



Advice on Obtaining Seeds of Plants for Conservation

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There is much interest in growing plants for soil improvement and protection. Cover crops help keep soil in place, protecting it from raindrop impact, preventing surface sealing, and helping maintain its structure. Green manure crops incorporated into the soil add nutrients and organic matter, enhancing soil structure and nutrient availability, and supporting beneficial soil organisms. Both types of crops can add nitrogen to the soil if they are nitrogen-fixing plants. In some cases, certain plants grown in crop rotations are helpful in managing soil populations of plant-parasitic nematodes. There is also interest in obtaining plant species for pasture improvement. In recent years, numerous CTAHR publications have described plant species suitable for these purposes (see p. 3). Unfortunately, locating and obtaining seeds or other propagation material for the plants recommended is often challenging and expensive.

For example, the legume sunn hemp (*Crotalaria juncea*) has become widely recognized for its utility as a green manure, and a cultivar, 'Tropic Sun', was selected in Hawai'i about 25 years ago. Despite the enthusiasm that 'Tropic Sun' generated, its seed has not become readily available until recently.

Importation concerns

One concern about importing seeds to Hawai'i from outside the state is the quality of the seed lot and the chance that it is contaminated with weed seeds. Another consideration is complying with our quarantine and seed import regulations established by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, as well as those established by the Hawai'i Seed Law and Rules and regulated by the Hawai'i Department of Agriculture. A third area of concern that has gained more recognition

lately is the potential for contamination of our native ecosystems by alien, invasive plant species (see, for example, the websites of the Hawai'i Ecosystems at Risk project, www.hear.org, and the Pacific Island Ecosystems at Risk Project, www.hear.org/pier). Risk-assessment profiles are being developed for plants to gauge their invasiveness. For example, 'Sunshine' vetiver grass has been assessed as having a low risk of invasiveness (see www.hear.org/pier/species/chrysopogon_zizanioides.htm and www.botany.hawaii.edu/faculty/daehler/wra).

The plants listed on page 3 of this publication may not yet have been assessed. They have been included here because of their desirability for agricultural uses, which may be at odds with concerns for Hawai'i's environment. If you share these concerns, consult one of the risk-assessment websites mentioned above to see if the plant of interest is listed. If it is not, the Hawai'i Invasive Species Council will schedule species for assessment upon request (contact hpwra@yahoo.com).

Looking for seed sources

When purchasing seeds, we advise that you consult Hawai'i seed suppliers first. If they cannot meet your needs, it is usually easier to purchase from U.S. mainland companies than from those in foreign countries, even if the seeds were sourced from a foreign country. Seeds from the U.S. mainland are considered interstate commerce and are not subject to the strict inspections and quarantine regulations that apply to seeds coming directly from foreign countries. The U.S. companies have already dealt with the import quarantine protocols for you. Seed shipments from foreign countries must be accompanied by a phytosanitary certificate and may be refused entry into the U.S. mainland and Hawai'i because of contamination by seeds of prohibited species, weed

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seeds, soil, or for other reasons.

The Internet is a useful tool for locating seed companies and learning about which plants they offer. In addition, extension agents at county offices of the UH-CTAHR Cooperative Extension Service may be able to provide advice, as can staff of the USDA Natural Resources Conservation Service's Hawai'i offices.

The following seed and information sources are known to the authors at the present time. Inclusion in this listing does not constitute an endorsement or recommendation of a particular company in preference to others that may exist and be able to provide similar materials. Seed providers who wish to be included in this listing should send details on the plants available and contact information by e-mail to Robert.J.Joy@hi.usda.gov.

Commercial seed sources in Hawai'i

Crotalaria Seed Specialists, LLC, and Hana Hou Seed Harvest, LLC, 95-1048 Kelakela St, Mililani, HI 96789, phone 808-341-0230, fax 808-487-1391, e-mail mchughj001@hawaii.rr.com (growers and suppliers of 'Tropic Sun' sunn hemp seeds).

Fukuda Seed Store, Inc., 1287 Kalani St, Ste 106, Honolulu, HI 96817, phone 808-841-6719, e-mail jokane-shiro@yahoo.com (suppliers of sunn hemp and other green manure and cover crop species).

Koolau Seed and Supply, Inc., 48-373G Kamehameha Hwy, Kāne'ohe, HI 96744, phone 808-239-1280, fax 808-239-2151, e-mail owens001@hawaii.rr.com (suppliers of sunn hemp and other green manure crop, cover crop, forage crop, and turfgrass seeds).

Commercial sources of 'Sunshine' vetiver grass plants in Hawai'i

Alberta de Jetley, Bennie's Farm, P.O. Box 630601, Lāna'i, HI 96763, phone 808-649-0808, e-mail sopdej@yahoo.com (limited supply).

Brian Cordero, Laulani Farms, phone 808-255-1048, e-mail corderobrian@hotmail.com.

Future Forests Nursery, P.O. Box 847, Kailua Kona, HI 96745, phone 808-325-2377, e-mail trees@forestnursery.com, website www.forestnursery.com.

Jason Fox, Vetiver Farms, P.O. Box 501, Pāpa'ikou, HI 96781, phone 808-756-8725, e-mail BigIslandSoil@gmail.com.

Lance Santo, Hawaii Agriculture Research Center, P.O. Box 100, Kunia, HI 96759-0100, cell phone 808-228-0162, office phone 808-677-5541, e-mail Lsanto@harc-hspa.com.

Paul Uyehara, Kahuku Agricultural Park, cell phone 808-342-6359, office phone 808-239-8975, e-mail uye-harapaul@yahoo.com.

Vetiver Systems Hawaii LLC, phone 808-536-5444, website www.vetiversystems.com.

Wayne Ogasawara, Mililani Agricultural Park, phone 808-256-9317, e-mail Wogasawara@aol.com.

Yellow Seed Bamboo Nursery, Jericho Stringer, # 70 West Kuiaha & the Hana Hwy., mail 1135 Makawao Ave, PMB 187, Makawao, HI 96768, phone 808-870-0591, e-mail yellowseedbamboo@yahoo.com, website www.yellowseedbamboo.com.

[For information on vetiver grass, see www.pia.nrcs.usda.gov/technical/pmc.html.]

Commercial seed sources on the U.S. mainland

Peaceful Valley Farm Supply, Inc., P.O. Box 2209, 125 Clydesdale Court, Grass Valley, CA 95945, phone 530-272-4769, 888-784-1722, website www.groworganic.com/default.html (suppliers of sunn hemp and other green manure crop, cover crop, and forage crop seeds).

Pogue Agri Partners, P.O. Drawer 389, Kenedy, TX 78119, phone 830-583-3456, fax 830-583-9843, e-mail pogue@pogueagri.com, website www.pogueagri.com (growers and suppliers primarily of forage crops with some green manure and cover crop seeds).

SeedQuest.com, websites www.seedquest.com/seed/forageandturf.htm, <http://seedquest.com/seed/fieldcrops.htm>, www.seedquest.com/seed/tropicalseed.htm (look up the crop, then find suppliers of that seed).

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Mention of a company name does not constitute an endorsement by the UH-CTAHR Cooperative Extension Service, the United States Department of Agriculture, or their employees and does not imply recommendation to the exclusion of other suitable companies.

CTAHR information on green manure, cover, and improved forage crops

UH-CTAHR has been publishing information on plants useful as green manures, cover crops, and improved forages for over a century. The species listed below are those featured in recent CTAHR publications and pages available on our website (find publications at www.ctahr.hawaii.edu/freepubs). Older CTAHR and Hawai'i Agricultural Experiment Station publications on such plants can be found through the Hawai'i State Library System and the UH libraries. At the CTAHR publications website, current downloadable documents can be searched for by keyword or category, and there are links to databases of the college's publications since its inception, as well as faculty journal articles and student theses and dissertations. The UH libraries catalog searcher, Voyager, is at <http://uhmanoa.lib.hawaii.edu>. Finally, some out-of-print CTAHR publications have been scanned for inclusion in UH Mānoa's ScholarSpace; see <http://scholarspace.manoa.hawaii.edu/handle/10125/1877>; they are also available through the CTAHR publications page search utility. Further information on the species listed below can be found on the CTAHR Sustainable and Organic Agriculture Program web page at www.ctahr.hawaii.edu/sustainag/cc-gm/index.html.

Cover crops

Non-legumes

bahiagrass
bermudagrass
carpetgrass
broadleaf*
narrowleaf
pangolagrass (digitgrass)*
Rhodesgrass
St. Augustinegrass*
stargrass*
'Tropic Lalo' paspalum*

Legumes

perennial peanut
stylo
white clover

Green manure crops

Non-legumes

annual ryegrass
azolla* (for flooded taro)
barley
buckwheat
oats
common
black
rye
sorghum-sudangrass hybrids

Legumes

cowpea
lablab
pigeonpea
'Tropic Sun' sunn hemp
white sweetclover
woollypod vetch

Improved forages

Non-legumes

kikuyugrass
pangolagrass*
signalgrass
stargrass*

*Denotes species that are only propagated vegetatively, not by seed. Some species used as turf, such as St. Augustinegrass, may be available from nurseries and turf suppliers. Ranchers often share propagation materials for improved pasture species among themselves. UH-CTAHR's Mealani Research Station in Waimea has demonstration plantings of forage species (see www.ctahr.hawaii.edu/forages) from which small amounts of propagules can be obtained for increase-plantings. NRCS field agents may be able to provide small amounts of propagules from their Plant Materials Center.

Star Seed, Inc., P.O. Box 228, 101 Industrial Ave., Osborne, KS 67473, phone 800-782-7311, fax 785-346-2479, e-mail info@gostarseed.com, website www.gostarseed.com/contact-us (suppliers of sunn hemp and other green manure crop, cover crop, and forage crop seeds).

Wolf & Wolf Seeds, 2747 Dorell Ave., Orlando, FL 32814, phone 407-481-0810, fax 407-481-0840, e-mail info@wolfseeds.com, website www.wolfseeds.com (growers and suppliers of sunn hemp and other green manure crop, cover crop, and forage crop seeds).