 = 0.89$).

Table 1. Herbicide treatments and rates or control measures evaluated in the wax myrtle study.

| Herbicide | Rate, lb ai/acre |
|---|---|
| Arsenal® + Garlon 3A® | 0.5 + 1.5 |
| Vanquish® + Garlon 3A® | 1.0 + 1.5 |
| Garlon 3A® | 1.5 |
| Garlon 3A® | 1.0 |
| Garlon 3A® | 0.5 |
| Vanquish® | 2.0 |
| Arsenal® | 0.5 |
| Mow only | - |

Table 2. Wax myrtle control for mowed vs. herbicide treatment at 6 months after herbicide application using either a wet blade mower or broadcast spray application.

| | | Wet blade | | Broadcast spray | |
|---|---|---|---|---|---|
| Herbicide | Rate lb ai/acre | 1998 | 1999 | 1998 | 1999 |
| Arsenal® + Garlon 3A® | 0.5 + 1.5 | 41 a† | 36 b | 78 b | 64 a |
| Vanquish® + Garlon 3A® | 1.0 + 1.5 | 26 a | 48 b | 83 ab | 79 a |
| Garlon 3A® | 1.5 | 40 a | 44 b | 97 a | 66 a |
| Garlon 3A® | 1.0 | 24 a | 35 b | 88 a | 63 a |
| Garlon 3A® | 0.5 | 23 a | 0 c | 60 c | 31 b |
| Vanquish® | 2.0 | 22 a | 69 a | 4 d | 0 c |
| Arsenal® | 0.5 | 56 a | 35 b | 7 d | 28 b |
| Mow only | | 20 a | 0 c | 1 d | 4 c |

†Means in columns followed by the same letter do not differ (DMRT=0.05).

Table 3. Wax myrtle control for mowed vs. herbicide treatment at 12 months after herbicide application using either a wet blade mower or broadcast spray application.

| Herbicide | Rate lb ai/acre | Wet blade | | Broadcast spray | |
|---|---|---|---|---|---|
| | | 1998 | 1999 | 1998 | 1999 |
| Arsenal® + Garlon 3A® | 0.5 + 1.5 | 47 b† | 47 ab | 73 bc | 42 a |
| Vanquish® + Garlon 3A® | 1.0 + 1.5 | 31 b | 50 ab | 81 ab | 75 a |
| Garlon 3A® | 1.5 | 42 b | 36 abc | 92 a | 70 a |
| Garlon 3A® | 1.0 | 37 b | 33 bc | 74 bc | 68 a |
| Garlon 3A® | 0.5 | 30 b | 14 cd | 63 c | 62 a |
| Vanquish® | 2.0 | 43 b | 58 a | 5 d | 26 a |
| Arsenal® | 0.5 | 76 a | 52 a | 18 d | 31 a |
| Mow only | | 26 a | 2 d | 1 d | 27 a |

†Means in columns followed by the same letter do not differ (DMRT=0.05).

Table 4. Wax myrtle control for mowed vs. herbicide treatment at 12 months after herbicide application using either a wet blade mower or broadcast spray application, 2-yr average.

| Herbicide | Rate lb ai/acre | Wet blade | Broadcast spray |
|---|---|---|---|
| Arsenal® + Garlon 3A® | 0.5 + 1.5 | 47 ab† | 58 ab |
| Vanquish® + Garlon 3A® | 1.0 + 1.5 | 41 abc | 78 a |
| Garlon 3A® | 1.5 | 39 abc | 81 a |
| Garlon 3A® | 1.0 | 35 abc | 72 a |
| Garlon 3A® | 0.5 | 22 bc | 63 a |
| Vanquish® | 2.0 | 51 ab | 16 c |
| Arsenal® | 0.5 | 64 a | 24 bc |
| Mow only | | 14 c | 14 c |

†Means in columns followed by the same letter do not differ (DMRT=0.05).

Table 5. Wax myrtle regrowth height (ft.) for mowed vs. herbicide treatment at 12 months after herbicide application using either a wet blade mower or broadcast spray application, 2-yr average.

| Herbicide | Rate lb ai/acre | Wet blade | Broadcast spray |
|---|---|---|---|
| Arsenal® + Garlon 3A® | 0.5 + 1.5 | 1.72 bc† | 2.02 a |
| Vanquish® + Garlon 3A® | 1.0 + 1.5 | 1.82 bc | 1.53 a |
| Garlon 3A® | 1.5 | 1.57 c | 2.24 a |
| Garlon 3A® | 1.0 | 1.80 bc | 1.99 a |
| Garlon 3A® | 0.5 | 2.11 bc | 1.97 a |
| Vanquish® | 2.0 | 1.84 bc | 2.79 a |
| Arsenal® | 0.5 | 1.46 c | 2.81 a |
| Mow only | | 2.35 a | 3.13 a |

†Means in columns followed by the same letter do not differ (DMRT=0.05).

Table 6. Herbicide treatments and rates or control measures evaluated in the tropical soda apple study in 1997.

| Herbicide | Rate, lb ai/acre |
|---|---|
| Weedmaster® | 1.9 |
| Remedy® | 1.0 |
| 2,4-D | 1.9 |
| Banvel® | 2.0 |
| Assert® | 0.09 |
| Velpar® | 0.5 |
| Non-mowed | - |

Table 7. Control of tropical soda apple treated with phenoxy herbicides 7 months after herbicide application using either a wet blade mower or broadcast spray application, 2-yr average.

| Herbicide | Rate quart/acre | Wet blade | Broadcast spray |
|---|---|---|---|
| Vanquish® | 0.5 | 74 a† | 71 bc |
| Vanquish® | 1.0 | 77 a | 91 abc |
| Vanquish® | 2.0 | 95 a | 100 abc |
| Weedmaster® | 0.5 | 72 a | 51 cd |
| Weedmaster® | 1.0 | 78 a | 51 cd |
| Weedmaster® | 2.0 | 80 a | 35 d |
| Mow only | - | 33 b | 32 d |

†Means in columns followed by the same letter do not differ (DMRT=0.05).

**NOTES:**