

ECHO Asia Seed Fact Sheet

Scientific name – *Moringa oleifera*

English common name – Moringa, Horseradish Tree

Asian common names –

- Burmese: daintha, dandalonbin, dan da lun, dan da lun bin
- Chinese: 辣木 la mu
- Hindi: मुन्गा munagaa, munga ara, munuga, muranka, muruggai
- Japanese: マルンガイ marungai, モリンガ・オレイフェラ marunga oreifera, ワサビノキ wasabi no ki, 山葵の木 wasabi no ki
- Khmer: daem mrom, daem mrum
- Lao: b'loum
- Malay: kacang kelur, kelor (Bali, Java), kalor (Indonesia), lemunggai, meringgai, remunggai, sajor kelor, semunggai, smunggai, semunggai, tjelor (Bali)
- Tagalog: kalungai, kamalungua, malongai, malungai, malunggay talbos, mulangai, mulangay, mulanggay
- Thai: มะรุม ma rum
- Vietnamese: chùm ngây



Varieties –

- **PKM-1:** Developed in India, these trees tend to be bushier and yield more pods than non-improved moringa. Six months from planting to pod production.
- **Regional Mix:** Mixture of various types native to Southeast Asia. Most parts of the plant are edible. Leaves high in protein, calcium, vitamins A, B, and C.

General description and special characteristics – The moringa tree is a drought resistant, fast growing, deciduous tree or shrub with an average height of 12 meters (39.4 ft) at maturity. It is also known as the horseradish tree and is native to northwestern India. Moringa is widely grown, however, in other parts of the old- and new-world tropics, including tropical Asia, many regions of Africa, and South and Central America.

Crop uses (culinary) – Leaves, flowers, and pods are a food source for humans and animals. The flowers are a good nectar source for honey, and the seeds are a rich oil source for cooking and lubricant uses. The roots are a source of a spice resembling horseradish, and many parts of the plant have been used in medicinal preparations.

Moringa foliage and fruit pods are rich sources of calcium and iron, and good sources of vitamins B, A, and C (when raw) and of protein (including significant amounts of the sulfur-containing amino acids, methionine and cystine). Young tender shoots, whole young leaves, and leaflets of older leaves can be prepared and eaten as greens. Blossoms are edible; they taste like radish. Sun and oven-dried flowers and leaves can be prepared as tea and used as soup supplements. Cooked young pods are reminiscent of asparagus. Mature pods browned in a skillet, mashed, and placed in boiling water results in excellent cooking or lubricating oil (very similar to olive oil) that floats to the surface. The oil preserves well, although it does become rancid with age. To prepare a horseradish sauce, pull small trees after a few months of growth, scrape the taproot of its bark and grind the root until fine. Mix 240 mL (1 cup) of ground root with 120 mL (1/2 cup) vinegar and 1 mL (1/4 tsp) of salt before chilling. Use sparingly; excessive use has been reported as potentially harmful. The ECHO technical note, *Moringa Recipes*, can be downloaded from ECHOcommunity.org.

Crops uses (agricultural) – Whole plants have been used as living hedges, fences, and windbreaks. The wood is very soft; it is useful for paper but makes low-grade firewood and poor charcoal. A handbook from the Philippines claims moringa leaves worked into a seedbed one week prior to seeding inhibits damping-off fungi.

Crop uses (livestock) – Fresh leaves are a nutritious animal fodder or can be processed as a supplemental forage. Research by Sanchez in Nicaragua determined that *Moringa oleifera* fed at 2 kg or 3 kg of dry matter per day can significantly improve dry matter intake (DMI), nutrient digestibility, and milk yields of dairy cattle fed a basal diet of *Brachiaria brizanta* hay in the dry tropics without affecting milk composition (fat, crude protein, and total solids) or organoleptic characteristics of milk such as odor, smell, taste, and color (Sanchez 2006).

Crop uses (medicinal) – Pterygospermin and/or related compounds (isothiocyanates), found in various parts of the moringa plant, have been shown to have antibiotic and fungicidal properties. Although other moringa plant parts are reported to be effective against infections, much of the formal research to date has focused on extracts from the seed. A study at the University of San Carlos in Guatemala was summarized in *EDN 37* (Amaranth to Zai Holes).

Other uses - Attracting attention in recent decades is the use of the dried, crushed moringa seeds as a natural coagulant to purify water. Even very muddy water can be cleared when crushed seeds are added, causing solid matter and some bacteria to coagulate and sink to the bottom of a container. The cleaned water can then be poured off and boiled. Use 100 milligrams of crushed seed (about 1 to 1.5 seeds) to clean 1 liter (1.06 quarts) of muddy water. Research is being done to determine the best stage of seed development for use in water treatment.

Seasons of production – In northern Thailand, moringa grows best when planted at the beginning of the rainy season providing there is good soil drainage. Dry season establishment is also possible with adequate irrigation.

Length of production and harvest period – Seedlings grow rapidly, possibly reaching 3-5 m (9-15 ft) in one growing season. In India, cuttings rooted in June (early rainy season) may produce a tree with fruits by the following April. Cutting off the tops of the trees to a height of 1-1.5 m (3-4.5 ft) encourages branching at lower stem positions, producing a living hedge if seedlings are thickly planted.

Production methods – Moringa is grown from seeds or from cuttings. Plant seeds 2 cm (1 in) deep and keep the soil moist (but not waterlogged to avoid root rot) after planting. Germination generally occurs within 1-2 weeks, but perhaps more quickly in optimal conditions. Plantings can be established by direct seeding but may perform best if seedlings are transplanted from a nursery. Stem cuttings 4-5 cm (1.2-2 in) in diameter that are approximately 1 m (3.28 ft) or more in length, can be rooted in moist soil; either in nursery containers or directly in the field. Moringa prefers full sun on well-drained soils. Moringa will not tolerate excessive soil moisture or standing water.

Plant spacing – For production of leaves only, space plants 50 cm (19.6 in) within rows spaced 1 m apart. For intensive production of leaves, space plants 10–20 cm (3.94-7.87 in) within rows 30–50 cm (12-19.6 in) apart. Moringa may also be planted 1 m apart or closer in a row to establish living fence posts. Or trees may be more widely spaced in gardens to provide shade to vegetables less tolerant of direct sunlight (Palada and Chang 2003).

Pollination info – Moringa cross-pollinates readily.

Environmental conditions for production – Moringa grows best between 25 to 35°C (77-95°F), but will tolerate up to 48°C (118°F) in the shade and can survive a light frost. The drought-tolerant tree grows well in areas receiving annual rainfall amounts that range from 250 to 1500 mm (9.84-59.1 in). Altitudes below 600 m (1,969 ft) are best for moringa, but the tree can grow in altitudes up to 1200 m (3,937 ft) in the tropics (Palada and Chang 2003).

Soil requirements – Moringa prefers a well-drained sandy loam or loam soil, but tolerates clay. It will not survive under prolonged flooding and poor drainage. Moringa tolerates a soil pH of 5.0–9.0 (Palada and Chang 2003).

Pests and diseases – Moringa is resistant to most pests and diseases. However, *Diplodia* root rot can occur in waterlogged soils, causing severe wilting and death of plants. Mites can be a problem in dry and cool conditions, causing yellowing of leaves, although plants usually recover during warm weather. Other insect pests include termites, aphids, leaf miners,

whiteflies, and caterpillars (Palada and Chang 2003).

Seed saving – Seeds should be harvested from well-developed pods once they have dried and turned brown and before they split open and fall to the ground. Seed viability may be maintained for several years in hermetic storage at 3°C (37°F) with 5-8% moisture content. Otherwise, Palada and Chang (2003) recommend storing seeds in well-ventilated sacks in a cool, dry, and shaded area. Seeds can remain viable for planting for two years. Steps may also be necessary to control storage pests that can damage the seeds. ECHO Asia has found that moringa seeds stored under vacuum sealing in cool conditions is a good practice for maintaining seed viability.

References –

ECHO. 1996. *Moringa Recipes*. ECHO Technical Notes. ECHO, North Ft. Myers, Florida. Available: http://www.echocommunity.org/resource/collection/E66CDFDB-0A0D-4DDE-8AB1-74D9D8C3EDD4/Moringa_Recipes.pdf.

FAO. 2007. *Moringa oleifera*. *Ecocrop*. 17 Aug 2012. Available: http://www.fs.fed.us/global/iitf/pubs/sm_iitf061%20%20%286%29.pdf

ICRAF. 2012. *Moringa oleifera*. *World Agroforestry Centre. Species Info*. 8 Aug 2012. Available: <http://www.worldagroforestry.org/sea/products/afdbases/af/asp/SpeciesInfo.asp?SpID=1169>

Meitzner, L.S. & M.L. Price. 1996. *Amaranth to Zai Holes: Ideas for Growing Food Under Difficult Conditions*. North Fort Myers, Florida: ECHO, Inc.

Palada, M.C. and L.C. Chang. 2003. *Suggested Cultural Practices for Moringa*. International Cooperators' Guide, AVRDC pub # 03-545. Shanhua, Taiwan: Asian Vegetable Research and Development Center.

Sanchez, N.D. 2006. *Moringa oleifera and Cratylia argentea: Potential Fodder Species for Ruminants in Nicaragua*. Doctoral thesis. Uppsala, Sweden: Swedish University of Agricultural Sciences.