LOCAL NAMES
English (kudzu,Japanese arrow root); Fijian (yaka,wa yaka,nggariaka); Filipino (tahaunon); French (koudzou); Indonesian (tobi); Lao (Sino-Tibetan) (khauz pied); Thai (phakpeetpe); Vietnamese (c[as]t c[aw]n)

BOTANIC DESCRIPTION
Pueraria Montana is a perennial, woody climber, with stems up to 30 m long and up to 10 cm in diameter, initially grey to brown pubescent, later glabrescent, and with very large oblong tubers up to 2 m long and up to 45 cm in diameter.

Leaves alternate, pinnately 3-foliolate; petiole 8-13(-21) cm long, rachis 1.5-7 cm long, both grey to golden-brown hairy, stipules peltate, up to 1.5(-2.5) cm long; leaflets ovate to orbicular, 8-26 cm x 5-22 cm, lateral leaflets oblique and often somewhat smaller than terminal leaflet, entire to 3-lobed, thinly appressed pubescent, petiolules 4-10 mm, stipels linear to lanceolate, up to 2(-3) cm long.

Inflorescence a usually unbranched elongated pseudoraceme up to 35 cm long, with 3 flowers per node, bracts up to 10 mm long, early caducous, bracteoles up to 5 mm long, fairly persistent. Flowers bisexual, short-pedicelled; calyx campanulate with 5 unequal teeth, tube 3-5 mm long, teeth 4-9 mm long; corolla papilionaceous, petals up to 2.5 cm long, purplish to blue or pink, often with a yellow or green spot on vexillum; stamens 10, monadelphous or with one free stamen; ovary superior, elongated, 1-celled.

Fruit a flattened oblong pod, 4-13 cm x 0.5-1.5 cm, straight to falcate, with golden-brown hairs, 5-15-seeded.

Seeds flattened ovoid, 4-5 mm x 4 mm x 2 mm, red-brown with black mosaic. Seedling with epigeal germination; first 2 leaves simple and opposite.

Three varieties are distinguished within P. montana, of which var. lobata (Willd.) v.d. Maesen & Almeida is particularly common in the Malesian region. This variety is often considered as a distinct species: P. lobata (Willd.) Ohwi. The other two varieties, var. montana and var. chinensis (Ohwi) v.d. Maesen & Almeida (synonym: P. lobata (Willd.) Ohwi var. thomsonii (Benth.) v.d. Maesen), are mainly restricted to mainland Asia, although both have been reported from the Philippines. The main distinguishing characteristics are flower size, leaflet form and fruit size. Extracts from P. tuberosa (Roxb. ex Willd.) DC., which does not occur in South-East Asia, showed anti-implantation activity in female rats. Its tubers are used in local medicine in Nepal, Pakistan and India, e.g. against renal complaints, as a febrifuge, as a cataplasm to cure swellings of joints and as a galactagogue; they are also used as a fish poison. In Thailand, the tubers of P. candollei Grah. ex. Benth. var. mirifica (Airy Shaw & Suvat.) Niyomdham (synonym: P. mirifica Airy Shaw & Suvat.) are used as a tonic and aphrodisiac, to treat mammary gland expansion and for their oestrogenic effect. Many flavonoids (daidzein, daidzin, genistein, genistin, kwakhurin, mirificin, miroestrol) as well as coumarins (columestrol, mirificoumestan and mirificoumestan hydrate) have been isolated. Pharmacological studies have shown oestrogenic, anti-implantation, abortifacient, antifertility, antispermatogenic and hypercalcaemic effects. Studies on the effects on birds found accelerated growth but inhibited egg-laying. The fertility in both male and female mice was effectively controlled by an aqueous extract of leaves, whereas the extract could effectively interrupt pregnancy.

BIOLOGY
Kudzu may grow 35 m or more in a single season. Bees have been reported to act as pollinators, and kudzu is said to be cross-pollinated. Outside its native area of distribution seed set is often poor.

ECOLOGY
P. montana occurs in thickets, forests, roadsides, pastures and hedges, and is common in the lowlands. Kudzu is drought resistant because of its deep roots.

BIOPHYSICAL LIMITS
Altitude: Up to 2000 m.

Soil types: It grows on a wide range of soils, but does not grow well on poor sandy soils and poorly drained heavy clays. It is intolerant of waterlogging, and grows best on well-drained fertile loams.

DOCUMENTED SPECIES DISTRIBUTION

Native: Australia, China, India, Indonesia, Japan, Korea, Republic of, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Taiwan, Province of China, Thailand, Vietnam

Exotic: Puerto Rico, US

The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS
Medicine: In Chinese medicine the tuber of kudzu is known as 'Radix Puerariae', and it is one of the most important crude drugs. Tea from the tubers is used in China and Indo-China against colds, fever, influenza, diarrhoea, dysentery and hang-overs. The flower buds are used as a diaphoretic and febrifuge. In China, its clinical use for various diseases in internal medicine, surgery, pediatrics and dermatology has been reported. The most important efficacy is for arrhythmia. The starch from the tuber is used medicinally in Japan in soup or tea to restore intestinal and digestive disorders. The extract is effective in lessening alcohol intoxication.

P. montana var. lobata has a high flavonoid content. In a methanol extract of the tuber 7 isoflavones were identified and quantified: puerarin (160 mg/g extract), daidzin (22 mg/g), genistin (3.7 mg/g), daidzein (2.6 mg/g), daidzein-4',7-diglucoside (1.2 mg/g), genistein (0.2 mg/g) and formononetin (0.2 mg/g).

Food: Kudzu tuber is esteemed for its fine starch, used especially in China, Japan and Papua New Guinea for sauces, soups, jelled salads, noodles, porridges, jelly puddings, confectionary and beverages. The young leaves, shoots and flowers may be consumed as a vegetable. Per 100 g, cooked leaves contain approximately water 89 g, protein 0.4 g, fat 0.1 g, carbohydrates 9.7 g, fibre 7.7 g and ash 0.8 g.

Fibre: The stem fibres are used for binding (ropes), weaving (clothes, fishing lines, baskets) and for paper production.

Fodder: Kudzu is excellent for fodder and silage, if mixed with grass. The green forage contains 14.5-20% crude protein, 2-3.5% fat, 27-36% crude fibre and 7-8.5% ash on dry weight basis.

Other products: Elsewhere in South-East Asia the tubers are used in times of famine.

SERVICES
Erosion control: It is effective for erosion control, provided its growth is controlled well.

Shade or shelter: Kudzu is a good shade plant.

Ornamental: Kudzu also popular as an ornamental climber with fragrant flowers.

TREE MANAGEMENT
At planting, kudzu is fertilized. Plantings should be kept free of weeds during the first year.

Tubers of kudzu can be harvested about 1 year after planting the cuttings. If left longer in the soil they can become very large. For fodder production, the first harvest is possible in the second year, but full production is reached from the third year onwards.

Tubers of kudzu may weigh up to 180 kg when old. A forage yield of 5 t/ha can be expected from good stands on fertile soil.

GERMPLASM MANAGEMENT

PESTS AND DISEASES
Diseases: Fungal diseases in kudzu include leaf-spot (caused by Alternaria spp.), anthracnose (caused by Colletotrichum sp.), stem rot (caused by Fusarium sp.), and damping-off (caused by Pellicularia solani), whereas bacteria (Pseudomonas spp.) may cause blight.

Pests: Nematodes (mainly Meloidogyne spp.) have been reported to attack the roots. Velvetbean caterpillars (Anticarsia gemmatilis) eat the leaves.

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