Laukahi: The Hawai‘i Plant Conservation Network

Priority	Research Topic	Genus/Species and comments
1	Propagation: Controlled Breeding	Solanum nelsonii-Was never able to get viable seed from field. Collected fruit with
2	Propagation: Controlled Breeding	This information is not know for the majority of Hawaiian plants, the list of species would be several hundred taxa; very important for large scale restoration projects; questions to be answered would include - Are plants and seeds resulting from controlled propagtion genetically changed? If so, at what stage does this occur (F1, F2, etc.) and does it affect their ability to survive in the wild? Species that are a good candidates for wild vs. cultivated plants - Brighamia, Cyanea superba.
2		Common Hawaiian fern species, from spores.
3	Propagation: Controlled Breeding	Same as above. Also, developing breeding programs for fire resistant strains of native plants in fire prone area? Is this possible? Are there any candidates for this? Are there fire resistant native grasses that could be planted along the roadways that might slow the spread of human caused fire?
3		Developing propagation methods in general is a vital part of conservation. Being able to know when it is optimal to hand pollinate species is a critical part of this work. For example, Patty Moriyasu was able to pinpoint the exact moment a Clermontia peleana subsp. peleana pistil was receptive to pollen, which resulted in improved seed set, many times more productive than hand pollinations in the past, which ultimately vastly improved the prognosis of the sp. This is applicable for virtually any of the 600+ rare plant taxa. By virtue of rarity, PEP species would benefit the greatest by this research.

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3	Propagation: Controlled Breeding	Please place this topic as the highest priority. This topic should lump all the different kinds of propagation together since different species require different methods. As a rare plant nursery we are doing the initial research on germination, vegetative propagation, best practices for cultivation, fertilization and pest control, as well as figuring out the phenology for doing hand pollinations. Our goal ultimately, is to produce plants for restoration out plantings. Stabilizing these species should be of the highest priority as extinction is final and precludes any other research that could be done in the future. Naturally, I think that priority should go to nurseries as we are a gene bank for rare plants. Since we produce thousands of plants each year and hold more than 90 species in our nursery we feel that funding should at least cover salaries for our staff of two for maintaining these endangered plants.
5	Propagation: Controlled Breeding	Any rare species that can be grown to maturity in nurseries (small trees, bushes, or herbaceous plants) would benefit from controlled crosses to generate lots of seed. I think priorities for this would be species that are only in cultivation or storage so that the chances of loosing the species is diminished. (NTBG did this with Kadua haupuensis and Steve Weller is doing it with Schiedea attenuata). Other instances where this has been of great benefit are for species in which individuals are so isolated that natural cross pollination rarely occurs. Example species: Euphorbia eleanoriae, Cyanea remyi, Kadua st. johnii, Kadua cookiana, Lysimachia.
5	Propagation: Controlled Breeding	Pteridophytes

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1	Propagation: Tissue Culture	Propagation of rare ferns using tissue culture or any other means. Ruth Aguraiuja has done work with the Diellia group of Asplenium ferns, but several other genera have rare species for which little work has been done. Adenophorus, Ctenitus, Dryopteris and Doryopteris are genera with rare species.
3	Propagation: Tissue Culture	Micropropagation would be a vegetative way to obtain quantities of common Hawaiian ferns with creeping rhizomes, e.g.: Microlepia strigosa, Diplazium sandwichianum, perhaps others
3		Need to learn to propagate all 238 PEPP species in tissue culture
4	Propagation: Tissue Culture	Propagation of species invitro from vegetative samples. Nellie Sugii has lots of experience getting things to grow invitro through embryo rescue, but several species never get to the point of having embyros to rescue. It would be awesome to be able to grow some species from apical meristems or even leaves. Melicope knudsenii, Melicope haupuensis, Melicope degeneri, Psychotria grandiflora, Nothocestrum peltatum, Xylosma crenatum, Astelia waialealae (lots of propagation invitro for this genus in Australia), Myrsine mezii, Stenogyne campanulata, Sicyos lanceoloideus, Lysimachia, Labordia, Fluggea, Euphorbia eleanoriae, Cyanea, viola kauaiensis var wahiawaensis. This would also allow us to capture propagules from male founders in dioecious species that don't respond to cuttings, airlayers, etc. It would also be a way to get some kind of propagule from plants growing in very difficult to access areas when they aren't flowering and you won't have a chance to return or from immature plants that are unlikely to make it to maturity.
5	Propagation: Tissue Culture	And Propagation: Controlled Breeding - Ctenitis squamigera
5		Enhance production capabilities for all threatened species and possible commercial application for mass produced common species necessary for restoration projects.
5		I don't know much about this- but from what I know there has been remarkable progress in propagating some really rare plants using this approach- and the potential seems very exciting.

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1		Kanaloa kahoolawensis, Flueggea neowawraea, Platanthera holochila, Melicope adscendens, Melicope knudsenii, Deparia kaalaana, Diplazium molokaiense
1	Propagation: Vegetative Techniques	Rare ferns/fern allies (Ctenitis, Pteris, Phlegmariurus, etc, etc.). Not having any tools to in propagation severely cripples our ability to do restoration, recovery, prevent extinction of these species.
1		Nothocestrum peltatum, Alectryon macrococcus ssp macrococcus, Xylosma crenatum, Melicope paniculata, Kokia kauaiensis
2	Propagation: Vegetative Techniques	Need to learn how to grow all PEPP species by cloning leaf material
2	Propagation: Vegetative Techniques	Asplenium peruvianum, Erythrina sandwicensis, Colubrina oppositifolia, Chrysodracon hawaiiensis, Delissea undulata, Haplostachys haplostachya, Hibiscus brackenridgei, Hibiscadelphus hualalaiensis, Kokia drynarioides, Melicope hawaiiensis, Meterosideros polymorpha var incana, Mezoneuron kavaiense, Neraudia ovata, Nothocestrum breviflorum, Portulaca sclerocarpa, Reynoldsia sandwicensis, Silene lanceolata, Solanum incompletum, Stenogyne angustifolia, Zanthoxylum dipetalum var. tomentosum, Zanthoxylum hawaiiense.
3	Propagation: Vegetative Techniques	Many plants are either functionally male and there fore do not produce seeds, and/or are difficult to propagate via traditional methods such as cuttings or airlayers. This is also in addition to developing Tissue culture techniques.
3		A number of slow growing tree species, especially those that are dioecious, could drastically benefit from improved vegetative propagation methods and infrastructure. Getting these kinds of species represented in controlled breeding populations is critical for their conservation.: Flueggea neowawraea, Zanthoxylums, Melicopes, Gardenias, Bobeas, others.

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4	Propagation: Vegetative Techniques	There are certain genera/species that have been difficult to cultivate, such as Huperzia spp., Adenophorus spp., Flueggea neowawraea, some Kauai Phyllostegia spp., etc. Without propagative techniques for these rare species that are not doing well in the wild (as they are responding to threats, low genetic diversity/numbers, widely dispersed populations, etc.), it will be difficult to conserve until these ex situ techniques are developed.
4		Vegetative techniques besides micropropagation, including division and harvesting of proliferations/buds/keiki, could be used to multiply Hawaiian fern species.
5	Propagation: Vegetative Techniques	Alectryon macrococcus var. macrococcus Bonamia menziesii (Makaleha) Polyscias bisattenuata