

How to Grow a Complete Diet with Permaculture Principles: Tropical Subsistence Gardening. 24 part class series

Part 14 of 24 14. Protein Crops: Perennial Greens & Legumes

Acknowledgements: A special thanks to Hawaiian Sanctuary, County of Hawaii Research and Development and all others involved to make these classes a reality! We are still looking for support to complete and enhance this amazing FREE program. <http://hawaiiansanctuary.com/donate>

Introduction: Staple crops make up the base of our diet, supplying a large percentage of our energy and nutrient needs. High protein crops for the tropics include the leaf crops: moringa, chaya and katuk, legumes: perennial lima bean, long bean and pigeon pea, pumpkin seeds and more!

Moringa, Perennial Leaf Crop:

Anatomy: Large open tree casting light shade, can reach 40 ft if not pruned

Niche in a Food Forest: Full sun, overstory tree, can support some less vigorous climbing vines.

Varieties: oleifera (most common in Hawaii), stenopetala (rare here)

Propagation: From seed, or woody cuttings. Ideally under 2000m elevation.

Cultivation: tolerates poor soil and drought, does not like waterlogged soil.

Diseases / Pest Control: None.

Harvest: as soon as plants are large enough to harvest leaves, 3mo.

Usage, Storage & Preservation:: raw, cooked or dried and ground into a powder. 9.4g protein per 100g powder

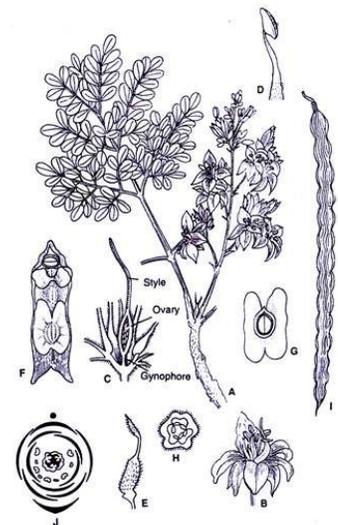


Fig. 51.1. *Moringa oleifera* Lam. A. Flowering twig with large tripinnate compound leaf and panicle inflorescence. B. Single zygomorphic flower. C. Flower in vertical section; showing gynophore; ovary; style. D. Single stamen. E. Gynoecium. F. Part of the fruit open to show winged seed. G. L.s. of the winged seed. H. T.s. ovary. I. Floral. J. Fruit.

Chaya, Perennial Leaf Crop:

Anatomy: dense bush to 15ft. Can start easily from cuttings be careful.

Niche in a Food Forest: dense shrub, brittle branches not ideal as trellis, full sun to partial shade.

Varieties: Spiny with deeply cut leaves may have small irritating spines will grow taller, and non spiny with maple like leaves.

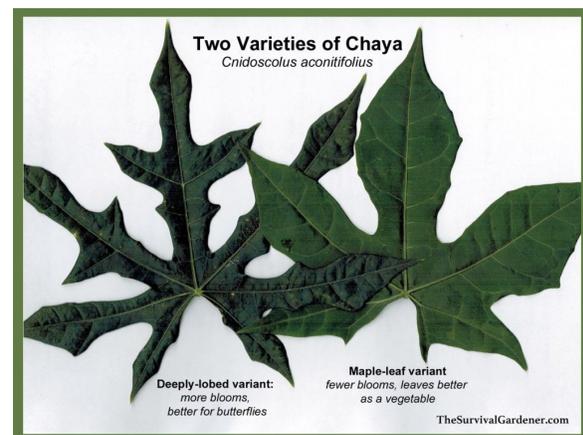
Propagation: cuttings with tips left intact, hollow stem rots easily otherwise.

Cultivation: Likes good drainage. Drought resistant. Best below 2000ft. Can grow to 5000 ft.

Diseases / Pest Control: none.

Harvest: Pick leaves as soon as plants are large enough. younger leaves are more tender. White latex sap may irritate skin, gloves help.

Usage, Storage & Preservation: : Must Cook 5-15min to deactivate toxic HCN, often boiled. HCN dissipates and cooking water is safe, can be added to soups 5.7g protein per 100g



Katuk, Perennial Leaf Crop:

Anatomy: Tall, spindly bush up to 8ft -12 ft tall and 2-3 ft wide, prune to keep harvestable.

Niche in a Food Forest: understory, can take deep shade to full sun.

Propagation: From woody cuttings or seed, may self seed.

Planting: 1-2 feet apart for a hedge or often planted in clusters.

Cultivation: Benefits from mulch and water, widely adapted. To XXXX feet elevation.

Diseases / Pest Control: none

Harvest: younger leaves are more tender but older leaves may have higher nutrition

Usage, Storage & Preservation: Fresh leaves raw or cooked, may be toxic if large amounts are juiced and drank. High protein 6.4g per 100g fresh leaves.



Pigeon Pea, legume shrub:

Niche in a Food Forest: pioneer and or coppice nitrogen fixing shrub, 6 ft wide by 8 ft tall.

Varieties: Many varieties exist, some are annual some perennial, several different colored seeds. Perennial types can live 3-5 years. Yellow and red flowered varieties exist here.

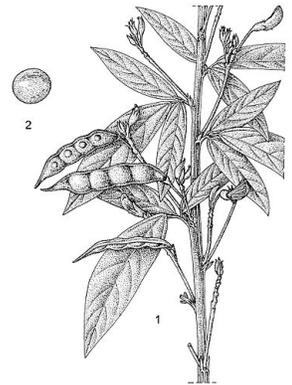
Propagation: From seed. Nutrition 22g protein per 100g

Cultivation: can be cut back and used for mulch around other trees, drought tolerant.

Diseases / Pest Control: few pests, pods left too long may rot or get bugs.

Harvest: seeds when full in pod can be eaten like edamame, or wait till pods are tan and dry.

Usage, Storage & Preservation: mature seeds used as a dry bean, freeze to kill weevils.



Long Bean, climbing legume:

Niche in a Food Forest: climbing nitrogen fixing vine, needs trellis or support and full sun.

Varieties: Many varieties exist, some are annual some perennial, usually reddish seeds. Otan is a locally grown variety that is very productive and can produce for a year or more.

Propagation: From seed. 2.5g protein per 100g green,

Cultivation: likes rich soil and mulch to keep down weeds, does not need much nitrogen.

Diseases / Pest Control: if left too long on plant may rot or mold and weevils may eat..

Harvest: entire pods can be eaten when young, raw or cooked, or wait till pods dry.

Usage, Storage & Preservation: mature seeds used as a dry bean, freeze to kill weevils.



Perennial Lima Bean, climbing legume:

Niche in a Food Forest: climbing nitrogen fixing vine, needs trellis or support and full sun.

Varieties: Many varieties exist, some are annual some perennial, several different colored seeds. The perennial "christmas lima" white with red speckle can live up to 6 years.

Propagation: From seed. 8g protein per 100g

Diseases / Pest Control: same as other beans above..

Harvest: seeds when full in pod can be shelled and eaten,(pods inedible) or wait till pods dry.

Usage, Storage & Preservation: mature seeds used as a dry bean, freeze to kill weevils



Further Reading: Specialty crops for pacific islands at agroforestry.org

Next Class: May 4th part 15 of 24. **Oil Crops: Avocado, Mac Nut & Pili Nut:**

Avocados are an easy way to get most of the fat we need in our diets in a delicious buttery fruit that thrives here! Mac nut and pili nut are also good sources of fat and protein.

Become a member of the new Puna Chapter: Hawaii Farmers Union United www.hfuuhi.org

Contact: Malama Aina Permaculture: Edible Landscape Design, Education & Nursery

Providing consultation, design, install, maintenance & edible plants

Past class handouts available at Hawaii-Permaculture-Institute.weebly.com

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