



Summaries of Herbicide Trials for Pasture, Range, and Non-Cropland Weed Control—2002

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The tables herein summarize herbicide trials for the control of pasture, range, and non-cropland weeds conducted over the past year by the University of Hawaii at Manoa College of Tropical Agriculture and Human Resources, the Hawaii Department of Agriculture, the Division of Forestry and Wildlife of the Hawaii Department of Land and Natural Resources, and other co-operators. These preliminary data are published to assist applicators experimenting with herbicides for weed control. The herbicide applicator is cautioned to confirm that any herbicide, rate, or method of application used conforms to the label.

Rating weed response to herbicides

Weed response to treatment is evaluated by different methods. Plant injury may be scored on a 0 to 100 scale in which the score is a subjective evaluation of the severity of injury:

0	No symptoms
10–30	Insignificant to poor weed control. Little or no defoliation.
40–60	Inadequate weed control. Moderately severe symptoms. Less than 70% defoliated.
70	Adequate weed control. Severe symptoms. All leaves chlorotic or more than 70% defoliated.
80	Good weed control. Very severe symptoms. 80% defoliated.
90	Excellent weed control. Very severe symptoms. 90% defoliation.
100	Complete control. No sign of life.

In addition to the scale described, efficacy of treatments may be determined by estimation of defoliation or its opposite, remaining weed cover. The method used will depend on the growth habit of the weed. Response may also be measured by counting the number of surviving plants or stems or by measuring weed height, or a combination of these.

Methods of herbicide application

Several different methods of herbicide applications were used in the trials described herein: foliar, cut-surface, basal bark, stump bark, and soil applications; plus very-low-volume foliar and basal bark applications. See: Motooka, Philip, Lincoln Ching, and Guy Nagai. 2003. *Herbicidal weed control methods for pastures and natural areas of Hawaii*. Univ. of Hawaii, College of Tropical Agriculture and Human Resources, Weed Control publication WC-8. 35 pp. [Downloadable from the CTAHR Web site: www.ctahr.hawaii.edu/oc/freepubs/pdf/wc-8.pdf].

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Materials tested

Herbicide	Trade name and manufacturer
Clopyralid	Transline (Dow Agrosciences)
Dicamba, dimethylamine salt	Banvel (BASF)
Dicamba, diglycolamine salt	Clarity (BASF) Vanquish (Syngenta)
Glyphosate	Rodeo (Monsanto). Roundup (Monsanto and several other manufacturers).
Imazapyr	Stalker (American Cyanamid)
Imazapyc	Plateau (American Cyanamid)
MCPA	MCP Amine (Clean Crop)
Metsulfuron	Escort (DuPont)
Triclopyr	Garlon 4 (Dow AgroSciences). Remedy (Dow AgroSciences). Garlon 3A (Dow AgroSciences) Pathfinder II (Dow AgroSciences).
Tebuthiuron	Spike 20P (Dow AgroSciences)

Weeds

Coral berry (*Rivina humilis* L.)
 Clidemia, Koster's curse (*Clidemia hirta* [L.] D. Don)
 Downy rosemyrtle (*Rhodomyrtus tomentosa* [Aiton]
 Hassk.)
 Fayatree (*Myrica faya* Aiton)
 Green kyllinga (*Kyllinga brevifolia* Rottb.)
 Guava (*Psidium guajava* L.)
 Ironwood, Australian pine (*Casuarina equisetifolia* L.)
 Karakanut (*Corynocarpus laevigatus* J.K. Forster & G.
 Forster)
 Largeleaf lantana (*Lantana camara* L.)
 Madagascar ragwort (fireweed) (*Senecio madagascariensis* Poiret)
 Olive (*Olea europaeus* L.)
 Senna pendula (Humb. & Bonpl. ex Willd.) H. Irwin &
 Barneby
 Shoebuttan ardesia (*Ardesia elliptica* Thunb.)
 Sicklepod, habucha (*Senna obtusifolia* [L.] H. Irwin &
 Barneby)

Strawberry guava (*Psidium cattleianum* Sabine)
 Thimbleberry (*Rubus rosifolius* Sm.)

Observations

In a series of trials to evaluate very-low-volume vertical streak basal bark applications (which are useful where non-target plants are in close proximity) ironwood (Table 2), karakanut (Table 3), and strawberry guava (Table 8) were sensitive to triclopyr as Pathfinder II. Olive however, was not (data not presented). Imazapyr was ineffective on karakanut (Table 3).

Lantana and faya tree, both tolerant of triclopyr, were treated with 0.5 lb/acre of clopyralid. No injury was observed at 3 MAT (data not shown). Clidemia was sensitive to triclopyr in foliar applications but not to dicamba or MCPA (Table 1). Green kyllinga populations were reduced by foliar applications of imazapyc (Table 4) but centipedegrass was stunted by the high rate. Madagascar ragwort control with MCPA at 1 lb/acre was enhanced by the adjuvant LI-700[®], and with clopyralid with Silwet L-77[®] (Table 5). The herbicide rates used in this experiment were half the recommended rates in order to detect the effect of the adjuvants. Ragwort was more sensitive to the diglycolamine salt of dicamba than to the old dimethylamine salt (Table 6). Strawberry guava was tolerant to both types of dicamba and sensitive to triclopyr amine in foliar applications (Table 8). Sicklepod was somewhat sensitive to dicamba and tolerant to MCPA and triclopyr in foliar applications. However the sicklepod stand was very dense so herbicide coverage was not ideal. Efficacy would probably have been better if the herbicides were applied at younger stages of sicklepod growth with a more open canopy. Downy rosemyrtle, tolerant to most brush killers, was sensitive to dicamba at 2 lb/acre in conventional sprays but less so with drizzle applications (Table 10).

In long-term trials, guava was very sensitive to soil-applied tebuthiuron at 19 MAT (months after treatment) whereas strawberry guava response was inadequate at 17 MAT (Table 10).

Table 1. Clidemia response to foliar herbicides (K02-07).

Date installed: 07/09/02. Date rated: 09/20/02. Location: Keaau. Investigators: K. Onuma, M. DuPonte, P. Motooka. Cooperator: Sam Taka. Notes: Four-nozzle boom, SS 8003, 30 psi, spray-volume rate 34 gpa. All herbicides at 1 lb a.e./acre.

Herbicide	Adjuvant	Defoliation (%)
Check		8 ¹
MCPA	Silwet L-77 ¹ , 0.25%	26
Dicamba	Silwet L-77 ¹ 0.25%	34
Dicamba DGA	Silwet L-77 ¹ , 0.25%	30
Triclopyr ester	Silwet L-77 ¹ , 0.25%	94
Triclopyr ester	Forest Crop Oil ¹ , 0.5%	98
Triclopyr ester	Liberate ¹ , 0.5%	89

¹Drift injury.

Table 2. Response of ironwood to vertical streak applications of triclopyr (G02-07).

Date installed: 06/04/02. Date rated: 09/09/02. Location: Kokee. Investigators: L. Ching, G. Nagai, A. Kiyono, G. Kawakami, C. Koga, S. Soto, P. Motooka. Notes: Pathfinder II applied in vertical streaks on opposite sides of the basal stems.

Herbicide	Defoliation (%)	Kill ¹ (%)
Check	17	10
Triclopyr	84	70

¹Smaller diameter stems were killed.

Table 3. Karakanut response to very- low volume vertical streak applicaton of triclopyr and imazapyr in oil (G01-08).

Date installed: 09/25/01. Date rated: 09/09/02. Location: Kokee. Investigators: L. Ching, G. Nagai, G. Kawakami, C. Koga, S. Soto, P. Motooka. Notes: Fine straight stream application of herbicides to opposite sides of the main stem from soil level to waist height.

Treatment	Defoliation (%)	Kill ¹ (%)
Check	24	10
Imazapyr	13	0
Triclopyr	82	44

¹Smaller diameter stems were killed.

Table 4. Green Kyllinga control in turf with imazapyc (K02-06).

Date installed: 06/10/02. Date rated: 07/29/02. Investigator: P. Motooka. Location: Kailua-Kona. Notes: Kyllinga brevifolia Rottb., Fimbristylis dichotoma (L.) Vahl., Cyperus sp.

Imazapyc rate (lb/acre)	Sedge inflorescence (no./yd ²)	Turf height (inches)
Check	28	4.8
0.2	7	3.9
0.4	7	2.8

Table 5. Madagascar ragwort response to various herbicides and surfactants (V02-1).

Date installed: 06/25/02. Date rated: 08/13/02. Investigators: J. Powley, P. Motooka. Cooperators: Haleakala Ranch. Location: Maui. Notes: Control based on weed cover reduction.

Herbicide	Rate (lb/acre)	Surfactant	Control (%)
Check	0		0
MCPA	1	Spreader 90 (0.5%)	67
MCPA	1	LI 700 (0.5%)	83
MCPA	1	Silwet L-77 (0.25%)	72
Clopyralid	0.25	Spreader 90	14
Clopyralid	0.25	LI 700	26
Clopyralid	0.25	Silwet L-77	62
Metsulfuron	0.03	Spreader 90	33
Metsulfuron	0.03	LI 700	54
Metsulfuron	0.03	Silwet L-77	57

Table 6. Madagascar ragwort response to dicamba and dicamba DGA.

Date installed: 06/25/02. Date rated: 08/13/02. Investigators: J. Powley, P. Motooka. Cooperators: Heleakala Ranch. Location: Kaluapulani.

Herbicide	Rate (lb/acre)	Control (%)
Check	0	34
Dicamba	1	61
Dicamba	2	83
Dicamba DGA	1	86
Dicamba DGA	2	86
MCPA	2	83

Table 7. Strawberry guava response to foliar herbicides.

Date installed: 07/09/02. Date rated: 09/20/02. Investigators: K. Onuma, M. DuPonte, P. Motooka. Cooperator: Sam Taka. Location: Keaau. Notes: Four-nozzle boom, SS8003LP nozzles, 30 psi, spray-volume rate 34 gpa. Applied to regrowth up to 5 ft tall. All herbicides applied at 1 lb a.e./acre.

Herbicide	Defoliation (%)
Check	0
Dicamba	38
Dicamba DGA	24
Triclopyr amine	88

Table 9. Response of sicklepod to herbicides (K02-10).

Date installed: 08/15/02. Date rated: 09/17/02. Location: Kainaliu. Cooperator: Ed Nobriga. Notes: Herbicides applied at 1 lb active/acre.

Herbicide	Surfactant	Defoliation (%)
Check		0
MCPA	0.25% Silwet L-77	25
Dicamba	0.25% Silwet L-77	75
Dicamba DGA	0.25% Silwet L-77	70
Triclopyr E	0.25% Silwet L-77	53
Triclopyr E	0.5% Liberate	50

Table 8. Strawberry guava control with very-low volume vertical streak applications of triclopyr/crop oil (G01-07).

Date installed: 05/25/01. Date rated: 06/04/02. Location: Kokee. Investigators: L. Ching, G. Kawakami, P. Motooka. Notes: Fine straight stream application of Pathfinder II applied on opposite sides of main stem from soil level to waist height. Average volume applied to tree, 9.4 ml, cost = \$0.08.

Treatment	Defoliation (%)	Kill (%)
Check	0	0
Pathfinder	100	100

Table 10. Unreplicated or unrandomized demonstrations.

Weed	Herbicide	Rate (lb/acre)	Method	Injury (%)	Reps	Duration (mo)	Site
Coral berry	Triclopyr	1	Drizzle	65	2 large plots	3	S. Kona
Downy rosemyrtle	Dicamba	2	Spray	98	1 long plot	3	Kauai
	DGA						
Downy rosemyrtle	Dicamba	2	Drizzle	60	1 large plot	3	Kauai
	DGA						
Guava	Teb ¹	10	Soil	96	3 large plots	19	Kauai
Lantana	Gly + LI 700	1	Drizzle	60	2 large plots	3	S. Kona
Lantana	Gly + QS ²	1	Drizzle	75	1 large plot	3	S. Kona
Lantana	Gly + QS	2	Drizzle	75	1 large plot	3	S. Kona
Lantana	Gly + LI 700	2	Drizzle	75	1 large plot	3	S. Kona
S. pendula	Triclopyr	1	Drizzle	85	2 large plots	3	S. Kona
Thimbleberry	Triclopyr	1	Drizzle	95	4 large plots	3	Keaau
Waiwi	Teb	10	Soil	56	6 large plots	17	Kauai

Teb = tebuthiuron, ²QS = Quiksorb¹, an experimental adjuvant supplied by Monsanto.