

**State and Private Forestry
FY 2010 Western Competitive
Resource Allocation
Single-State Project Proposal**

Filename	
HI_koawilt.doc	
Administration Information	
Dollar Amount Requested:	\$150,000
Matching Share:	\$157,500

Applicant Information	
State Forestry Agency:	HI DLNR-DOFAW
Contact Person:	Rob Hauff and Sheri Mann
Address:	1151 Punchbowl St Room 325
City/State/Zip Code:	Honolulu, HI 96813
Phone (Work/Cell):	808 587 4174 / 808 587 4172
Email:	Robert.D.Hauff@hawaii.gov / Sheri.S.Mann@hawaii.gov
Fax:	808 587 1060

Project Information				
2	Descriptive Title of Project:	Developing wilt resistant koa for Hawaii		
	Names of Partnering Agencies / Organizations:	Hawaii Agriculture Research Center (HARC), USFS Forest Health Protection, Haleakala Ranch, Hawaii Reserves Inc. (HRI), L.B. Dorcy Tree Farm, University of Hawaii, HI DLNR-DOFAW, Queen Emma Foundation, Plant Disease Consulting Northwest		
	State(s):	Hawaii	Congressional Districts:	1 and 2
	Counties:	Honolulu, Maui	Forest Service Regions:	5

Total Leverage								
Please specify each 3 rd party contributor (partnering organizations and agencies, including other Federal) and the dollar value of each contribution. Please DO NOT show grant requested funds in this table.								
3	Contributors: (Please specify by name)	Queen Emma Foundation	L.B. Dorcy Tree Farm	HARC	Leeward Haleakala Watershed	Haleakala Ranch	HRI	TOTAL
	Value of Contributions:	\$30,000	\$30,000	\$37,500	\$30,000	\$15,000	\$15,000	\$157,500

Project Budget					
	Grant Share (\$ requested)	Applicant	Non-Federal Contributors	TOTAL	
		Cash¹	In-Kind²		
4	Personnel / Labor:	\$90,000.00	\$30,000.00	\$0.00	\$120,000
	Fringe Benefits:	\$12,500.00	\$0	\$0	\$12,500
	Travel:	\$7,500.00	\$4,500.00	\$0.00	\$12,000
	Equipment:	\$5,000.00	\$1,500.00	\$15,000.00	\$21,500
	Supplies:	\$5,000.00	\$1,500.00	\$15,000.00	\$21,500
	Contractual:	\$30,000.00	\$0.00	\$90,000.00	\$120,000
	Construction:	\$0.00	\$0	\$0	\$ 0
	Other:	\$0.00	\$0	\$0	\$ 0
	Indirect Costs:	\$0	\$0	\$0.00	\$ 0
	TOTAL:	\$150,000	\$37,500	\$120,000	\$307,500

5	Project Duration
	What is the duration of this project? <input type="checkbox"/> One Year <input type="checkbox"/> Two Years <input checked="" type="checkbox"/> Three Years

6	National Relevance
	Conserve Working Forest Landscapes <input checked="" type="checkbox"/> Protect Forests From Harm <input checked="" type="checkbox"/>
	Enhance Public Benefits From Trees and Forests <input checked="" type="checkbox"/>

7	Project Description
----------	----------------------------

¹ 'Cash' is the value of any qualifying match the applicant pays for such as cash, staff time, supplies, or equipment.

² 'In-Kind' is the value of any qualifying match contributed by a non-federal 3rd party contributor such as donated time, supplies, or equipment.

Maximum 5500 Characters Including Spaces – Clearly summarize the proposed project, including goals, objectives, measurable outputs, outcomes, and how grant funds will be used towards successful completion of the project.

In Hawaii, koa (*Acacia koa*) is a valuable tree species economically, ecologically, and culturally. Koa's distribution ranges from lowland to montane areas and dry to wet forests, but much of the original koa forests have been displaced by land-use changes, fire and invasive species. As Hawaii's largest native tree, koa provides habitat for many native birds, insects and plants, some of which are endangered. Koa is also the primary nitrogen fixing species in native forest ecosystems. Koa is Hawaii's premier timber and is used to produce furniture, musical instruments, surfboards and craft wood items. Koa has much cultural significance to native Hawaiians and was the focal point of many traditional ceremonies. The resurgence of interest in Hawaiian voyaging and racing canoes using traditional methods has led to a greater public awareness of the scarcity of trees suitable for "canoe koa" and the importance of renewing this depleted resource. With major (momentous) land use change and declines in sugarcane, pineapple, and cattle production, there is an opportunity and keen interest in utilizing native koa in reforestation and restoration efforts. However, moderate to high mortality rates in many plantings have impeded past efforts. Currently, many landowners/managers are reluctant to reforest with koa in many eco-regions due to high mortality rates. Koa wilt/dieback was first described in Hawaii by Gardner (1980). He completed Koch's postulates and determined the primary cause of the disease was pathogenic strains of *Fusarium oxysporum* which he designated f.sp. *koae*.

Research has shown that natural genetic resistance to koa wilt exists in wild populations and that the frequency of resistance can be increased through selection and breeding. Hawaii Agriculture Research Center (HARC), in collaboration with the USDA Forest Service and Plant Disease Consulting Northwest, has developed a screening protocol that can quickly assess koa seedlings for resistance to koa wilt. The purpose of this project is to leverage the previous research to benefit reforestation/restoration efforts in Hawaii. Specifically, this project will use HARC's methods to identify resistant koa seed sources for use in reforestation and restoration. This will provide partners the opportunity to plant genetically adapted, eco-region specific, disease resistant koa seedlings.

HARC is a nonprofit organization with a long history of providing technical assistance to Hawaii's agriculture and natural resource sectors. HARC works extensively with koa due to koa's importance to the forest industry and ecosystem health.

The goal of this project is to provide landowners/managers with an effective approach for managing koa wilt disease. The development of seed sources that are genetically resistant to koa wilt would remove a major obstacle in utilizing this native species.

To achieve this goal, the project will encompass four primary objectives:

- 1: Collect viable, eco-region specific koa (eg. low elevation, windward) seed by family from wild koa populations
- 2: Screen seedlings from collected seed for naturally occurring resistance to koa wilt (*Fusarium oxysporum*) in greenhouse inoculation trials
- 3: Outplant seedlings from identified resistant families for seed production and silvicultural demonstrations
- 4: Manage existing stands of selected, resistant koa for seed production

The project objectives will lead to the following measurable outputs:

- Objective 1: The number of target mother trees and amount of seed collected
- Objective 2: The number of trials conducted and the number of families and seedlings tested per trial
- Objective 3: The number of resistant koa seedlings/acres planted
- Objective 4: The amount of improved seed collected from existing seed production stands

The immediate outcome of this project will be the establishment of four, 2-3 acre koa (*Acacia koa*) plantings that have increased levels of resistance to wilt. These plantings will serve as an alternative model to the traditional methods used in koa reforestation. The plantings will demonstrate that higher survival rates can be achieved through the use of resistant planting material. The plantings will serve the end goal of providing land owners/managers the opportunity to confidently include koa plantings in their reforestation and/or restoration projects; resulting in ecological, economic and cultural benefits.

An additional outcome of the project will be the seed produced from these plantings. Research has shown that while resistance to koa wilt occurs at low levels in natural populations (<5%), much higher rates can be achieved in properly managed seed orchards. The partnering agencies will be able to return to the plantings as a source of resistant koa seed for use in future projects.

Program Integration	
8	<p>Maximum 1250 Characters Including Spaces</p> <p>The nature and scope of this project encompasses all three of the USFS S&PF's themes. The project will protect forests from harm by identifying new wilt disease resistant koa sources that can be used in reforestation/restoration efforts. Increased plantings of eco-region specific, disease-resistant koa would also enhance programs of invasive plant containment and mitigation.</p> <p>Public benefits from forests will be enhanced by increased ecosystem services through healthier forests. Working forest landscapes will be conserved through making eco-region, disease resistant koa available to partnering agencies/organizations for restoration/reforestation projects. Further, by helping to enhance a viable forest products industry, this project will improve rural economies and provide additional sources of employment/income.</p> <p>The project will provide disease resistant seed for non-industrial private forest owners working on projects with Forest Service S&PF such as Forest Stewardship and NRCS's landowner assistance programs. The project will serve as a disease management model for these programs and serve to improve their koa reforestation/restoration efforts.</p>

Collaboration	
9	<p>Maximum 1250 Characters Including Spaces</p> <p>Currently, there is much interest from both private landowners and public land managers to re-establish koa on their underutilized lands. However, in many instances, after establishment and several years of growth, many saplings are lost to the pathogen <i>F. oxysporum</i> which induces a vascular wilt disease. In some areas planting of koa is being discouraged because resistant seedlings are unavailable. Almost universally our project partners are interested in the development of disease resistant eco-region specific koa seed sources that can be deployed on sites they own or manage. Clearly, if disease resistant koa could be developed for a wide range of sites this would be a significant achievement. This is reflected in project goals and objectives. The key contribution from collaborators is in the form of land for koa reforestation, as well as equipment, supplies, and management efforts to maintain these sites. Their contributions will significantly enhance the success of this project. In return, collaborators, such as the Leeward Haleakala Watershed Partnership and state foresters, will have location specific, disease resistant koa plantings on lands they manage.</p>

10	Leverage
-----------	-----------------

	<p>Maximum 1250 Characters Including Spaces</p> <p>The public-private partnership leverages the following resources in order to support the missions of project partners, the state's Division of Forestry and Wildlife, and the USFS S&PF:</p> <ul style="list-style-type: none"> • Land preparation prior to planting (invasive species removal, field preparation, fencing for ungulate control etc.) • Greenhouse infrastructure to conduct screenings and growouts • Equipment and supplies to maintain planting sites over time (herbicides, spray equipment, irrigation etc.) • Monetary contributions for necessary travel and supplies (growing media, planting containers etc.) • Specialized labor to complete project objectives (collect seed, conduct screenings etc.) • Access to resistant seed from previously installed plantings • Maintenance and expansion of a forest tree seed bank of improved koa seed for non-industrial private forest owners <p>Additionally, existing koa performance trials (progeny tests) on several islands have been in place for as long as 15 years and funded in excess of \$500,000 by private landowners. The proposed project builds on these existing plantings by utilizing project resources to establish new plantings in ecoregions where koa wilt screenings have not yet been conducted, or where more collections are needed.</p>
--	---

	<p style="text-align: center;">Meaningful Scale</p> <p>Maximum 1250 Characters Including Spaces</p> <p>The proposed outcome of this project will be the establishment of a significant base population of eco-region specific, wilt resistant koa plantings. Given the length of the project and the work required in collecting, screening and planting, a goal of 4 sites is proposed. While the actual planting sites will be relatively small (2-3 acres), the project will establish koa wilt resistant seed sources. Landowner/managers will be able to return to the plantings as a source of resistant planting material for future projects. Within five years the koa plantings will begin to produce seed and each planting will be capable of producing tens of thousands of seeds per year. Therefore, this project is of the necessary scale to provide improved koa seed for reforestation/restoration on a large scale.</p>
--	---

	<p style="text-align: center;">Sphere of Influence</p> <p>Maximum 1250 Characters Including Spaces</p> <p>The project's potential to influence future koa reforestation efforts is one of the project's greatest strengths. High mortality limits not only conservation efforts but also the future of koa as a timber crop. There are currently no koa plantations of scale for forest products, and the current model of harvesting koa from native forests is unsustainable. If commercial koa plantings are not established, Hawaii is in danger of losing not only the largest component of its forest industry (\$25 million per year), but the most culturally significant forest product as well.</p> <p>This project will demonstrate enhanced methods of koa reforestation with the use of disease resistant planting material. The goal of this project is that reforestation with koa becomes a viable option for landowners/managers and will therefore be more likely to include koa in their conservation and/or commercial forestry projects. The project will also serve as a regional model for forest tree disease management that could be adapted throughout the Pacific. Genetic resistance is the key to mitigating adverse effects of pathogens or insects.</p>
--	---

Sustainability of Outcomes

Maximum 1250 Characters Including Spaces

13

The areas reforested/restored with disease resistant koa will provide benefits far beyond the life of the project itself in the form of increased ecosystems services, cultural uses and forest products. The plantings, when converted to seed production areas, will also provide landowners with a source of disease resistant koa far beyond the life of this project. This will lead to increased deployment of naturally selected, disease resistant koa across the Hawaiian landscape, the impact of which will be felt for generations to come.