Propagation of Laurel Fig (*Ficus microcarpa*) via plant cuttings

Crystel Digrazia, Mackenna Faucher, Bibiana Y. Garcia and Ragnhild Kløve Sandnes
Department of Tropical Plant and Soil Sciences, University of Hawaii at Manoa, 3190 Maile Way, St. John 102, Honolulu, Hawaii, United States

Laurel fig (*Ficus microcarpa*) was propagated using vegetative cuttings from the ends of branches. They were treated with or without Hormex powder #8 - indole-3-butyric acid. Results after 28 days indicated significant benefit of root hormone treatment. The mean of treated root weight was 0.126 g and the mean of untreated root weight was 0.061 g. Rooting percentage was 100. The T test performed showed statistical significance toward the usage of root hormone treatment for improving root density.

Laurel fig, *Ficus microcarpa*, is an ornamental, evergreen tree in the Moraceae family (Ficus microcarpa n.d.). It can survive in temperatures ranging from 24 to 117 degrees fahrenheit, making Hawaii a suitable area for growth (Martin 2020). The tree is native to Indonestia and does well in seacoast areas. Mature height and spread are both 40x60 feet (Ficus microcarpa nitida n.d.).

The laurel fig is known to have strong roots, and is not a species that would normally need auxins such as indole-3-butyric acid. The objective of this experiment was to see if laurel fig could be propagated from branch cuttings, and if there is any significant benefit to root growth when applying hormone treatments.

MATERIALS AND METHODS

Plant material

This study was performed at the University of Hawaii at Manoa Magoon Research Station from 4 October 2022 to 1 November 2022. Mature branch cuttings were harvested from a fully developed and healthy laurel fig tree. The cuttings were uniform and measured at about 14 cm (5.5 in). The branch cuttings were divided into four groups of 20, where two of the groups were treated with Hormex® powder #8, containing indole-3-butyric acid as the active ingredient. All 80 cuttings were planted into a total of four trays filled with a 1:1 ratio of perlite to vermiculite. Each experimental unit consisted of 20 cuttings. The cuttings were allowed to root in a greenhouse under a timed misting system. The percent rooting and root weights were collected 28 days after planting.

Data analysis

A T-test was performed on the individual root weight and the individual rooting index using theT-test function of Google Sheets.

RESULTS

No significant differences were observed in percent rooting between branch cuttings that were treated with or without Hormex. Both groups had a 100% success rate of rooting, unaffected by the Hormex treatment (Figure 1). The average root weight for the control and Hormex groups were 0.061 g and 0.126 g, respectively (Figure 2). The average rooting index for the control and Hormex groups were 3.7 and 4.0 respectively (Figure 3). Figure 4 shows the degree of rooting between the control and Hormex treated cuttings.

The results of the T tests showed that for individual root weight the value was less than 0.05, meaning that there was scientific significance. For the individual root index the value was greater than 0.05 proving that there was no scientific significance. There was no need to perform a T-test for the rooting percentage because both groups had 100% rooting.

DISCUSSION

Ficus microcarpa was not affected by the application of indole-3-butyric acid when it came to survivability (rooting percentage). It did

however prove to increase root growth significantly, more than doubling the average root weight compared to the control group (Figure 2). This result, while supported by physical data, does not seem true when comparing the average rooting index (Figure 3) which was categorized by sight. A T-test was performed for each data set–average individual root weight and average individual rooting index–to determine the reliability of their results. The T-test confirmed the reliability of the data driven graph while disproving the reliability of the visually categorized graph.

Possible sources of error include the discovery of an additional sample to Hormex group 2 (causing, a miscount in sample size and an increase in plants per tray) as well as the possibility of mass loss due to incorrect trimming of roots, possible mass loss during drying (baking) and possible mass loss during transportation and handling.

The addition of a single sample to the Hormex group caused issues with counting the number of cuttings when determining the rooting index. While the number of cuttings that were weighed and recorded did not change, which sample that was cast away made it difficult to determine which category should be decreased by one. With the results from the T-test it made it even less likely that it would have been possible to visually determine which category the cutting may have originated from. Ultimately, the extra cutting should have been included in the data and incorporated into the averages to avoid the resulting decrease in confidence.

In future experiments it would prove valuable to include (individual) longest root length or average root length to avoid discrepancies with taking data visually. This would provide additional data toward determining the benefits of Hormex for improving root growth and density

In conclusion, Hormex application can be used to improve root density and growth but more research is needed to determine to what extent.

LITERATURE CITED

Baldos, OC & Corpuz, AK 2020, 'Propagation of arid land peperomia (Peperomia blanda var. floribunda) via leaf cuttings', pp. 1–6.

Ficus microcarpa n.d., plants.ifas.ufl.edu, | Center for Aquatic and Invasive Plants | University of Florida, IFAS, viewed 9 December 2022, <https://plants.ifas.ufl.edu/plant-directory/ficus-microcarpa/>.

Ficus microcarpa nitida n.d., Boething Treeland Farms, viewed 9 December 2022, <https://www.boethingtreeland.com/plants/ficus-microcarpa-nitida-retusa/>.

Martin, CA 2020, Ficus microcarpa (Indian laurel fig), Asu.edu, Arizona State University, viewed 9 December 2022, <https://www.public.asu.edu/~camartin/plants/Plant%20html%20files/ficusnitida.html>.

----------end text of report----------

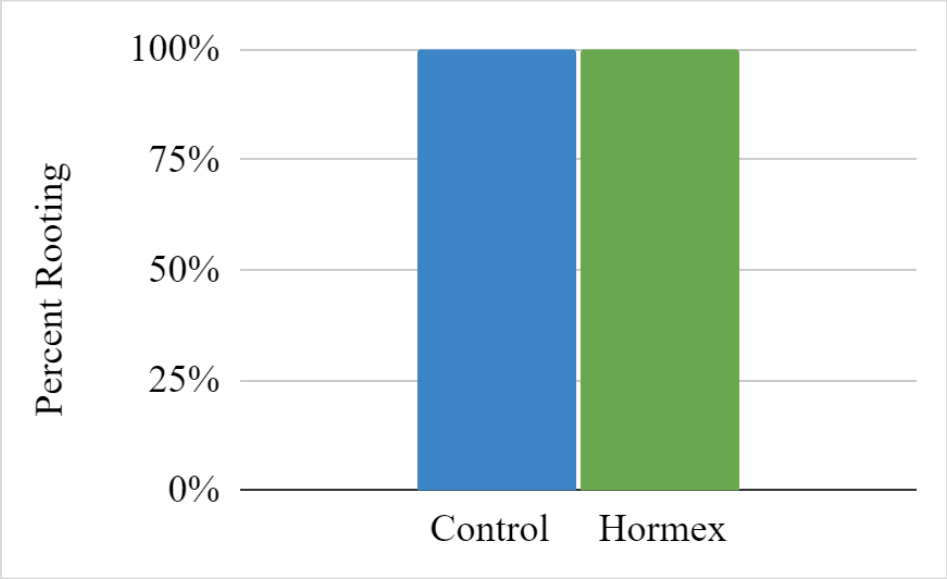

Figure 1. Percent rooting of *Ficus microcarpa* branch cuttings treated with or without Hormex.

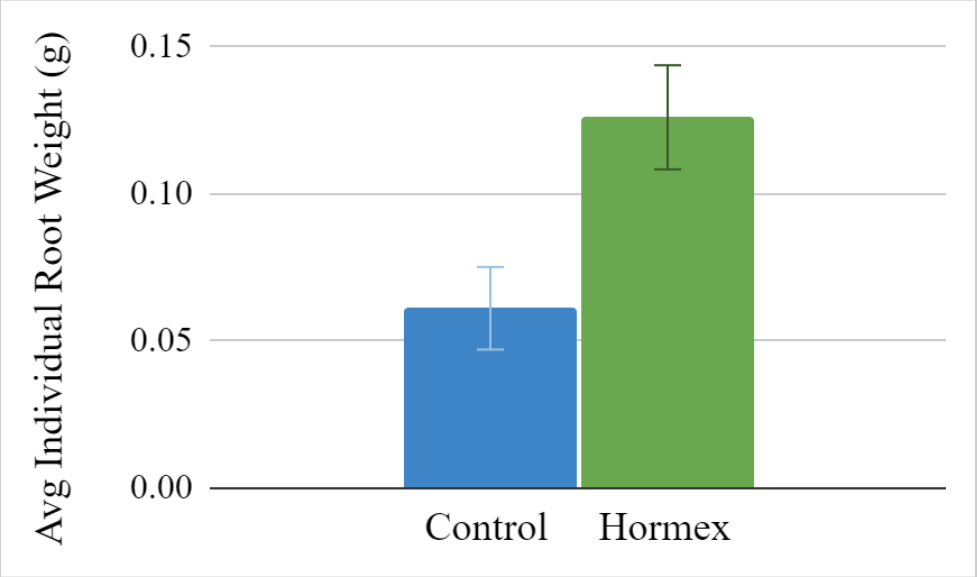

Figure 2. Average total root weight of *Ficus microcarpa* branch cuttings treated with or without Hormex.

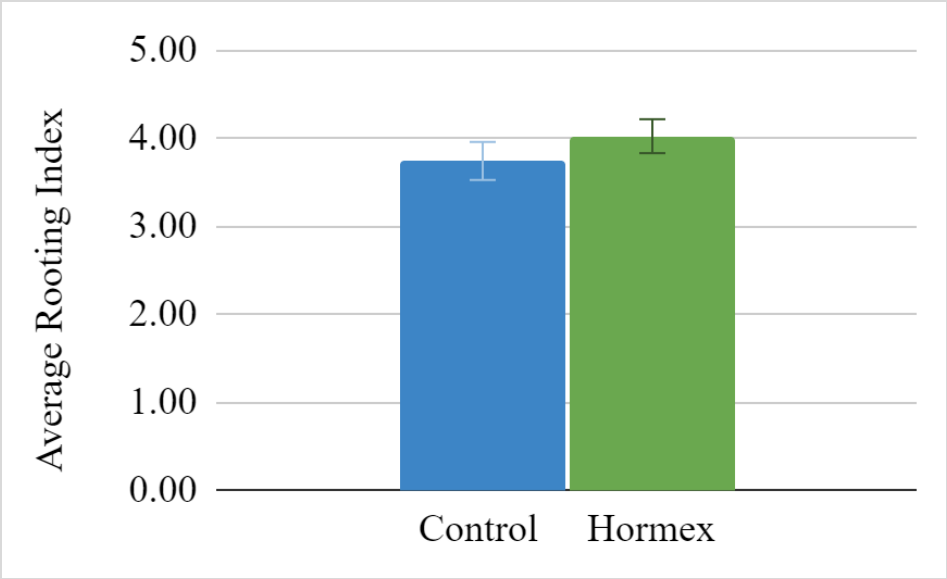

Figure 3. Average rooting index of *Ficus microcarpa* branch cuttings treated with or without Hormex.

Figure 4. Rooting of *Ficus microcarpa* branch cuttings treated with or without Hormex.

Percent Rooting

Treatment	Rep	Alive										Percent
		1	2	3	4	5	6	7	8	9	10	
		11	12	13	14	15	16	17	18	19	20	
Control	1	1	1	1	1	1	1	1	1	1	1	100%
		1	1	1	1	1	1	1	1	1	1	100%
	2	1	1	1	1	1	1	1	1	1	1	100%
		1	1	1	1	1	1	1	1	1	1	100%
											Total Control Average:	100%
Hormex	1	1	1	1	1	1	1	1	1	1	1	100%
		1	1	1	1	1	1	1	1	1	1	100%
	2	1	1	1	1	1	1	1	1	1	1	100%
		1	1	1	1	1	1	1	1	1	1	100%
											Total Hormex Average:	100%

Total Root Weight (g)

Treatment	Rep	Cutting Number										Average
		1	2	3	4	5	6	7	8	9	10	
		11	12	13	14	15	16	17	18	19	20	
Control	1	0.02	0.00	0.00	0.02	0.03	0.05	0.06	0.00	0.02	0.12	0.062
		0.03	0.04	0.05	0.07	0.07	0.18	0.17	0.00	0.17	0.14	
	2	0.00	0.05	0.02	0.05	0.03	0.04	0.08	0.20	0.24	0.16	0.060
		0.01	0.00	0.01	0.01	0.06	0.05	0.01	0.06	0.04	0.08	
											Total Control Average:	0.061
Hormex	1	0.00	0.00	0.07	0.08	0.00	0.06	0.10	0.14	0.10	0.13	0.113
		0.03	0.07	0.13	0.15	0.12	0.17	0.15	0.27	0.25	0.23	
	2	0.02	0.10	0.08	0.01	0.05	0.09	0.12	0.22	0.09	0.13	0.140
		0.15	0.13	0.13	0.12	0.23	0.19	0.20	0.14	0.31	0.28	
											Total Hormex Average:	0.126

Rooting Index

Treatment	Rep	# Cuttings/Set	Number of Cuttings					Sum of Weights	Rooting Index
			Heavy x5	Medium x4	Light x3	Alive x2	Dead x1		
Control	1	20	4	6	7	3	0	71	3.6
	2	20	6	7	5	1	0	75	3.8
	Mean		5	6.5	6	2	0	73	3.7
Hormex	1	20	8	4	8	0	0	80	4.0
	2	20	7	7	6	0	0	81	4.1
	Mean		7.5	5.5	7	0	0	81	4.0

Individual Rooting Index

Treatment	Rep	Cutting Number									
		1	2	3	4	5	6	7	8	9	10
		11	12	13	14	15	16	17	18	19	20
Control	1	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00
		3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00
	2	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
		4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	2.00	
Hormex	1	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00
		4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	2	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00
		4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.00