ECHO Asia Seed Fact Sheet

Scientific name – *Canavalia ensiformis*

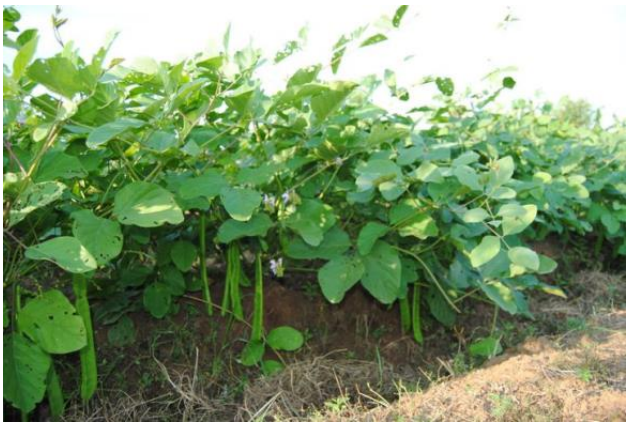

Photo: ECHO Asia staff

English common name – Jack bean
Asian common names –

- Chinese: 洋刀豆 yang dao dou
- Japanese: タチナタマメ tachi nata mame
- Malay: kacang parang
- Thai: ถั่วพร้า thua phraa
- Vietnamese: Đậu tấc

Variety – Chiang Dao

General description and special characteristics – Jack bean is an annual legume. It is bushy (vines less than 1 meter (3 ft.) long), having a deep root system that makes it drought-tolerant. It produces large leaves and smooth pods (up to 30 cm/12 in. long) that yield large, smooth white seeds.

Crop uses (culinary) – There is controversy surrounding whether jack bean pods should or should not be eaten. The seeds contain a toxic amino acid called canavanine which can reduce the ability of the intestines to absorb nutrients. However, there are documented cases of the young pods and dried seed used as a food source in Sri Lanka, India, Indonesia, China, Korea, and Japan. Tender young pods, up to 10-15 cm (4-6 in.) long, are picked and consumed as a vegetable. The jack bean seed can be fermented and processed into a meat substitute called "tempeh" in Indonesia. In Honduras, jack bean seeds were roasted without skin and consumed without effects like nausea or dizziness, which are characteristic of over-consumption of velvet bean. In general, it is recommended to remove the skin of the jack bean seed in which anti-nutritional components are concentrated. Seeds can be boiled in several changes of salted water and the skin removed before consumption. Seeds contain approximately 25 percent protein.

Crop uses (soil improvement) – The second most widely planted green manure cover crop after *Mucuna* (velvet bean), jack bean will grow even where it is difficult for velvet bean to grow. It is hardy, deep-rooted, drought-resistant, and tolerates shade. It is capable of helping wastelands regenerate.

The dense foliage of jack bean serves well as weed control but it should be established in a weed-free area first for faster initial development. It can be used to maintain organic matter levels in soil, producing up to 40-50 tons of green material per hectare (18-22 short tons of fresh biomass/acre). The best time to incorporate jack bean biomass into soil is during the flowering stage, when nutritional composition is at its highest. Jack bean adds up to 240 kg of nitrogen per hectare (214 lbs. N/acre), more than velvet bean, pigeon pea, and *Pueraria* (kudzu family). Its leaves and dense cover protect soil from erosion during heavy rainfall and the deep root system adds stability to the soil. Once established, jack bean needs little additional labor.

Crops uses (livestock production) – Jack bean can be used as fodder, although livestock is often reluctant to eat it until the plant material is dry and therefore more palatable.

Toxicity has been reported in cattle grazing jack bean and consuming too much seed meal. The beans contain a basic amino acid, canavanine, the source of the toxicity. Animals affected by eating too much of the plant or meal have a clear nasal discharge and exhibit lameness and prostration. It has been shown that 28 g (1 oz.) of seed per 0.73 kg (1.6 lb.) body weight are lethal to cattle and either the meal should not comprise more than 30 percent of the ration or it should be heat-treated to destroy the enzyme before feeding. The husk of the seed is always removed before milling.

Seasons of production – Jack bean can be grown year round with adequate soil moisture (especially during the establishment of the root system). Under rain-fed conditions, jack bean can be planted anytime from the beginning of the rainy season up through the final 1-2 months of the rains. Following the rains, jack bean can tolerate drought conditions if the root system is mature.

Length of production and harvest period – Jack bean requires approximately 120 days for maturity. Generally, green pods can be harvested within 2-3 months and the mature seed after 3-4 months.

Production methods – For cover crop purposes, establish jack bean plants 25-30 cm (10-12 in.) apart.

Pollination – According to *Seed to Seed*, jack bean flowers are large and attractive to insects. Therefore, different varieties grown in proximity would probably be cross-pollinated by insects.

Environmental conditions for production – Jack bean has been grown successfully where average annual temperatures range from 14 to 27°C (57-81°F), from warmer parts of temperate zone to hot, tropical rainforest areas. Where early frost shortens the growing season, the beans remain unaffected even if the leaves become frostbitten. Jack bean can also grow well where rainfall is as high as 4,200 mm (165 in.) and as low as 700 mm (28 in.). It also grows well in both partial shade and direct sunlight. Although generally grown in the tropical lowlands, jack bean can be grown in areas as high as 1800 m (5,906 ft.).

Soil requirements – Among pulses, only jack bean, sword bean, and lima bean grow really well in highly leached, nutrient-depleted, lowland tropical soils. The crop tolerates acid soils (pH range 4.3-8.0) and is far less affected by waterlogging and salinity than other pulse crops.

Pests and diseases – In northern Thailand, and possibly other parts of Southeast Asia, a yet unidentified larva (approximately 1 cm long) is known to consume seeds in the maturing jack bean pods. Without adequate pest control, the worm can destroy the majority of the seeds in a planting.

Seed saving – Allow the pods to dry on the vine and harvest before they split open. To process large numbers of pods, place the dried pods into a sack and then beat with a stick to break the pods open and release the seeds. Dry the seeds out of direct sun and clean out pieces of pods, dirt, etc. Jack bean stores well for at least 1-2 years under suitable conditions (dry, cool, insect-free).

References –

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