

Suppression of the Noxious Weed *Miconia calvescens* on the Island of Hawaii

Annual Summary and Progress Report, 1999-2000

Data & information provided by Kim Tavares
Information Coordinator, Operation Miconia Hawaii
16 E. Lanikaula St. – Hilo, Hawaii – 96720
office ph: (808) 974-4140 Hotline: (808) 961-3299 fax: (808) 974-4148
email: miconia@aloha.net
06 August 2000

List of tables, figures and attachments included in this report:

- Table 1. District area Miconia control data.
- Table 2. Miconia control ground surveys & treatment.
- Table 3. Search for Miconia plants in likely areas in a logical pattern.
- Table 4. Monitor previously treated areas and re-treat as needed.
- Table 5. Follow-up Hotline reports and other reports from outside sources.
- Table 6. Field crew volunteers at Kona, Hilo and Puna.
- Table 7. Volunteer & staff presentations.
- Table 8. Press releases and other publications.
- Table 9. Treat new and remote Miconia populations.
- Table 10. Treat large flowering trees in older established stands.
- Table 11. Monitor the progress of treatment at new and remote populations.
- Table 12. Monitor the progress of treatment at old populations.

- Attachment 1. - Site Centers List (2 pages)
- Attachment 2. - Figure 1. Map Management Units & Site Centers
- Attachment 3. - Figure 2. Map HAMAKUA (ham)
- Attachment 4. - Figure 3. Map KONA NORTH (kon)
- Attachment 5. - Figure 4. Map KONA SOUTH (kos)
- Attachment 6. - Figure 5. Map PUNA (pun)
- Attachment 7. - Figure 6. Map HILO SOUTH (his)
- Attachment 8. - Figure 7. Map HILO NORTH (hin)
- Attachment 9. - Progress and Impact of Leaf Spot Fungus, by P. Conant

GOALS AND OBJECTIVES.

Prevent Miconia plants from becoming established in new areas and to slow their spread where they exist now.

Eradicate all flowering or near flowering trees in the Kona infestations (Honalo and Honaunau) by 6/30/99 and define population boundaries.

The results of hiring a full time crew for West Hawaii were positive. Allowing the team to focus on fewer sites showed that a thorough and complete effort can be accomplished. All mature and near mature trees were destroyed, and seed production has stopped. The site boundaries were defined by combining data from ground and air surveys using global positioning satellite (GPS) receivers and a global information systems (GIS) database.

Search potential areas and locate/validate plants reported by outside sources. Eradicate outlying and remote populations.

Eradication work continued at 42 sites across East Hawaii. There are no mature or near mature trees at Laupahoehoe or Akaka Falls. Near mature trees exist at Ninole and Hakalau on steep slopes. A plant reported far north at Kukuihaele was never found, and determined a falsely identified plant. Surveying for seedlings should continue along all edges to prevent seedlings from maturing into new remote infestations. Of primary concern are all sites within a kilometer of undeveloped forest lands.

Destroy mature plants in core populations to reduce the rate of spread.

Mature trees at core populations (or sites) received treatment, especially along roadsides and some gullies. Destruction of mature trees occurred at Onomea, Papaikou, Honolii, Panaewa, Ainaloa, and Leilani Estates. Volunteers from the Hawaii Economic Development Board, Puna Outdoor Circle, Leilani Estates Community Association, and Upward Bound did most of the work at these sites. DLNR forestry crews assisted the Miconia field team at Honolii. Ainaloa was managed by the field team.

Re-visit treated areas to monitor and eradicate newly established seedlings.

Field teams are too small in East Hawaii to completely and effectively remove all trees at all sites and maintain all prior work every year. More crews are needed at this time to stop all seed production at all sites as soon as they are found. Revisiting sites occurs as time permits, to monitor the size and densities of plants and to make sure the site is scheduled for work before plants mature. More efforts towards community adoption programs and volunteer events would reduce the pressure on work at site cores, and will free up field teams to continue surveying for seedlings in remote areas.

Cooperate and facilitate biological control efforts.

The fungus has survived and is steadily infecting trees at the application sites. Operation Miconia has asked Hawaii Dept. of Agriculture to apply the fungus at all suitable sites on Hawaii as soon as possible.

LEVEL I -- BASE PROGRAM.

1. IMPLEMENTATION OF CONTROL ACTIVITIES.

Activities & Timelines:

- 1) Search for and destroy Miconia plants in likely areas in a logical pattern.
[Timeline: ongoing, present through June 30, 2000]

The search for miconia during the FY2000 included work at 44 sites throughout six districts of Hawaii County.

In Hamakua, a miconia plant was reported at Kukuihaele. Ground and air surveys of this site with the reporting party produced no miconia. Report was a misidentified plant.

Surveys and treatment were conducted on 6060 acres within South Hilo district at 14 sites. 1885 mature trees and 13,587 immature plants were destroyed. 287 acres were surveyed in North Hilo, 3 seedlings were uprooted.

The Puna district had work done at 24 sites, covering 4541 acres. Mature trees destroyed numbered 1384, and 13,109 immature plants were uprooted or treated.

At Honaunau, South Kona 23 trees and 149 immature plants were found and destroyed on 2150 acres of forest land.

2500 acres at Honalo, North Kona were surveyed by ground and by air. Teams destroyed 11 mature plants and 29 immature plants. Seed production has been stopped for the time being.

Table 1. District area Miconia control data.

Area	Map	# Sites	acres		hectares		trees		sapling		seedlings	
			1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Kukuihaele	ham	1	10	112	4	45	0	0	0	0	0	0
Hilo North	hin	3	0	267	0	117	0	0	0	0	0	3
Hilo South	his	14	3374	2686	1366	1085	41	1844	59	3724	207	9651
Puna	pun	24	2437	2104	986	851	27	1357	231	2960	530	9388
Kona South	kos	1	0	2150	0	870	0	23	0	112	0	37
Kona North	kon	1	2153	2500	871	1000	8	3	5	14	2	8
6 month		44	7974	9819	3227	3968	76	3227	295	6810	739	19087
12 month			17793		7195		3303		7105		19826	

Table 2. is a complete list of sites visited from the ground during this grant period. Details on total acreage, plants found and destroyed are given for each site.

Hawaii Island Miconia Control Progress Report for July 1999 thru June 2000

Table 2. Miconia control ground surveys & treatment.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Honalo	kon	1	Honalo	450	1000	182	400	7	3	4	14	2	8
Honaunau	kos	2	Honaunau	0	2150	0	870	0	23	0	112	0	37
Kukuihaele	ham	1	Kukuihaele	10	112	4	45	0	0	0	0	0	0
Laupahoehoe	hin	3	Laupahoehoe	0	40	0	16	0	0	0	0	0	3
Ninole	hin	4	Ninole	0	200	0	82	0	0	0	0	0	0
Hakalau	hin	5	Hakalau	0	47	0	19	0	0	0	0	0	0
Akaka Falls	his	6	Akaka	151	40	61	17	0	0	0	1	0	0
Hilo	his	36	Kawili	0	17	0	7	0	0	0	0	0	1
Honolii	his	11	Honolii	148	1550	60	625	0	246	0	1181	0	2029
Onomea Makai	his	30	Onomea	69	10	28	4	9	284	4	749	0	3220
Onomea Makai	his	32	Makai Kawainui	1	0	1	0	2	0	0	0	20	0
Onomea Mauka	his	7	Kawainui	1236	106	500	43	0	0	0	0	0	0
Onomea Mauka	his	9	Hanawi	988	0	400	0	0	0	0	0	0	0
Onomea Mauka	his	10	Kapue	49	675	20	273	0	0	0	1	0	0
Onomea Mauka	his	12	Puueo	272	85	110	35	0	0	0	0	0	0
Onomea Mauka	his	13	Waiau	0	64	0	26	0	0	0	0	0	0
Panaewa Makai	his	40	Panaewa HHL	17	5	7	2	9	159	38	94	55	154
Papaikou	his	31	Papaikou	371	10	150	4	0	600	0	1009	0	3531
Waiakea	his	16	Waikahe	5	40	2	16	1	0	0	8	132	12
Waiakea	his	39	Panaewa FR	67	84	27	34	20	555	17	681	0	704
Ainaloa	pun	54	Puhala	1	15	0	6	5	1	7	6	2	63
Eden Roc	pun	26	Malieka	0	130	0	52	0	0	0	2	0	0
Eden Roc	pun	56	Kopua	0	70	0	28	0	0	0	0	0	0
Fern Acres	pun	27	Anthurium	0	425	0	172	0	14	0	37	0	22
Fern Acres	pun	41	Lehua	22	90	9	37	1	4	0	68	3	499
Fern Forest	pun	25	Jungle King	23	222	9	90	0	0	2	2	25	0
Glenwood	pun	22	Glenwood	0	42	0	17	0	0	0	0	0	0
Haena	pun	46	Haena	7	10	3	4	0	89	70	421	36	1874
Hawaiian Acres	pun	61	HA9DE	0	89	0	36	0	7	0	29	0	201
Hawaiian Acres	pun	63	HA5DE	0	7	0	3	0	0	0	7	0	102
Hawaiian Acres	pun	65	HA1DE	0	3	0	1	0	1	0	0	0	0
Hawaiian Beaches	pun	47	Aweoweo	0	22	0	9	0	3	0	1	34	0
Hawaiian Paradise Park	pun	50	Pohaku	0	135	0	54	0	0	0	1	0	0
Hawaiian Paradise Park	pun	55	Laamia	4	2	2	1	0	0	4	1	0	0
Kurtistown	pun	17	Kurtistown	19	250	8	100	9	5	16	39	35	45
Kurtistown	pun	19	Enos Lane	4	50	2	21	3	17	2	461	1	1659
Leilani	pun	29	Keahialaka	5	270	2	110	1	3	5	878	0	0
Leilani	pun	64	Kupono	0	25	0	10	0	1212	0	1000	0	4900
Makuu HHL	pun	28	Makuu	210	0	85	0	5	0	125	0	393	0
Nanawale	pun	43	Flower	3	0	1	0	0	0	0	0	0	0
Nanawale	pun	44	Albizia	0	134	0	54	0	0	0	2	0	10
Opihikao	pun	42	Kauaea	0	105	0	43	0	0	0	3	0	3
Orchidland	pun	57	Orchidland	22	50	9	20	0	0	0	2	1	5
Pahoa	pun	60	Pahoa	0	1	0	0	0	1	0	0	0	5
			all ground	4156	8381	1682	3385	72	3227	294	6810	739	19087
			12-mo		12537		5067		3299		7104		19826

Miconia management units (MU's #1 thru #28) were originally used to break down the data collected by field crews into segments using geography, at risk parcels, and political boundaries as unit boundaries. As data accumulated and was analyzed, it appeared reasonable to change the method to a more precise and calculable type of unit. The new units are called "Site Blocks". They are constructed using aspects of geography, political boundaries, tax key parcel boundaries, and anything else that makes sense from the ground. Each block is assigned to a "Site Center", of which there are 92 in all, at this time. (see Attachment 1. Site Centers List, also see Attachment 2. Management Units & Site Centers Map)

For the purposes of this report, the following table will show both the old "MU" number and the new "Site" number. The table is split between air and ground surveying. Column labeled "Map" is the name of the corresponding GIS map product included in the attachments.

- Survey Honalo (MU- 23, 4500 acres) and Honaunau (MU-24, 4800 acres)
- Survey Onomea, uphill from Hwy 19, with emphasis on gulches and forested tracts (MU #2 & 3, about 60,500 acres)
- Survey Pahoa town and vicinity (MU #11, about 7,100 acres)
- Survey the Waiakea Tree Planting units (MU #4, about 7300 acres)

Table 3. Search for and destroy Miconia plants in likely areas in a logical pattern.

Task	MU	Area	Map	Site	Location	acres		hectares		trees		saplings		seedlings	
						1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Air	23	Honalo	kon	1	Honalo	1703	0	689	0	1	0	1	0	0	0
Air	23	Honalo	kon	1	Honalo	0	1500	0	600	0	0	0	0	0	0
					Air	1703	1500	689	600	1	0	1	0	0	0
					12-mo		3203		1289		1		1		0

Task	MU	Area	Map	Site	Location	acres		hectares		trees		saplings		seedlings	
						1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Gr	23	Honalo	kon	1	Honalo	450	1000	182	400	7	3	4	14	2	8
Gr	24	Honaunau	kos	2	Honaunau	0	2150	0	870	0	23	0	112	0	37
Gr	2	Onomea Mauka	his	9	Hanawi	988	0	400	0	0	0	0	0	0	0
Gr	2	Onomea Mauka	his	10	Kapue	49	675	20	273	0	0	0	1	0	0
Gr	2	Onomea Mauka	his	12	Puueo	272	85	110	35	0	0	0	0	0	0
Gr	2	Onomea Mauka	his	13	Waiau	0	64	0	26	0	0	0	0	0	0
Gr	3	Onomea Mauka	his	7	Kawainui	1236	106	500	43	0	0	0	0	0	0
Gr	4	Waiakea	his	39	Panaewa FR	67	84	27	34	20	555	17	681	0	704
Gr	11	Pahoa	pun	60	Pahoa	0	1	0	0	0	1	0	0	0	5
					Ground	3062	4165	1239	1681	27	582	21	808	2	754
					12-mo		7226		2920		609		829		756

Previously treated areas need to be monitored in order to prevent new growth from maturing. Seeds already set will sprout or go dormant for at least 8 years (Dr. Jean Yves Meyer, July 2000 update). Data from 2 sites in Hilo suggests 20 years or more dormancy might be expected in some cases. The following table includes a list of all sites previously surveyed and treated that were monitored during this grant period, and the results.

- Monitor previously treated areas and re-treat as needed (about 7600 acres)

Table 4. Monitor previously treated areas and re-treat as needed.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Laupahoehoe	hin	3	Laupahoehoe	0	40	0	16	0	0	0	0	0	3
Ninole	hin	4	Ninole	0	200	0	82	0	0	0	0	0	0
Hakalau	hin	5	Hakalau	0	47	0	19	0	0	0	0	0	0
Akaka Falls	his	6	Akaka	151	40	61	17	0	0	0	1	0	0
Hilo	his	36	Kawili	0	17	0	7	0	0	0	0	0	1
Onomea Makai	his	32	Makai Kawainui	1	0	1	0	2	0	0	0	20	0
Onomea Makai	his	30	Onomea	69	10	28	4	9	284	4	749	0	3220
Onomea Mauka	his	13	Waiau	0	64	0	26	0	0	0	0	0	0
Onomea Mauka	his	12	Pueo	272	85	110	35	0	0	0	0	0	0
Panaewa Makai	his	40	Panaewa HHL	17	5	7	2	9	159	38	94	55	154
Papaikou	his	31	Papaikou	371	10	150	4	0	600	0	1009	0	3531
Waiakea	his	16	Waikahe	5	40	2	16	1	0	0	8	132	12
Ainaloa	pun	54	Puhala	1	15	0	6	5	1	7	6	2	63
Eden Roc	pun	56	Kopua	0	70	0	28	0	0	0	0	0	0
Eden Roc	pun	26	Malieka	0	130	0	52	0	0	0	2	0	0
Haena	pun	46	Haena	7	10	3	4	0	89	70	421	36	1874
Hawaiian Acres	pun	65	HA1DE	0	3	0	1	0	1	0	0	0	0
Hawaiian Acres	pun	63	HA5DE	0	7	0	3	0	0	0	7	0	102
Hawaiian Acres	pun	61	HA9DE	0	89	0	36	0	7	0	29	0	201
Hawaiian Beaches	pun	47	Aweoweo	0	22	0	9	0	3	0	1	34	0
Hawaiian Paradise Park	pun	50	Pohaku	0	135	0	54	0	0	0	1	0	0
Hawaiian Paradise Park	pun	55	Laamia	4	2	2	1	0	0	4	1	0	0
Kurtistown	pun	19	Enos Lane	4	50	2	21	3	17	2	461	1	1659
Leilani	pun	64	Kupono	0	25	0	10	0	1212	0	1000	0	4900
Nanawale	pun	44	Albizia	0	134	0	54	0	0	0	2	0	10
Nanawale	pun	43	Flower	3	0	1	0	0	0	0	0	0	0
Orchidland	pun	57	Orchidland	22	50	9	20	0	0	0	2	1	5
Pahoa	pun	60	Pahoa	0	1	0	0	0	1	0	0	0	5
			revisited	928	1300	376	526	29	2374	125	3794	281	15740
			12-mo		2228		902		2403		3919		16021

- Follow-up Hotline reports and other reports from outside sources. Unit of measure is number of reports checked.

The Miconia Hotline continues to receive calls from the public at rate of about 13 calls per month. Most reports are generated through public awareness activities such as distributing "Miconia Wanted" flyers and from newspaper press releases and public service announcements. Of the 158 calls that came in

during the grant period, 91 were followed up by site visits or phone calls, and the remaining 67 calls were previously mapped core and satellite sites.

As reports come in they are assigned a category from 1 to 5. Category 1 reports are possible new sites. Category 2 reports may be new but are within the expected range of known trees. Category 3 reports are usually roadside plants in highly visible areas. Category 4 reports are residents that have miconia on their own property. Category 5 includes all the well known sites or older established stands, i.e., Onomea, and Leilani Estates. Table 5 shows the number of calls that came in to the Hotline, and their categories.

Table 5. Follow-up Hotline reports and other reports from outside sources.

Category	Description	1999	2000	12-mo
1	Possibly new	28	19	47
2	Other visit required	4	14	18
3	Visible needs treatment	13	8	21
4	Landowner request help	2	3	5
5	Known Core or Satellite	34	33	67
		81	77	158

- Promote public awareness with emphasis on the Kona (Honaunau and Honalo infestations). Targeted are 12 volunteer projects, 12 presentations, and 4 press releases.

The Kona field team had volunteer help on several occasions. One resident took the field team to a newly discovered remote tree site at Honalo (Site 1). The balance of the volunteers worked along with the crew to survey forest blocks at Honalo and Honaunau (Site 2). There were also several volunteer projects in East Hawaii.

Table 6. Field crew volunteers at Kona, Hilo and Puna.

District	Site	Group / Individual	Date	wkr/days 1999	wkr/days 2000
Kona	1	Hunters & Residents	Dec-99	1	-
Kona	1	Hunters & Residents	Jan-00	-	1
Kona	1	Puna Judo	Feb-00	-	4
Kona	2	Hunters & Residents	Apr-00	-	1
Kona	2	Puna Judo	May-00	-	5
				1	11

District	Site	Group / Individual	Date	wkr/days 1999	wkr/days 2000
Hilo	11	Alu Like	Jul-99	45	-
Hilo	35	Hunters & Residents	Oct-99	1	-
Hilo	30	Hawaii Island Economic Development Board	Apr-00	-	10
Hilo	31	Hawaii Island Economic Development Board	May-00	-	7
Hilo	40	Upward Bound & other Students	May-00	-	1
Hilo	14	Hunters & Residents	Jun-00	-	1
Hilo	40	Upward Bound & other Students	Jun-00	-	18
Hilo	5	Hawaii State Intake Services Center	Jul-00	1	-
Hilo	9	Hawaii State Intake Services Center	Jul-00	1	-
Hilo	30	Hawaii State Intake Services Center	Jul-00	1	-
Hilo	48	Hawaii State Intake Services Center	Jul-00	2	-
				51	37

District	Site	Group / Individual	Date	wkr/days 1999	wkr/days 2000
Puna	17	Alu Like	Jul-99	46	-
Puna	29	Alu Like	Jul-99	45	-
Puna	44	Alu Like	Jul-99	46	-
Puna	27	Hunters & Residents	Jan-00	-	1
Puna	63	Leilani Estates Community Association	Feb-00	-	2
Puna	63	Hunters & Residents	Apr-00	-	1
Puna	63	Leilani Estates Community Association	Apr-00	-	9
Puna	46	Hawaii Island Economic Development Board	May-00	-	22
Puna	63	Leilani Estates Community Association	May-00	-	4
Puna	19	Alu Like	Jun-00	-	8
Puna	27	Alu Like	Jun-00	-	8
Puna	29	Alu Like	Jun-00	-	8
Puna	67	Leilani Estates Community Association	Jun-00	-	8
Puna	66	Hawaii State Intake Services Center	Aug-00	2	-
				139	71

Volunteers and staff also provided information and fielded questions at several presentations including the Kona Farm Fair, several Kona Farmers Alliance and Coffee Council meetings, and conducted door to door surveys while distributing "Miconia Wanted" flyers and surveying farms.

Dozens of 8.5" x 11" Miconia Wanted posters were laminated and put up throughout neighborhoods and general stores in areas suspect of miconia and where the field teams are working. Posters were tied to trees along trails to miconia sites in forest areas of Hilo and Puna and flyers were left at hunter stations.

Table 7. Volunteer & staff presentations.

Districts	Presenter / Staff	Function	Date	wkr/days	Agency
Kona	Chelsea Naldoza	Kona Farm Fair - booth staffing	Sep-99	2	Volunteer
Kona	Nelson Ho / David Naldoza	Kona Farm Fair Info Booth	Sep-99	4	BIMAC
Kona	Laura Hillis	Kona Farmers Alliance meeting	Jan-00	1	BIMAC
Kona	Laura Hillis	UH Agriculture Extension meeting	Jan-00	1	BIMAC
Kona	Virginia	Kona Coffee Council meeting	Jan-00	1	Ag, Extn.
Hilo	Nelson Ho / James Hank	Hawaii CC Earth Day Fair	Apr-00	2	BIMAC
Hilo	Nelson Ho	Upward Bound Students	Jun-00	1	BIMAC
Puna/Kau	NPS Kuhea Paracuelles	Environmental Edu. Radio Contest	Nov-99	1	HAVO
Puna	Kim Tavares	Fern Forest Community Annual Mtg	Dec-99	1	BIMAC
Puna	Linda Naniseni	Surveys & Public Awareness	Jan-00	1	Volunteer
Puna/Hilo	Dawn Lee	Surveys & Public Awareness	Mar-00	4	Volunteer
Puna	Willie and Nancy Iaukea & Kim	Hawaiian Acres Earth Day Fair	Apr-00	3	VL/BIMAC
All	USGS BRD staff	USGS Open House, Menlo Pk. CA	May-00	2	HAVO
All	Kim Tavares	Miconia Think-Tank Workshop	May-00	1	BIMAC

Several newsletters, publications and other forms of media focused on Miconia control over the grant period. The new Kona field team was announced in the newspapers, along with public service announcements and other news articles. Press in Kona, Hilo, Puna, and state-wide, reported on Miconia control.

Table 8. Press releases and other publications.

District	Press Release Title	Author	Publication	Date	Agency
Kona	More Help in Miconia Battle	Nelson Ho	West Hawaii Today	8/13/99	BIMAC
Kona	Miconia Control on Hawaii Island	Nelson Ho	Malama I Ka Honua-Sierra Club	4/1/00	BIMAC
Kona	Aerial miconia survey today (PSA)	WHT	West Hawaii Today	6/27/00	PUB
Hilo	Miconia Volunteers Hit 100 Mark	HIEDB	Press Release	5/27/00	Volunteer
Hilo	Miconia SWAT mission nets 1700 trees...	HIEDB	Hawaii Tribune Herald	6/7/00	Volunteer
Puna	A Look at our Environment in Fern Forest	Kim Tavares	Annual Newsletter - Community Development Hui of Fern Forest	11/1/99	BIMAC
Puna	Miconia	Kim Tavares	Eden Roc Community Newsletter	1/1/00	BIMAC
Puna	Miconia: an Invasive Weed Tree in Fern Ac	Kim Tavares	Fern Acres Community Newsletter	1/1/00	BIMAC
Puna	Miconia: an Invasive Weed Tree in HACA	Kim Tavares	Hawaiian Acres Comm. Newsletter	4/1/00	BIMAC
Puna	Call for Community Miconia Effort	Nelson Ho	Fern Acres Community Newsletter	5/1/00	BIMAC
All	Miconia Threatens Fragile Native Plants	Heidi Bornhorst	Honolulu Advertiser	9/26/99	PUB
All	Miconia Control on the Big Island: Year 3	Nelson Ho	Hawaii Landscape	1/1/00	BIMAC
All	Forestry 2010: HVNP progress report	Jim Martin	Woods	5/1/00	HAVO
All	not published yet	TV Asahi, Japan	Motherland TV Productions	5/2/00	PUB
All	not published yet	Tom Coffman	Nature Conservancy	5/22/00	PUB

2) Treat new and remote Miconia populations using a combination of mechanical and chemical methods. Unit of measure is acres treated and plants killed.

[Timeline: ongoing, present through June 30, 2000]

- Treat plants in Honaunau and Honalo (MU 23 and 24, about 700 acres)
- Treat plants in Kurtistown (MU #6, about 150 acres)
- Treat plants in Mountain View (MU #7, about 300 acres)
- Treat plants in Onomea above 600' elevation (MU #2 & #3, about 500 acres)

There is no new or remote work in Kurtistown or Mountain View. All work in these areas is included in monitoring (Table 4.), or old established stands (Table 10.). The following table shows work done in Honaunau, Honalo, Onomea and other new and remote locations.

Table 9. Treat new and remote Miconia populations.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Honalo	kon	1	Honalo	450	1000	182	400	7	3	4	14	2	8
Honaunau	kos	2	Honaunau	0	2150	0	870	0	23	0	112	0	37
Onomea Mauka	his	7	Kawainui	1236	106	500	43	0	0	0	0	0	0
Onomea Mauka	his	9	Hanawi	988	0	400	0	0	0	0	0	0	0
Onomea Mauka	his	10	Kapue	49	675	20	273	0	0	0	1	0	0
Fern Forest	pun	25	Jungle King	23	222	9	90	0	0	2	2	25	0
Fern Acres	pun	27	Anthurium	0	425	0	172	0	14	0	37	0	22
Makuu HHL	pun	28	Makuu	210	0	85	0	5	0	125	0	393	0
Fern Acres	pun	41	Lehua	22	90	9	37	1	4	0	68	3	499
Opihikao	pun	42	Kauaea	0	105	0	43	0	0	0	3	0	3
			new & remote	2979	4773	1205	1928	13	44	131	237	423	569
			12-mo		7752		3133		57		368		992

3) Treat large flowering trees in older established stands using mechanical, chemical, and biological control methods. Unit of measure is acres treated and number of trees killed. [Timeline: ongoing, present through June 30, 2000]

- Continue to kill mature trees along the Onomea scenic drive, Ainaloa, and Leilani as time and weather permits. This effort will rely largely on volunteers and community groups.

Miconia eradication is ongoing at older established sites with mature trees, especially when volunteers or forestry crews (Dept. of Land & Natural Resources, Division of Forestry & Wildlife) are available to help. During this grant period work continued at the largest and oldest sites where many mature trees were destroyed by mechanical and chemical control methods.

Table 10. Treat large flowering trees in older established stands.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Honolii	his	11	Honolii	148	1550	60	625	0	246	0	1181	0	2029
Onomea Makai	his	30	Onomea	69	10	28	4	9	284	4	749	0	3220
Onomea Makai	his	32	Makai Kawainui	1	0	1	0	2	0	0	0	20	0
Panaewa Makai	his	40	Panaewa HHL	17	5	7	2	9	159	38	94	55	154
Papaikou	his	31	Papaikou	371	10	150	4	0	600	0	1009	0	3531
Waiakea	his	39	Panaewa FR	67	84	27	34	20	555	17	681	0	704
Ainaloa	pun	54	Puhala	1	15	0	6	5	1	7	6	2	63
Haena	pun	46	Haena	7	10	3	4	0	89	70	421	36	1874
Kurtistown	pun	17	Kurtistown	19	250	8	100	9	5	16	39	35	45
Leilani	pun	29	Keahialaka	5	270	2	110	1	3	5	878	0	0
			all ground	706	2204	286	889	55	1942	157	5058	148	11620
			12-mo		2910		1175		1997		5215		11768

- 4) Introduce leaf spot fungus into new locations where it is likely to spread. Introduce the fungus into previously treated areas to help control newly emerging seedlings and saplings, hopefully increasing time between re-treatments. Measure is number of new introductions [Timeline: ongoing, present through June 30, 2000]

The leaf spot fungus released by Eloise Killgore of Hawaii Dept. of Agriculture is present and showing effects on the leaves of miconia. Some plants that were not part of the intended release were also infected, which is evidence that it is moving on it's own. Eloise cultured a sample from the newly affected plants that appears to be stronger and more quickly established than the original. This was applied to gulches accessible by bridges, where conditions are optimal.

There are no areas remaining in Hawaii county that have dense stands of mature miconia trees outside of South Hilo district, which is best for fungus establishment. The field team suggests application of the fungus at sites where seedling densities are high to see if it will have an impact there as well. Some of the sites outside Onomea that are expected to produce thousands of seedlings annually are:

- ❑ 11 – Honolii, South Hilo
- ❑ 64 – Kupono, Leilani Estates, Puna
- ❑ 37 – Kahaopea, Hilo Town Core Population
- ❑ 17 – Kurtistown, Puna

There are also some smaller but also notable sites that might be worth exploring as application sites. These are:

- ❑ 47 – Aweoweo, Hawaiian Beaches, Puna
- ❑ 33 – Reeds Island, Reeds Bay, South Hilo
- ❑ 19 – Enos Lane, Mt. View, Puna
- ❑ 59 – Hilo Landfill, Hawaiian Home Lands, Hilo

2. IMPLEMENTATION OF EVALUATION AND MONITORING ACTIVITIES.

Activities & Timelines:

- 1) Monitor the progress of treatment of new and remote populations. Unit of measure is acres monitored [Timeline: ongoing, present through June 30, 2000]

Treatment at new and remote sites was effective, as only two plants were found during monitoring. The following table includes a list of all new or remote sites previously surveyed and treated, and monitored during this grant period.

Table 11. Monitor the progress of treatment at new and remote populations.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Akaka Falls	his	6	Akaka	151	40	61	17	0	0	0	1	0	0
Onomea Mauka	his	7	Kawainui	1236	106	500	43	0	0	0	0	0	0
Onomea Mauka	his	9	Hanawi	988	0	400	0	0	0	0	0	0	0
Onomea Mauka	his	10	Kapue	49	675	20	273	0	0	0	1	0	0
Onomea Mauka	his	12	Puueo	272	85	110	35	0	0	0	0	0	0
			all ground	2696	906	1091	368	0	0	0	2	0	0
			12-mo		3602		1459		0		2		0

- 2) Monitor the progress of treatments of old populations, with emphasis on quantifying depletion of soils seedbank following repeated treatments. Unit of measure is acres monitored [Timeline: ongoing, present through June 30, 2000]

Monitoring results at old established populations is not as encouraging. In many cases destruction of large flowering trees increases the rate of seed sproutings by allowing more sunlight to reach ground. This will be good in the long run, as much of the seeds already in the soil will be depleted that much faster.

Table 12. Monitor the progress of treatment at old populations.

Area	Map	Site	Location	acres		hectares		trees		sapling		seedlings	
				1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Onomea Makai	his	30	Onomea	69	10	28	4	9	284	4	749	0	3220
Panaewa Makai	his	40	Panaewa HHL	17	5	7	2	9	159	38	94	55	154
Waiakea	his	16	Waikahe	5	40	2	16	1	0	0	8	132	12
Ainaloa	pun	54	Puhala	1	15	0	6	5	1	7	6	2	63
Eden Roc	pun	26	Malieka	0	130	0	52	0	0	0	2	0	0
Eden Roc	pun	56	Kopua	0	70	0	28	0	0	0	0	0	0
Fern Acres	pun	41	Lehua	22	90	9	37	1	4	0	68	3	499
Haena	pun	46	Haena	7	10	3	4	0	89	70	421	36	1874
Hawaiian Acres	pun	61	HA9DE	0	89	0	36	0	7	0	29	0	201
Hawaiian Acres	pun	63	HA5DE	0	7	0	3	0	0	0	7	0	102
Hawaiian Acres	pun	65	HA1DE	0	3	0	1	0	1	0	0	0	0
Hawaiian Beaches	pun	47	Aweoweo	0	22	0	9	0	3	0	1	34	0
Hawaiian Paradise Park	pun	50	Pohaku	0	135	0	54	0	0	0	1	0	0
Hawaiian Paradise Park	pun	55	Laamia	4	2	2	1	0	0	4	1	0	0
Kurtistown	pun	17	Kurtistown	19	250	8	100	9	5	16	39	35	45
Kurtistown	pun	19	Enos Lane	4	50	2	21	3	17	2	461	1	1659
Leilani	pun	29	Keahialaka	5	270	2	110	1	3	5	878	0	0
Leilani	pun	64	Kupono	0	25	0	10	0	1212	0	1000	0	4900
Nanawale	pun	44	Albizia	0	134	0	54	0	0	0	2	0	10
Opihikao	pun	42	Kauaea	0	105	0	43	0	0	0	3	0	3
Orchidland	pun	57	Orchidland	22	50	9	20	0	0	0	2	1	5
Pahoa	pun	60	Pahoa	0	1	0	0	0	1	0	0	0	5
			all ground	176	1512	71	611	38	1786	146	3772	299	12752
			12-mo		1689		682		1824		3918		13051

- 3) Update the distribution map and database records and assess the status within each management unit to aid strategic planning

The miconia distribution database in GIS format is updated weekly with information collected daily by field teams equipped with GPS receivers. Surveys, treatments and monitoring activities, along with hotline tips and other reports are also collected and used to track miconia locations and control progress. A summary of the status (confirmed-y, potential-i, excluded-n) of each new management unit or site can be seen in Attachment 1. Site centers list & status.

- 4) Monitor the progress and impact of the leaf spot fungus on Miconia.

The leaf spot fungus released by Eloise Killgore of Hawaii Dept. of Agriculture (HDOA) is present and showing effects on the leaves of miconia. It is being monitored by Patrick Conant of HDOA in Hilo. Some plants that were not part of the intended release were also infected, which is evidence that it is moving on it's own. Eloise cultured a sample from the newly affected plants that appears to be stronger and more quickly established than the original. This was applied to gulches accessible by bridges, where conditions are optimal. A report by Patrick Conant on the progress and impact of the pathogen is attached. (Attachment 9).

- Summarize monitoring results, progress and efficacy of treatments.

Monitoring treatment at new and remote sites produced positive results, as only two young plants were found at those sites. Monitoring results at old established populations is not as encouraging. In many cases destruction of large flowering trees increases the rate of seed sprouts by allowing more sunlight to reach ground. This will be good in the long run however, as the seeds already in the soil will germinate and be destroyed sooner rather than later on.

- Report on the progress of the leaf spot fungus.

A report on the progress and impact of the pathogen is attached. (Attachment 9).

- Ascertain the effectiveness of the containment control strategy and project future needs and cost effectiveness.

Searching the peripheries while maintaining the cores has been an effective containment control strategy. We have maintained this strategy throughout the grant period with frustration and success. The frustration comes from finding that peripheral plant in the middle of nowhere, thus confirming the suspected range of infestation. Success is more likely to be noticed by big-number destruction at core sites. Surveying for 100% detection and treatment on the periphery while continuing mature tree treatment at core sites, prevents miconia from becoming established in the wild.

The area of potential infestation is large, island-wide over 20,000 acres. With the help of birds, each mature tree site that produced seeds even once has potentially affected about 800 acres. Most seedlings will emerge near the mother plant, but in some cases seedlings have been found much farther. Miconia plants have been found 400 meters or better and up to a kilometer away from a nearest known source at Honalo (1), Honaunau (2), Jungle King (25), Glenwood (22), Kauaea (42), Puu Honuaula (45), Hilo Landfill (59), Honolii (11), and at Kawainui (7). Since these examples exist, a ground search of a kilometer in all directions from a mature tree is not unreasonable if the goal is 100% control at the edges. At the extreme edges of the infestation near forests, it is urgent. Air surveys in 100 meter wide grid sweeps should extend outward from the tree and up to 2 kilometers away, to increase effectiveness and successful detection of outlying plants. It should be done annually to detect them before they mature.

To prevent losing the ground we have gained during this grant period, our efforts must continue and expand. We need more field crews, equipment, vehicles and air surveys to monitor prior work and survey around it. All mature trees at core sites should be destroyed in the next twelve months to relieve pressure on the surrounding farms and forests. At the same time peripheral surveys in all forests should continue in order to prevent outlying plants from reaching maturity. In remote areas where miconia was detected, surveys should include areas of previous work as well as expand outward.

Native forests, timber forests, ranches, farms and residents in five districts of Hawaii County all live with miconia near by. The economics of losing our endemic Hawaiian habitat is immeasurable. But what can be measured is the potential to destroy timber lands and future harvests. Besides dealing with the variety of existing crop pests, farmers in infested areas have the added burden of needing to control seedlings in their fields. As worldwide alien species awareness continues, crops such as cut flowers raised among fruiting miconia trees could pose a serious threat to other tropical climates, by harboring miconia seeds in exported foliage and plants. Miconia-free islands within the state are at risk of being infested by these and other means as well.

It is more important now than ever that field teams continue surveys and treatments at all sites. Mechanical and biological controls must continue. Work accomplishments during the grant period are significant enough that it would be tragic to dilute the efforts while progress and momentum are at a peak. We are at a point where people don't realize the potential of the problem, because Onomea is the only visible example we can show. Miconia containment control is no small task nor is it impossible, if we see our strategy through to the end.

Attachment 1. Site centers list & status.

(y=miconia found n=miconia reported-misidentified i=reported inconclusive)

District	Area	Site	Location	Status
Hamakua	Honokaa	83	Honokaa	n
Hamakua	Kalopa	82	Kalopa	n
Hamakua	Kukuihaele	58	Kukuihaele	n
Hamakua	Paauiilo	89	Paauiilo	n
Hilo N	Hakalau	5	Hakalau	y
Hilo N	Laupahoehoe	3	Laupahoehoe	y
Hilo N	Ninole	4	Ninole	y
Hilo N	Papaaloa	91	Papaaloa	i
Hilo S	Akaka Falls	6	Akaka	y
Hilo S	Hilo	33	Reeds Island	y
Hilo S	Hilo	34	Keaukaka	i
Hilo S	Hilo	35	Komohana	y
Hilo S	Hilo	36	Kawili	y
Hilo S	Hilo	37	Kahaopea	y
Hilo S	Hilo	38	Zoo	y
Hilo S	Hilo	39	Panaewa FR	y
Hilo S	Hilo	40	Panaewa HHL	y
Hilo S	Hilo	59	Hilo Landfill	y
Hilo S	Honolii	11	Honolii	y
Hilo S	Honomu	48	Honomu	n
Hilo S	Kaumana	14	Akolea	y
Hilo S	Kaumana	84	Ua Nahele	i
Hilo S	Onomea	9	Hanawi	y
Hilo S	Onomea	30	Onomea	y
Hilo S	Papaikou	31	Papaikou	y
Hilo S	Pepeekeo	7	Kawainui	y
Hilo S	Pepeekeo	8	Waiaama	y
Hilo S	Pepeekeo	32	Makai Kawainui	y
Hilo S	Puueo	10	Kapue	y
Hilo S	Puueo	12	Puueo	y
Hilo S	Puueo	13	Waiau	y
Hilo S	Waiakea Uka	15	Hoaka	y
Hilo S	Waiakea Uka	16	Waikahe	y
Kau	Ocean View	76	HOVE	i
Kau	Wood Valley	67	Wood Valley	n
Kohala N	Hawi	80	Kohala	i
Kohala S	Kamuela Highlands	92	Kamuela	y
Kohala S	Waikoloa Village	79	Waikoloa	i
Kohala S	Waimea	81	Waimea	i
Kona N	Holualoa	77	Holualoa	i
Kona N	Honalo	1	Honalo	y
Kona N	Kalaoa-Kona	85	Ahikawa	n
Kona N	Kaloko Mauka	49	Kaloko	y
Kona S	Capt. Cook	78	Capt. Cook	i
Kona S	Honaunau	2	Honaunau	y
Kona S	Opihihale	90	Opihihale	n

Attachment 1. Site centers list & status. (cont'd)

District	Area	Site	Location	Status
Puna	Ainaloa	28	Makuu	y
Puna	Ainaloa	54	Puhala	y
Puna	Eden Roc	26	Malieka	y
Puna	Eden Roc	56	Kopua	y
Puna	Eden Roc	68	Palainui	y
Puna	Fern Acres	27	Anthurium	y
Puna	Fern Acres	41	Lehua	y
Puna	Fern Forest	23	Kaleponi	y
Puna	Fern Forest	24	Kokokahi	y
Puna	Fern Forest	25	Jungle King	y
Puna	Glenwood	22	Glenwood	y
Puna	Haena	46	Haena	y
Puna	Hawaiian Acres	61	HA9DE	y
Puna	Hawaiian Acres	63	HA5DE	y
Puna	Hawaiian Acres	65	HA1DE	y
Puna	Hawaiian Acres	69	HA10BC	y
Puna	Hawaiian Acres	71	HA1CD	y
Puna	Hawaiian Acres	88	HA11D	y
Puna	Hawaiian Beaches	47	Aweoweo	y
Puna	Hawaiian Beaches	70	Palani	y
Puna	Keaau	73	BM605	y
Puna	Keaau	86	Papai	n
Puna	Kehena	74	Kehena	i
Puna	Kurtistown	17	Kurtistown	y
Puna	Leilani Estates	29	Keahialaka	y
Puna	Leilani Estates	62	Kahukai	y
Puna	Leilani Estates	64	Kupono	y
Puna	Mauna Loa Estates	87	Ruby	n
Puna	Mt. View	18	Kukui Camp	y
Puna	Mt. View	19	Enos Lane	y
Puna	Mt. View	20	Ihope	y
Puna	Mt. View	21	Oshiro	y
Puna	Nanawale Estates	43	Flower	y
Puna	Nanawale Estates	44	Albizia	y
Puna	Opihikao	42	Kauaea	y
Puna	Orchidland	57	Orchidland	y
Puna	Orchidland	72	Puanani	y
Puna	Orchidland	75	Aulii	y
Puna	Pahoa	60	Pahoa	y
Puna	Paradise Park	50	Pohaku	y
Puna	Paradise Park	51	Shower	y
Puna	Paradise Park	52	Naupaka	y
Puna	Paradise Park	53	Awapuhi	y
Puna	Paradise Park	55	Laamia	y
Puna	Puna Geothermal	45	Puu Honuaula	y
Puna	Royal Hawaiian Estates	66	Mokuna	y