



# ECHO

# Asia Seed Bank

**ECHO Asia Impact Center**

# 2014

# Seed Catalog

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## Amaranth (grain)/ผักขมเมล็ด *Amaranthus cruentus*



**Grain PI 538255**

Yellow inflorescence, white stem



**Grain PI 538320**

White stem, red inflorescence



**Grain PI 606767**

Light brown inflorescence

### **Description:**

The young leaves and stems of amaranth can be cooked and eaten like spinach, but the plant is mainly grown for its high protein grain (~12-16%). If roasted in a hot pan, amaranth seeds pop like popcorn, making nutrients more accessible. Leaves can be prepared according to local cooking customs for other leaves. Leaves and stalks can also be used as livestock feed.

Grain amaranth varieties flower and seed in response to shortening days. Grows best in warm temperatures with sufficient soil moisture. Amaranth tolerates poor soil fertility and drought; responds well to fertilization. Soil pH above 6.0 is recommended.

## Amaranth (vegetable)/ผักขมผัก *Amaranthus tricolor*



**Greenleaf**

Light green leaf



**Tigerleaf**

Produces leaves with green and red stripes

### **Description:**

Mostly short-day crops, amaranths are fast growing, short-lived annuals grown for their protein-rich leaves and plant tops. Amaranths are also high in calcium and iron. Leaves can be eaten raw but usually cooked (boiled, stir fried, etc.). Leaf tips and young shoots are both consumed. The leaves are also often used as feed for pigs and possibly other livestock.

Amaranth grows well in both hot humid and hot dry climates. Can grow in a wide range of soil types and soil moisture levels. Amaranth can tolerate a range of soil pH between 4.5 and 8.0.

## Bitter Gourd/มะเขือขม *Momordica charantia*



### Khmer

Fruits are pear-shaped or oblong, grow 10-15cm (4-6 in.) in length, and turn from green to yellow-orange when ripe.



### Description:

A slender annual climbing to 3.05-3.66 m (10-12 ft.) tall with edible fruits and young vines that may be prepared in a variety of ways. The fruits are pear-shaped or oblong, growing to 10-15cm (4-6 in.) long. Flowering is day neutral. Bitter melon prefers a well-drained, sandy loam soil but will grow in areas with poorer soils. Prefers daytime temperatures between 24-27°C (75-81°F) as well as regular rainfall or irrigation.

The immature gourds and tender vine tips are consumed as cooked vegetables. The fruits are high in folic acid and vitamin C and the leaves are rich in vitamin A and calcium. They are very versatile in cooking as they can be boiled, fried, curried, pickled or baked. Bitterness is reduced by soaking the peeled fruit in salt water before cooking. Tender shoots and leaves are also used as greens.

## Calabash Gourd/น้ำเต้า *Lagenaria siceraria*



### Burmese

Produces very large oblong fruit up to 50 cm (20 in.) in length.



### ECHO Bottle Gourd

Produces light green multi-globed fruit up to 15 cm (6 in.) in length. Mature fruits can be made into bottles or birdhouses when dry.



### Om Koi Long

Produces edible fruit up to 60 cm (24 in.) in length.

### Description:

Bottle gourd fruit is eaten when very young throughout Asia, in the same way as pumpkin, often used in curries. The young shoots and leaves are also eaten as vegetables. The seeds, containing 45 percent oil, can be pressed for cooking oil. The dried gourd is also known to have many other practical uses including cups, utensils, pipes, musical instruments and as a floatation aids for fishing nets

Can be planted year-round and is very prolific in subtropics; tolerates heat and humidity better than most cucurbits. Grows best in well-drained, loose soil (pH: 4.5-7.5) with a good layer of compost. Grow on trellis.



## Chaya/ชายา *Cnidoscolus aconitifolius*



### ECHO

ECHO's variety has leaves without irritating hairs. Chaya is a fast-growing perennial shrub that produces large, dark green leaves. The leaves and thick succulent stems of chaya are a good source of protein, calcium, phosphorous, iron, vitamins A and C as well as niacin, riboflavin and thiamine.

### Description:

Chaya is generally cooked and eaten as a potherb. Raw chaya leaves are toxic as they contain a cyanide-producing glucoside. However, cooking inactivates the toxic compounds. The entire plant may also be ground, dried and used as animal feed.

Tolerant of both drought and hot, humid weather, and moderately frost-tolerant. Chaya does not tolerate water-logged soils and has been killed by standing water of a few days duration. Tends to be highly disease and pest-resistant. Chaya tolerates a wide variety of soil conditions but does not perform well in highly acidic soils.

## Chia/ไฉ่ *Salvia hispanica*



### Chiang Mai

Multicolored seeds, from white to brown to grey, come from plants naturalized in Northern Thailand.

### Description

Chia is an annual herbaceous plant in the mint family growing to about 1.5 meter (approx. 5 feet) in height. It originates from Central America, where it has been grown primarily for its tiny but highly nutritious seeds, for thousands of years. Chia is best planted towards the end of the rainy season, with the harvest of mature seeds taking place approximately four months later. Too much moisture during seed-setting and maturity can lead to harmful mold and bacteria growth on the seeds.

Chia seeds yield 25-30% extractable oil which is rich in essential fatty acids. It is one of the highest known sources of Omega-3 fatty acids. Seeds can be added to any meal or drink and can be digested without breaking the seed coat. The widely acclaimed health benefits of Chia can be attributed to its overall high nutrient content: high in soluble fiber, 20-23% protein, rich in antioxidants and minerals. Seeds soaked in water will dissolve to create a gel that can be used in other cooking and mixed in juices. Leaves can be steeped to make tea used for a myriad of health problems.

## Chickpea, Garbanzo Bean/ถั่วหัวช้าง *Cicer arietinum*

### Burma Red

Produces small, rough-coated, red-brown seed (Desi type); approximately 3.5 months to first seed harvest.



### Burma Round

Produces large, round, smooth light brown seed (Kabuli type); approximately 4.5 months to first harvest.

### Description:

One of the oldest cultivated legumes on record, chickpea is the second most important pulse crop in the world. The immature green pods and tender shoots are used as vegetables and mature seeds are prepared as dahl or flour. Chickpea is a key ingredient in such well-known Asian and Middle-Eastern foods as humus, falafel, and Burmese tofu. Can be fermented into tempeh. Dried seeds can be ground and used as a coffee substitute. A strong acid dew forms on the plant overnight that is gathered and made into vinegar or cooling drinks. Dried seeds are about 60% carbohydrates and 23% protein.

Small bushy plants 20–50 cm (8–20 in.) in height, chickpeas are grown in tropical, subtropical, and temperate climates, but produce better in tropical or subtropical climates with 400 mm (16 in.) or more of rain annually. Too much water will cause plant roots and stems to rot. Will need irrigation when dry. Varieties vary in production time from 45-75 days from seed to flower.

## Chili Pepper/พริก *Capsicum frutescens*



### Hawaiian

Milder peppers, 4-6 cm (1.6-2.4 in) in length



### Karen

Hot red peppers, 2-4 cm (0.8-1.6 in.) in length



### Tiny Hot

Very hot, very small peppers, 2-3 (0.8-1.2 in.) cm in length

### Description:

Chili peppers are eaten raw or cooked and can be dried and ground into a powder for use as flavoring. Leaves are sometimes cooked as a potherb.

Pepper plants are usually grown as annuals in temperate climates but can be perennial if there is no frost. Height varies with variety, but 1 m (3.3 ft.) is typical.

Chili peppers require full sunlight and a long hot season for growth. In humid areas, it is best to grow peppers during the dry season and water as needed. Grows best in a loam or silt loam soil with good water-holding capacity, but can grow in many soil types, as long as the soil is well-drained. Tolerates a pH of 4.3 to 8.3.

## Corn, Flint Corn/ข้าวโพดพันธุ์พื้นเมืองเมล็ดสีล้วน *Zea mays*



### Naga Multi-Colored

Field corn from Northeast India. Produces mid-sized ears with multi-colored kernels. Grows vigorously under suitable conditions.

#### Description:

Having a hard “flinty” seed coat, flint corn is often multi-colored, hardy and grown for both human and livestock consumption. A rich carbohydrate food source, the immature kernels are consumed raw, cooked, or roasted. Maize grains are pounded or ground as meal or flour to be used in baking or as cooked cereal. Maize kernels are often soaked prior to grinding and after fermentation are used to prepare dishes such as kenkey or pozol. Corn starch is used as a thickening agent. Young tassels may be boiled and eaten and the pollen used as a soup ingredient.

Maize is an important feed source for poultry, swine and cattle. The whole plant is used as green fodder or as silage for cattle with kernels processed into various types of feed. Ground cobs may be used as litter material for animal bedding.

This is a warm climate crop, thriving in open, sunny environments having daytime temperatures of 20-24°C (68-86°F). Rainfall during the growth period should be 500 mm (20 in.) or more.

Plant during the rainy season or dry season with irrigation. Prefers full sun and well-drained soil and grows best with a pH of 6.0-7.0.

## Corn, Popcorn/ข้าวโพดคั่ว *Zea mays*



### Naga Popcorn

Popcorn from Northeast India; small ears with hard, round, yellow kernels. Can also be fed to animals. Hardy crop.

#### Description:

Maize is a rich carbohydrate food source. The immature kernels are consumed raw, cooked, or roasted. Maize grains are pounded or ground as meal or flour to be used in baking or as cooked cereal. Maize kernels often are soaked prior to grinding, and after fermentation are used to prepare dishes such as kenkey or pozol. Corn starch is used as a thickening agent. Young tassels may be boiled and eaten and the pollen used as a soup ingredient.

Plant during the rainy season or in dry season with irrigation. Grows best with a pH of 6.0-7.0.



## Corn, Sweet corn/ข้าวโพดหวานสีเหลือง *Zea mays var. saccharata*



### Hawaiian Supersweet #9 – Yellow

Yellow, sweet, and crispy; large ears; an improved open-pollinated variety.

#### Description:

Sweeter than other types as the endosperm (before becoming ripe and dry), contains sugar as well as starch. Grows well in tropical conditions and grows best during the rainy season and may be grown during the dry season if irrigated. Prefers full sun and well-drained soil. Grows best with a pH of 6.0-7.0. Matures 68-75 days.

## Cosmos/ดอกปอกระเจา *Cosmos sulphureus*



### Thung Khang Tong

Local Thai annual semi-hardy herb up to 1-2 m tall with bright orange or yellow flowers.

#### Description

Cosmos are effective nectaries for butterflies and can be planted to attract pollinators and other beneficial insects such as syrphid flies, lacewings and parasitic wasps. Cosmos are also said to repel the corn earworm. As a companion plant, scatter seeds at plot edges, or plant at intervals within garden.

It is a warm-weather annual that tends to reseed itself. Highly adaptable to a wide variety of conditions. Plant in well-drained soil. Tolerant of low fertility. Will become leggy if soil is too rich. Prefers neutral to alkaline pH.

## Cowpea/Black-Eyed Pea/ถั่วดำ *Vigna unguiculata*



**Lahu/Mae Ai**

Bush variety. Shows good resistance to disease. Grayish seed.



**Samoeng**

Short creeping vine; intercropped with upland rice; tasty plump pod. Black seed.



**Chiang Dao**

Vining cowpea; good green manure/cover crop. Vines less than 1 m long; pods approximately 20 cm (8 in.) long. Four months to maturity.



**India Black Eyed Pea**

Trellising vine. Prolific seed-bearing variety. Beans are white with black spot around hilum.

### **Description:**

Cowpea can be eaten as a leafy vegetable and its seeds eaten green or dried. Young pods can also be eaten like green beans. In southern India, the beans are called *thatta kaai* and are an integral part of the regional cuisine. In Tamilnadu, cooked and mashed cowpeas are combined with jiggery, ghee and other ingredients to make cake-like sweets. Often used as a green manure cover crop; relay cropped.

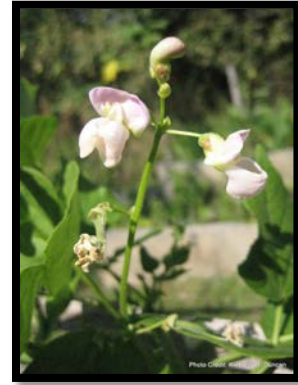
In northern Thailand, cowpea is intercropped with upland rice and can be grown on very poor acid soils as a soil-improver. Cowpeas tolerate high heat, dry conditions and can be grown with less rainfall and under more adverse conditions than *Phaseolus vulgaris* and *Phaseolus lunatus*. Cowpea yields harvest of mature green peas in 60-90 days. Harvesting of leaves can begin about 30 days after planting. Fixes approximately 80 kg N/ha. Drought tolerant if root system established. Thrives where soil is well drained, properly inoculated and moderately rich with lime.

## Cranberry bean/ถั่วแครนเบอร์รี่ *Phaseolus vulgaris*



### Mae Ai

Pole variety, the pod is a distinctive speckled-pink color. Shows good resistance to disease. Considered to have a creamy / nutty flavor.



### Description:

The cranberry bean can be eaten by humans as either a fresh, green vegetable or a dried cooked pulse. It is low in fat, high in calcium, phosphorus and iron, and is 22% protein.

Will succeed at high altitudes with a cool growing season. Prefers a well-drained, loose soil in full sun with a pH of 5.5 to 7.0. Thrives in the tropics at elevations between 1,000-3,000 m (3,280-9,842 ft.) when the soil temperature is over 10°C (50°F). At lower elevations, best to plant during the cool-dry season.

Mature seeds ready to be picked 60-65 days from planting.

## Cucumber/แตงกวากัมพูชา *Cucumis sativus*



### Khmer

From Cambodia. Approximately 30 days from seed to flowering. Large fruit averaging 30 x 7 cm (12-2.75 in.) in size; eaten raw or in soups. Can also be pickled. Pests include the white moth.

### Description:

Cucumber is eaten raw, pickled or cooked in soups, stews and stir-fried dishes. The young leaves and stems of cucumber may be cooked as a green vegetable. The fruit is also used commercially in lotions to soften facial skin, heal and soothe damaged skin and as a natural sunscreen. Cucumber seeds are sometimes consumed as a diuretic.

Cucumbers perform best in loose, well-drained soils amended with organic matter, pH 4.5-8.7. Hot, dry weather is ideal. Irrigation is encouraged as water stress may cause bitter fruit. Daytime temperatures of no lower than 15° C (60°F), humidity of 80-90%, and rainfall of 100-200 mm (4-8 in.) per month produce the best results. Cucumbers are not suited to high mountain climates or very dry seasons.

## Eggplant/มะเขือ *Solanum melongena*



### Yellow

Very productive in hot, humid weather. Fruit turns yellow when mature. Edible when young and green (firm and less bitter) and when mature and yellow (softer and slightly more bitter).



### Maetha

Fruit is 2-3 cm in diameter, white and crispy. Eaten raw as vegetable, in salads or in spices like nam phrik.



### Naga

Perennial, producing many big fruit all-year round. Plant in cold season. Fruit is edible while young.

### Description:

An annual or semi-perennial shrubby plant. Immature fruits are used as a cooked vegetable. Eggplants may be boiled, fried, stuffed or included in Asian chili sauces. In Southeast Asia, unripe fruits are commonly used in curries.

Productive at ECHO Asia, even with nematodes, but susceptible to various soil pathogens. A semi-perennial, eggplant does best in well-drained soils with temperatures 28-35°C (75-100°F). Can plant all year, but does best during cool dry season. Soil pH: 4.3-8.5.

## Foxtail Millet/ข้าวฟ่างหางกระรอก *Setaria Italica*



### Chiang Dao

This variety is from northern Thailand's Chiang Dao district. Although foxtail millet is known as a short-term crop, this variety is sometimes intercropped with upland rice, requiring approximately 120 days. Plant height reaches about 2 m (6.5 ft.) and yields yellow-brown seeds. Can be planted during the rainy season or during the dry season with irrigation.

### Description:

As with other grains, foxtail millet can be ground for flour or as a beverage base, boiled for porridge or roasted.

An annual grass, millet is known to have been cultivated in China since the sixth millennium BCE. An alternate name for the grain is 'Chinese millet'. In tropical Asia, foxtail millet grows best during the rainy season. A staple in many countries, it is also useful as forage.

Foxtail millet can be grown up to an elevation of 1,800 m (5,900 ft.) and up to latitude 50° N. Prefers sandy loam to clay loam soils. It is a water efficient, (10-12 in./25-30 cm per crop), warm weather crop.



## Green bean/ถั่วแขกต้น *Phaseolus vulgaris*

### Khasi

Quick producing pole variety from NE India that produces pods about 12 cm (5 in.) in length with dark brown seeds.



### Naga

Quick producing pole variety from NE India that produces tender, sweet pods about 12 cm (5 in.) in length. Seeds are brown with a distinctive swirled pattern.

### Description:

In northern Thailand, the immature pods are eaten raw or stir fried with oyster sauce. The beans are used in soups. Can be sautéed lightly in butter, steamed briefly, or cooked in a stir fry. Can be preserved by pressure canning and freezing. Spent vines can be used as mulch or cultivated into soil and vines and foliage may be used as fodder.

Green (or French) beans do well in the tropics when planted at elevations between 1,000 and 3,000 m and when soil temperature is over 10°C (50°F). Grow during the cool dry season at lower elevations. These beans prefer full sun and well-drained, loose friable soils with a pH of 5.5 to 7.0.

## Inca Nut/ถั่วดาวอินคา *Plukenetia volubilis*



### Lao

Fruits are capsules 3 to 5 cm in diameter with 4 to 5 points, are green and ripen blackish brown.

### Description:

Inca nut is a woody vining perennial plant in the Euphorbiaceae family native to the high altitude rain forests of the Andes in South America. It has been grown for centuries for the large seed and seed oil, used in cooking. Seeds are oval, dark brown, and 1.5-2 cm (.5-.8 in) in diameter.

Raw seeds are inedible, but roasting after shelling makes them very palatable. The viscous oil is yellow to orange in color and used for cooking. With adequate water and temperature, Inca nut will produce multiple times per year. Growth and fruit set are reduced in dry, cool seasons if no irrigation is provided. Found at altitudes up to 1700 m (5500 ft) and temperatures between 10-36°C (50-96°F). Prefers consistent rainfall and full sun, is adapted to a variety of soil types and does well in acid soils.

## Indigo, Large/ครามใหญ่ *Indigofera zollingeriana* syn. *I. teysmannii*



### Philippine

Medium-sized nitrogen-fixing tree. Can attain heights of 3-5 m (10-16 ft.) within two years.

### Description:

Applications in Asia include forage production for goats, soil conservation hedgerows, firewood production, as well as overstory (shade) for agroforestry projects. Can be used to suppress imperata grass.

Grows best in tropical/sub-tropical, humid/sub-humid climates. It is a pioneer species which often invades open areas or fields after burning. Found at altitudes up to 850 m. Needs full sun.

Tolerates acid soil, and can grow on poor soil.

## Jack Bean/ถั่วพริ้ว *Canavalia ensiformis*

### Chiang Dao

Local Thai variety with a bushy growth habit. Matures in 120 days.



### ECHO

A more aggressive climber than the local variety.

### Description:

Produces large leaves and smooth pods, which are edible when tender. Yields large, smooth, white seeds. Seeds are toxic and require special preparation in order to be consumed. Can be used for fodder for ruminants. An excellent green manure/cover crop, jack bean produces considerable amounts of biomass (29.4 t/ha or 13 short tons/acre fresh weight) and fixes up to 230 kg N/ha (205 lb. N/acre).

Jack bean grows well at 14 to 27°C (57-81°F) average temperature, from warmer parts of temperate zone to hot, tropical rainforest areas. Can thrive with rainfall as high as 4,200 mm (165 in.) and as low as 700 mm (28 in.). Can be grown up to 1800 m (5,906 ft.).

## Job's Tears/มะเดือย *Coix lacryma-jobi*



### Mekong Mix

A soft, round, edible variety. 120 days from seed to flowering. Seed coat turns gray or black when mature.

#### Description:

Despite its minor crop status, Job's tears is a nutritious grain, containing more fat and protein than rice and wheat. Both sticky and non-glutinous varieties are grown throughout much of South and Southeast Asia, as well as parts of China. Can be eaten like rice, ground into flour, added to soups and snacks and fermented. The grain is fed to poultry and the foliage used as fodder. Seeds of certain types are used as beads for decoration.

Often planted at beginning of rainy season. Requires fertile soil for its best growth. In poor soils many of the fruits are hollow. Reportedly best suited to latitudes between 22° N and S.

## Lablab Bean (annual)/ถั่วแปะยี *Lablab purpureus*

### Chiang Dao Mix

A white-seeded field lablab.



### Highworth

Produces non-shattering pods with black seeds. Quick maturing; yields well.

#### Description:

The beans can be sprouted, soaked in water, shelled, boiled and then smashed into a paste which is then fried with spices. Dried seed can be processed to make a bean cake (tofu) or fermented to make a meat substitute (tempeh). In Thailand, field lablab is sold as a fried, salty snack.

The crop is grown for fodder, cover crop and/or for pulse production and the growing crop can be grazed by cattle, goats, pigs and sheep.

Field varieties of lablab are drought-resistant summer annuals or short-lived perennials. Grows best at average daily temperatures of 18-30°C (64-86°F) and is tolerant of high temperatures. Lablab is also quite cold tolerant, able to grow at low temperatures (down to 3°C or 37°F) for short periods; can also tolerate very light frosts. Being drought tolerant when established, will even grow where rainfall is <500 mm (20 in.), but loses leaves during prolonged dry periods. Tolerates light shade. Lablab grows in a wide range of soils from deep sands to heavy clays, provided drainage is good, and with pH between 4.5-7.5. However, lablab has low salinity tolerance.

## Lablab Bean (vegetable)/ถั่วแปบ *Lablab purpureus*



### Chiang Dao

Yields purple pods with black seed.

#### Description:

A climbing, semi-perennial legume grown for edible purple pods, leaves and flowers. Young and old bean seeds are also consumed cooked (raw dry seed is reportedly poisonous).

Usually planted during the rainy season. In Thailand, begins flowering indeterminately in November; green pods harvested from December to March.

Lablab is remarkably adaptable, growing in various climates and regions with annual rainfall ranging from 200 to 2,500 mm (8–98 in.) and elevations ranging from seal level to 2,133 m (7,000 ft.). Vegetable lablab can grow in many types of soils with the pH varying from 4.4 to 7.8 and ideal temperatures for vegetable lablab production range from 22° to 35°C (72–95°F). Can tolerate light shade.

## Lettuce, Tropical or Indian/ผักกาดหอมบ้าน *Lactuca indica*



### ECHO Tropical

Grows over 7 feet tall

#### Description:

Tropical lettuce is a fast-growing, self-seeding, semi-perennial vegetable which grows up to 2 m in height. Leaves are a fair source of vitamins A and C. Young leaves can be eaten raw; older leaves, which are bitter, can be served raw with vinegar, steamed, or boiled. At times, the leaves are employed as wrappers in which to fry fish.

Thrives under warm, moist conditions. Optimum temperature range is 25–30°C (77–95°F). If planted in well-drained soil, can tolerate rainfall in excess of 3500 mm/year (138 in./year); pH 5–8.



## Lettuce/ผักกาดหอม *Lactuca sativa*



### Khasi Green

Loose-leaf type from northeast India. Light green leaves usually eaten raw.

#### Description:

In addition to salads, in Asia lettuce is consumed raw as a side vegetable to dip in chili sauces, curries and other dishes. It is also boiled as a potherb, pickled, braised, sautéed, fried, pureed, or used in soups and stews.

Lettuce thrives under cool, moist conditions and can survive a light frost. Long, hot days generally prompt plants to bolt (send up a flowerstalk); at this point the sap in the leaves turns unpalatably bitter and leaf harvest ends. Heavy rains can encourage the growth of fungus and subsequent rotting. Needs regular watering and welcomes shade from taller crops. A rich, loose soil with a pH between 6.0 and 7.0 is ideal.

## Leucaena (Red)/กระถิน *Leucaena diversifolia*



### UHDP

Presumably named for its reddish brown pods (when mature), red leucaena has long been grown at the UHDP Center in northern Thailand.



#### Description:

The pods, seeds and shoots are used for food. In Thailand, young shoots are eaten fresh as a dipping vegetable or cooked in soups or fried with eggs. In Indonesia, fermented seeds are used to make a food called “tempeh lamtoro”. Green, unripe seeds are eaten as well. The green pods and high-protein leaves are a source of livestock fodder.

Good for alley cropping and intercropping (especially as it offers filtered shade for other crops), red leucaena also has timber and firewood potential as it coppices well. Forage quality is reportedly lower than *L. leucocephala* but better adapted to higher elevations and cooler temperatures.

Red leucaena has been promoted by the Mindanao Baptist Rural Life Center for its tolerance of acid soil and as a psyllid resistant alternative to *L. leucocephala*. The tree flowers year round in northern Thailand.

## Leucaena (White Leadtree)/กระถิน K 500 *Leucaena leucocephala*



### **K-500 Cunningham**

An excellent forage variety developed in Australia. It is a cross between Salvador and Peru-type cultivars.

#### **Description:**

Similar to the UHDP Leucaena Red variety, the pods, seeds and shoots are used for food. The green pods and high-protein leaves are a source of livestock fodder. Dried leaves can be processed as pellets for livestock and poultry. *L. leucocephala* is one of the highest quality and most palatable fodder trees of the tropics, often described as the 'alfalfa of the tropics'. It also serves well as an alley crop and windbreak.

Leucaena grows well with rainfall from 600-2000 mm/year. It does well in soils with pH 5.5-8.0. Intolerant of highly acid soils, low phosphorus, high salinity, high aluminum saturation and water-logging.

## Lima Bean/ถั่วราชมาษ *Phaseolus lunatus*



### **Burma Red**

Indeterminate climbing lima bean; produces medium-sized red beans approximately 90 days after planting.

#### **Description:**

Immature sprouts, leaves, green, shelled beans and pods are consumed in Asia (raw seeds may be toxic). Dried vines may be used as animal fodder.

Well adapted to lowland tropics especially the highly leached, infertile soils of the more humid regions, but prefers well-drained, well-aerated neutral (pH 6-7) soils. Elevations for production range from sea level to 2400 meters (7,874 ft.) in the tropics. Plant at the beginning of the rains; dry period needed for seeds to mature.

## Angled Luffa / บวบเหลี่ยม *Luffa acutangula*



### 'Burmese' Angled Luffa.

Edible fruit (less than 30 cm/1 ft. long) and leaf shoots.



### 'Chaing Dao' Small Luffa

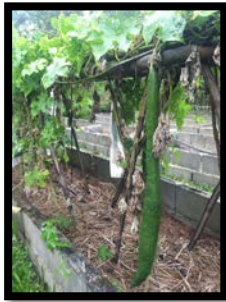
Cucumber-like edible fruit 3-5 cm (1-2 in) long. Does not become spongy.

### Description:

A climbing annual that produces oblong, fibrous fruit about 1 foot long, with black seeds. Eaten throughout South, East, and Southeast Asian countries and can be cooked as a vegetable or used in soups. Though smooth luffa is generally preferred as a sponge source, the procedure for sponge harvesting is similar for both angled and smooth types.

Angled Luffa is well adapted to the warm dry tropics but often can be grown in the wet tropics as well. Luffas are frost sensitive and do not thrive in temperate regions. Can be planted year-round in the tropics but best if planted at the beginning of the rainy season. Although the vines can be allowed to trail along the ground in dry regions, trellising is recommended to reduce fruit rot, particularly in humid areas.

## Luffa Sponge, Smooth/ บวบหอม *Luffa aegyptiaca*



### Smooth (ECHO)

Produces smooth plump fruit.



### Thai Long

Produces smooth long fruit (~30 cm/12 in.).



### Thai Oval

Produces large oval fruit.

### Description:

A climbing annual that produces oblong, fibrous fruit about 1 foot long, with black seeds. The young leaves, shoots, and fruit of luffas are eaten; older, dry fruit are used as sponges.

Luffas produce vigorous climbing vines; plants should be trellised. Well adapted to warm dry tropics, but can be grown in wet tropics. Luffas may be planted year round in the tropics but best growth is obtained by planting at the beginning of the rainy season. Luffas are frost-sensitive making it difficult to grow them outside tropical or subtropical climates. Fences or trellis supports for luffas need to be sturdy to support the weight of the fruit. Vines can be allowed to trail over the ground in the dry tropics but trellis supports are essential to prevent fruit rot in the wet tropics.

## Malabar Spinach/ผักปลั่ง *Basella alba*



### Bangladesh

Large-leafed and vigorous; producing edible shoots in 70 days.



### Description:

Malabar spinach is a perennial twining herb grown for its tender stems and leaves, which can be cooked like spinach. The leaves and shoots are mucilaginous when cooked. Its fruits have been used for dyeing.

Malabar spinach needs night temperatures above 14°C (60°F) and is best suited to humid regions. Tolerates a wide range of soil conditions but does best on slightly acidic (pH 6-6.7), humus-rich sandy loams. Trellising is recommended.

## Marigold (African)/ดอกดาวเรือง *Tagetes erecta*



### Heirloom

Prolific bloomer with large yellow, orange, and gold double flowers on vigorous bushy plants

### Description:

African marigolds can be added anywhere in the garden and serve as a beneficial companion plant. The strong odor repels pests and masks the smell of many crops, making it harder for pests to find and damage their host crop. They also attract butterflies and other beneficial insects. Marigold roots exude a nematocidal toxin which has been shown to prevent damage from nematodes when planted in rotation with nematode-susceptible crops.

This heirloom variety, originally from the United States, grows to 0.9-1.2m (3-4 ft.) in height. It is a hardy annual. Marigolds prefer the warm season but will survive cool weather. Prefers full sun; tolerates drought, should not be over-watered. Requires well-drained soil. Tolerant of both acid and alkaline soils.



## Moonflower/ดอกชมจันทร์ *Ipomoea alba*



### Chiang Dao

A local naturalized variety that producing hundreds of large white flowers



### Description:

Often called moonflower or moon vine, *Ipomoea alba* is only one of many different plants commonly called "Moonflower." It is a species of morning glory native to the Americas but naturalized throughout the world. A perennial long-stemmed woody vine, moonflower produces fragrant white or pink flowers, 8-14 cm (3-5.5 in) in diameter, that open in the evening and remain open until morning sunrise.

Flowers that are previously unopened are broken at the stem and eaten cooked or fried and are said to help in digestion and other stomach ailments. Flowers that have opened on previous nights are edible but not commonly eaten.

## Moringa, Drumstick Tree, Horseradish Tree/มะรุม *Moringa oleifera*



### Regional Mix

Mixture of various types native to Southeast Asia.

### Description:

Tree with small rounded, compound leaves and long pods with large, winged seeds. Leaves are especially high in protein, calcium, and Vitamins A, B, and C; can be eaten raw, cooked, or dried and ground. Young pods are included in curries (inner portion is edible). Roots can be used as a spicy condiment similar in taste to horseradish.

Grows well in poor soils and full sun but must be established in well-drained sites; yellow leaves and dieback may indicate too much water. Moringa tolerates a soil pH of 5.0–9.0 and 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.

## Mung Bean/ถั่วเขียว *Vigna radiate*

### Burmese Green

Day-neutral, bush variety. New to ECHO Asia. Green seed.



### Lao

Day-neutral, bush variety; approximately 60 days from seed to flowering. Green seed.

### Description:

Mung bean is an early-maturing bush/slightly vining legume, high yielding and widely adaptable. It is used throughout Asia as a food legume, for flour, in desserts and sprouted for use in other dishes. It has a protein content of approximately 25%. Mung bean is cultivated most extensively in the India-Burma-Thailand region of Southeast Asia but found in countries such as Iran, Pakistan, Vietnam and China as well.

Mung bean is a short season crop requiring 60 to 90 days from planting to maturity. Grows mainly within 20-40° C (68-104°F) and up to 2000 m (6,562 ft.) in the tropics. Grows well in areas with average rainfall of 600-1000 mm (24-39 in.) but it can survive with less precipitation. Generally grows well on warm, sandy or otherwise loose soils but prefers well-drained loams or sandy loams with a soil pH range of 6.2-7.2.

## Mustard/ผักกาดเขียว *Brassica juncea*



### Khasi

Extremely spicy/hot variety from NE India with rounded, spiny leaves. Performs better than Mizuna if planted during rainy season.

### Mizuna

Thai variety of the mildly spicy mustard originating in Japan.



### Description:

Mustard is a leafy cool season green, often used in salads or cooked. Seeds may also be pressed for oil.

Mustard grows best in cooler, milder temperatures (15-18°C/59-64°F) and can tolerate annual rainfall between 500-4200 mm (20-165 in.) and elevation up to 2000 m (6561 ft.). Best to plant at the end of the rains, just prior to the cool season. Prefers loamy, well-drained soil and a pH 5.5-6.8.

## Niger Seed/งาญี่ปุ่น *Guizotia abyssinnica*



### Burmese

This oil crop is drought tolerant once established and ready for harvest approximately three months after planting.

### Description:

A member of the Aster family, Niger is an oilseed crop which has culinary, livestock-production and soil-improvement uses. Seeds contain around 40% oil and about 20% protein. Seed cake used for livestock feed.

Requires short day-length for flowering. Along the Thai-Burma border, Niger seed is sown into harvested hill fields near the end of rainy season; recommended planting distance of 20 to 30 cm (8 to 12 in).

Niger is best planted during the period of decreasing day-length in the higher latitudes of the tropics and sub-tropics. Grows well at soil pH values between 5.2 and 7.3 or on almost any soil that is not extremely heavy.

## Okra/กระเจี๊ยบเขียว *Abelmoschus esculentus*



### Bhutanese

Produces green pods, eaten when 7-10 cm (3-5 in) long. Pods become hairy and spiny when mature, but young pods are edible.



### Clemson Spineless

Prolific producer of dark green, spineless pods, which can be harvested continuously for weeks. Pods best when 7-10 cm (3-5 in.) long. Plants grow to about 1.2 m (4 ft.) in height.



### Red Maroon

Produces dark red pods that can reach 20 cm but are eaten when 12-15 cm long.

### Description:

Okra is an upright annual plant with plump, hairy pods. Young tender pods are eaten. Leaves are reportedly edible as well. Pods are mucilaginous (containing a slimy substance). Can be fried with chilies or boiled. Adding cumin, salt, and/or lime cuts mucilage.

Okra grows best in hot climatic conditions and needs full sunlight on fertile, well-drained soils, ideally well-manured loam; pH 6.0-7.0.

## Pigeon Pea/ถั่วมะแฮะ *Cajanus cajan*



Thailand Mix

### Description:

Pigeon pea is a short-lived perennial which may live up to 5 years. The tree-like shrub grows to between 1.2 and 3.0 m (4-10 ft.) tall and is used for food and fodder as well as in agroforestry systems. Pigeon pea can be eaten as dried peas, flour or green vegetable peas. Seeds are high in protein (~21%).

Produces a deep root system and fixes nitrogen quickly (168-280 kg/ha or 150-250 lb/acre). Can be planted as an annual. It is grown in the tropics and subtropics between 30°N and 30°S latitudes. Optimum average temperatures range from 18-29°C; frost is not tolerated. Grows best where annual rainfall ranges from 500-1,500 mm (20-60 in.) a year. Generally considered drought-resistant, pigeon pea can be grown on a wide range of soil types. Waterlogging is harmful. Drained soils of intermediate water-holding capacity and with a pH between 5.0-7.0 are favorable.

## Rice Bean (red)/ถั่วแดง and (green)/ถั่วแป๋ *Vigna umbellata*



**Chiang Dao**

Local Thai variety. Red seed.



**ECHO**

Light yellow-green seed.



**Thai Green**

Light yellow-green seed, slightly larger than 'ECHO' variety.

### Description:

Slender, annual, twining vine with Pods approximately 10 cm (4 in.) long, produced in groups of 5-12. Both young pods and dry seeds are edible. Rice bean is most often served in India as a dhal and can also be made into flour. It can also help with soil improvement and is known as a high-quality fodder. It is often relay-cropped with corn as a green manure/cover crop. Fixes approximately 80 kg N/ha (71 lb. N/acre).

Requires short days to flower. Drought-tolerant; known for its wide adaptation to diverse soil conditions. 5 months to maturity.



**Roselle/กระเจี๊ยบแดง *Hibiscus sabdariffa***



**Burmese**

A hardy, red-stemmed roselle that produces many calyces. 90 days from seed to flower. Edible leaf shoots. An excellent vegetable variety.

**Bhutanese**

Bigger fruits, dark edible leaves, and thicker calyces good for making drinks.



**Description:**

Annual shrub of Southeast Asian origin. Leaves are edible raw or cooked with fresh leaves containing 2-3% protein and traces of calcium, phosphorus, and iron. Roselle flower calyces are used for tangy-flavored drinks and teas, sauces, or eaten fresh. It also has a number of reported medicinal uses. Roselle seeds can be pressed as a source of cooking oil.

Suitable for tropical climates with well-distributed rainfall of 1500–2000 mm yearly, from sea-level to about 600 m altitude. Grows best in permeable soil, a friable sandy loam with humus being preferable; however, will adapt to a variety of soils. A short-day plant, it can be grown in temperate regions, but will not produce fruit.

**Sesame/งาขาว *Sesamum indicum* L.-**

**Kaset Sart**

Big seed and fruit, tolerant to disease. Pod does not split before harvest.



**Lao**

Small seed and small fruit. Caution required when harvesting, as pod tends to split open and release seeds.

**Description:**

Sesame is an annual plant growing 50 to 100 cm (1.6 to 3.3 ft) tall. It is known for its seeds high oil content. Sesame seeds, which contain approximately 50% oil and 25% protein are usually roasted or stewed. They can also be ground into flour, added to breads, vegetables etc, used to make sweetmeats, or crushed and used as a butter. The seeds can also be sprouted and used in salads. Sesame oil is used in cooking, salad oils and margarine. Young leaves are used as a soup vegetable in sub-Saharan Africa.

Sesame occurs mainly in the tropics and subtropics from sea-level to 1500 m. High temperatures are required for optimal growth and production. Sesame is very drought-tolerant, with a minimum rainfall of 20 to 26 in. per season for reasonable yields. Intolerant of water-logging. Thrives on moderately fertile and well-drained soils with pH ranging from 5.5 to 8.0. Most cultivars are sensitive to salinity.

## Sesbania or Hummingbird Tree/ดอกแคร์ขาว *Sesbania grandiflora*



### Local Mix

White flower type from Thailand.

#### Description:

Sesbania is a nitrogen-fixing tree that grows to 5 m (16 ft.) tall with compound leaves and large flowers. It is used for fodder as well as a green manure. It is also planted as a light shade tree, as support for climbing crops, and in windbreaks. The flowers can be eaten raw, in curries, or steamed as a side. Young leaves and pods are also occasionally consumed by humans.

Best to plant seedlings in moist but well-drained soil. Will survive some flooding. Will tolerate poor, acidic, or saline soils and grows well in full sun and light shade, but is sensitive to long periods of cool temperatures or frost.

## Siamese Senna/ขี้เหล็กบ้าน *Senna siamea*



### Thai

Local variety from Thailand.

#### Description:

An evergreen, leguminous tree with compound leaves that grows to between 15 and 20 m (50-65 ft.) in height. Commonly planted and found in the wild. Unlike many leguminous trees, it does not fix nitrogen. In Southeast Asia its hard wood is found to be especially useful as fuel wood but is also used in construction and furniture making, in windbreaks or as a shade tree. It has also been employed in alley cropping and intercropping systems. Young leaves, flowers and tender pods are edible. The taste is bitter, but the plant parts are boiled 1-3 times (water discarded) before added to soups and curries or with chili pastes. Traditional senna leaf curries were reportedly used as a mild laxative drug.

Grows best in well-drained, fertile soils; intolerant of saline soils. Prefers sun or light shade; does not grow well above 1,300 m (4,265 ft.) elevation.

## Sorghum/ข้าวฟ่าง *Sorghum bicolor*



### Pang Daeng

A local grain sorghum variety mostly grown for livestock feed.

#### Description:

Sorghum is a 3-meter tall minor grain crop, often intercropped with upland rice. The grain is cooked like rice or popped like popcorn. Around the world, some types of sorghum are cracked like oats for porridge, some malted for beer, and others baked like wheat into flatbreads. Grain is also fed to chickens raw or cooked as pig feed.

Usually planted at the beginning of the rainy season in northern Thailand and harvested at the beginning of the dry season (approximately 6 months). Sorghum can be grown from sea level to 1,000 m (3,281 ft.). Rainfall of 200–1,250 mm (8-50 in.) is preferred. Adapted to a wide range of soils if moderately well-drained; pH 5.0-8.5. Sorghum is well adapted to areas where low rainfall and high temperatures will not produce a reliable corn crop.

## Sunflower / ดอกทานตะวัน *Helianthus annuus*



### Chiang Dao

A local variety that averages in 2.5 m in height. The flowers are around 15 cm across and petals are yellow in color. The seeds have a striped pattern and the kernel is quite tasty.



#### Description:

Sunflower is an upright annual plant that varies in height from 1-4 m. Seeds can be roasted and eaten whole or pressed for oil. In small-farming and backyard garden settings, sunflowers can be a good choice for intercropping (taking note of spacing and species). Sunflowers can also be planted along plot borders to attract pollinating insects.

Sunflower is grown principally in temperate regions, but tolerates subtropical and tropical climates. Subtropical varieties can stand -6 to -10°C but the plant is sensitive to frost at all other stages of growth. Can be grown at elevations up to 2600 m in the tropics, but best below 1500 m. Will succeed in most soil types. Well-drained soils are important and are intolerant of waterlogged soils. Will tolerate both drought (comparable to sorghum and millet) and very acidic soils (4.5 - 8.7).

## Sunn Hemp/ปอเทือง *Crotalaria juncea*



### Chiang Mai

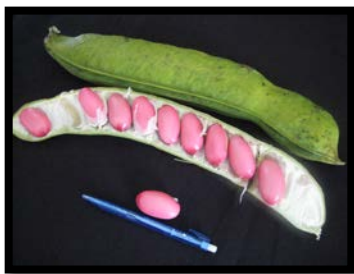
A prolific local variety. Can grow up to 2 m (6 ft.). Primarily used as a green manure/cover crop.

#### Description:

Sunn hemp is an annual legume with stems that grow to a height of a meter (~3 ft.) or more. It produces bright yellow edible flowers and plump, velvety pods. It can serve as animal fodder; however, it contains toxins and should not form more than 10% of a cow's diet and should not be fed to horses and pigs. Fiber from the bark is used to make rope, canvas, fishing nets, pulp and paper. It is commonly used as a green manure/cover crop.

The plant performs well any time of year if moisture is adequate. It may suppress nematodes and shows some drought resistance. Although it is adapted to hot climates, this plant will endure slight frost. Prefers full sun and performs well in almost any soil that is not waterlogged. Grows vigorously in well-drained soils with a pH of 5.0 to 7.5, and thrives even on poor soils with little or no nitrogen fertilizer. If grown as a fiber crop sunn hemp should be sown in light, loamy soil. It will produce coarse fiber with low yields if grown on heavy clay.

## Sword Bean/ถั่วดาบ *Canavalia gladiata*



### Mae Jo

Thai variety producing large, light pink seed. Approximately 6 months to first harvest.

#### Description:

Sword bean is a drought-tolerant legume known for its extremely large seed pods (25-36 cm/10-14 in. long) and large red or pink smooth seeds (4 cm or 1.5 in. long.). It is typically grown as a green manure/cover crop.

Immature pods are sliced cross-wise before being prepared in stir fried dishes and curries. Sword bean seeds are somewhat toxic. However, the large, but not fully mature, seeds from green pods can be prepared for consumption by boiling for 10 minutes and peeling.

Preferred environmental conditions are found in the humid lowland tropics with temperatures 15-30°C (59-86°F), but the plants may be grown with success in tropical elevations of up to 1,000 m (3,200 ft.). Will grow in areas experiencing annual rainfall anywhere between 700-4,200 mm (approximately 27-165 in.). Optimum growth occurs in full sunlight, but sword bean is tolerant of some shade.



## Tomato/มะเขือเทศ *Solanum lycopersicum*



### Burmese

Medium sized variety, producing dark red fruit.  
Indeterminate.



### Tommy Toe

An heirloom cherry tomato variety, well known for its juiciness and flavor as well as general disease resistance. Fruits are 2.5 cm (1 in) and prolific.

### Description:

The tomato plant is erect or spreading and viney, coarsely hairy with small yellow flowers. Hundreds of varieties exist with fruits of different shapes, sizes and colors. The fruits are prepared and eaten in a variety of ways and are high in lycopene, an antioxidant. It is closely related to potatoes, eggplants and peppers.

Tomatoes can be grown at altitudes between sea level and 2000 m (6560 ft) in the tropics, but yields are generally higher at elevations over 1000 m (3280 ft). A diurnal variation (daily temperature fluctuation) of at least 5-6°C (9-11°F) is considered necessary for optimum development. High relative humidity can be harmful to the tomato crop and fruits rarely ripen fully in wet and dull weather. On the other hand tomato is also sensitive to sunburn and hot dry winds can lead to flower drop and reduced yields. Tomatoes can be grown on many soil types, however, sandy or sandy loam soils with a pH of 5.5 to 7.0 are preferable. The optimal soil temperature for germination is 20-30°C (85°F).

## Velvet Bean/พมามุ่ย *Mucuna pruriens*



### Tropical

Climbing variety. Requires short days for flower and pod production. An excellent green manure/cover crop.



### Description:

Velvet bean is an annual legume crop extremely valuable for intercropping in cornfields, rehabilitating depleted land and for controlling weeds. Leaves and pods are used as human food in certain parts of the world. However, velvet bean is not recommended for human consumption due to the presence of L-dopa. The pods often are used for feeding cattle and sheep; pigs can also eat velvet bean as long as it is less than 25% of the total diet. It is not a suitable food for poultry. In addition, the vines can be grazed, made into hay, or mixed with corn as silage. It serves as a good green manure, able to fix nitrogen at reported rates of 228 kg/ha (200 lbs./acre).

Can tolerate drought, low soil fertility and acidic soil, soil pH: 4.0-7.5. It is sensitive to frost and does not grow well in cold, wet soils. It grows best at altitudes under 1,500 m (4,500 ft.) and thrives in areas with full sun and high rainfall.

## Wax Gourd/Wintermelon/ฟักเขียว *Benincasa hispida*



### Upland Mix

Produces a large, green edible gourd about 46-61 cm (1.5 to 2 ft.) long.

#### Description:

Wax gourd is an annual squash-like vine, with large, soft, hairy leaves. Fruits are large, oblong, 25-120 cm long, usually hairy when young, with a waxy covering when ripe. Fruit may weigh up to 40 kg, though 10 kg is normal. They have solid white flesh and cucumber-like seeds. Fruit may be eaten raw or cooked and is used in soups and curries. Young leaves can be boiled and seeds roasted. The fruit may be stored for many months at room temperature.

Wax gourd can be grown year-round in tropical climates but is usually planted at the beginning of rainy season. Frost sensitive. Soil pH 5.0-7.5.

## White Hoary Pea / ครามป่า *Tephrosia candida*



### Common (Burma)

The leaves are high in protein and can be used as fodder for pigs and cattle. Can be planted to provide ground cover and erosion control between perennial crops. Suitable for rehabilitating degraded land.

#### Description:

A leguminous, perennial shrub with a dense leaf canopy. The leaves are high in protein and can be used as food supplement for pigs and cattle, but are not eaten by humans. Insecticidal properties are also reported. Used for numerous applications including improved fallows and soil conservation.

Grows well up to 1,600 m (5,249 ft.) in elevation and prefers a mean annual temperature range of 18-28° C (64-82°F) as well as a mean annual rainfall between 700-2,500 mm (28-98 in.). Grows on a wide range of soils including very poor soils where few other crops can grow. Tolerates a pH of 3.5-7; more acidic soils seem to be more suitable. Does not tolerate waterlogged soils.

## Winged Bean/ ถัวยี่ง *Psophocarpus tetragonolobus*



### Bogor

20 cm (8 in.) pods, vigorous, high yields.  
A short-day length variety.

### Day Neutral

Blooms during longer days, allowing for  
out-of-season production.

### Pang Daeng Nawk

Short-day length variety from northern  
Thailand; produces long, tender pods  
(30 cm/12 in).



### Description:

Perennial (sometimes cultivated as an annual) legume with long, winged pods on a climbing vine. Leaves, shoots, flowers, pods and seeds are all edible; the root tuber is white and firm and averages 20 percent protein. Young pods, harvested while still tender and bendable, can be boiled and served like green beans or used to dip sauces and curries and protein-rich bean milk and flour are useful dietary treatments for protein-deprived children.

Winged bean thrives in hot, wet climates although a dry period is favorable to fertilization and the production of mature pods. It can however be grown in the tropics at elevations up to 2100 m (6,890 ft.). Grows well under a variety of soil conditions except in sand or high salinity environments. Drought sensitive. Most varieties are planted at the beginning of the rainy season with flowering induced by short-day length. However, day-neutral varieties can be planted year round.

## Yam Bean, Jicama/ มันแกว *Pachyrhizus erosus*



### Laoda

Regional variety with vigorous  
growth. Prefers full sun.



### Description:

Yam bean is a leguminous plant with a bulbous tuber that may be eaten raw or cooked. Tubers are low in calories and contain less than 10% carbohydrates and slightly more than 1% protein (fresh weight). They are also a good source of vitamin C. The young seed pods are sometimes cooked and eaten as a vegetable. Leaves and beans contain rotenone, a natural insecticide, and therefore should not be consumed.

Yam bean requires short days for tuber production. Produces well in hot, humid environments with a long, warm, frost-free growing season. Can be used as a cover crop or trellised. Prefers well-drained soil. Optimal soil pH 6.5-8.

## Yard long bean/ถั่วฝักยาวถาย *Vigna unguiculata ssp. Sequipedalis*



### Kachin

A local variety with green purple-speckled pods. Preferred for its soft texture.



#### Description:

A legume cultivated for its edible immature pods. The leaves are edible raw or cooked with fresh leaves containing 2-3% protein and traces of calcium, phosphorus, and iron. The crisp, tender pods are eaten both fresh and cooked. They are at their best when young and slender. They are sometimes cut into short sections for cooking uses. As a West Indian dish, they are often stir-fried with potatoes and shrimp.

Prefers deep, fertile, well-drained loam. Can be grown on a trellis. A short-day plant. Can be grown in temperate regions, but will not produce fruit.

## Zinnia/ดอกบานชื่น *Zinna elegans*



### Thung Khang Tong

Local Thai variety with a mix of purple and white flowers.

#### Description:

Zinnia is an upright, bushy flower with a yellow and black inner flower and petals of varying color. Zinnias can be planted around and in garden beds to attract beneficial insects. Zinnias are often grown for sale as cut flowers.

Zinnia is a warm-weather annual. Grows best in a hot dry season. It will flower more often with shortening days. Prefers full sun. Grows best with a long, dry hot season. Grows well in a well-drained loamy soil, rich in organic matter, pH 5.5-7.5.