

Flemingia macrophylla



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Scientific name

Flemingia macrophylla (Willd.) Merr.

Synonyms

Crotalaria macrophylla Willd.
Flemingia congesta Roxb. ex W. T. Aiton
Moghania macrophylla (Willd.) Kuntze
Flemingia latifolia Benth.
Flemingia prostrata Roxb.

Family/tribe

Family: *Fabaceae* (alt. *Leguminosae*) subfamily: *Faboideae* tribe: *Phaseoleae* subtribe: *Cajaninae*. Also placed in: *Papilionaceae*.

Common names

apa apa, hahapaan, pok kepokan (Indonesia); serengan jantan, beringan (Malaysia); laclay-guinan, gewawini, malabalatong (Philippines); thwàx h'èè h'üad, hom sam muang, thoua huat (Laos); mahae-nok, khamin naang, khamin ling (Thailand); tÓp mo'láto, cây dau ma, cai duoi chon (Vietnam).

Morphological description

Perennial, deep-rooting, leafy shrub, 0.5-2.5 m (rarely -3 m) high. Prostrate to erect growth habit, numerous stems arising from the base. Leaves trifoliolate, leaflets elliptic-lanceolate, 5-15 cm long, 2-8 cm wide, silky or hairless, papery when old. Inflorescences mostly dense, axillary racemes, 5-30 cm long, with 15-40 pea flowers; calyx 7-13 mm long; corolla 14 mm long, white to pink or yellowish, densely silky, standard greenish with distinct red blotches or stripes and purple apex, wings rose-pink. Pods oblong, 11-15 mm long, 5-7 mm wide, dark brown and slightly silky, dehiscent, 2-seeded. Seeds globular, mottled brown or shiny black, 2-3 mm in diameter. 45,000-97,000 seeds/kg.

Distribution

Native to:

The humid to subhumid tropics and subtropics of Taiwan, southern China, Cambodia, Laos, Myanmar, Thailand, Vietnam, Indonesia, Malaysia, Bhutan, India, Nepal, northern Pakistan, Sri Lanka, and



Papua New Guinea. Found mostly under trees along watercourses and in grasslands, on clay and lateritic soils.

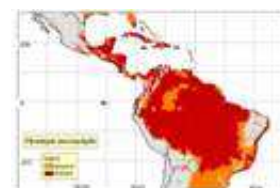
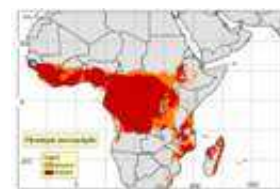
Although native to Asia, it is cultivated and naturalised in sub-Saharan Africa and South America.

Uses/applications

Most commonly used in contour hedgerows for erosion control, often in association with *Desmodium cinereum* (formerly known as *D. rensonii*). Prunings are used for mulch (slow breakdown of leaf due to high concentration of condensed tannins) and green manure in alley cropping systems. It is also used to shade young coffee and cocoa plants, for weed suppression and soil enrichment in orchards, and to provide fuel wood and stakes for climbing crop species. It is considered a poor forage since it has a high fibre and condensed tannin concentrations and is not readily eaten by stock. Pods provide a brilliant orange dye for silk.



Flemingia macrophylla (Willd.) Steud. f. *macrophylla*
 (A. Brown, 1846, 1847)



Ecology

Soil requirements

Will grow on most soils, with very low to moderate (and even high) fertility, with a pH range from 4-8, and high soluble aluminium (80% saturation).

Moisture

Requires a minimum rainfall of about 1,100 mm, and up to 3,500 mm/year, tolerating up to 6 months' dry season. Very drought tolerant. Capable of surviving on very poorly drained and occasionally waterlogged soils.

Temperature

Best growth between 22-28°C, producing minimal growth above 36°C and below 12°C. Found from sea level to 2,000 m asl .

Light

Moderate to high shade tolerance, grouped with *Calopogonium caeruleum* and *Desmodium heterocarpon* subsp. *ovalifolium*.

Reproductive development

Short day flowering response.

Defoliation

Plants grow vigorously once established, if adapted. Excellent coppicing and regrowth capacity after cutting, producing numerous shoots from buds near the base of the stem . Cut at intervals of 6-14 weeks at 35-100 cm above the ground. Cutting interval depends on

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climatic conditions.

Fire

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Moderate fire tolerance.

Agronomy

[Guidelines for the establishment and management of sown pastures.](#)

Establishment

To improve germination, seeds should be soaked in boiled water for 2-3 minutes, stirring the whole time, followed by soaking in cool water for 12 hours. Reasonable results being obtained from cool water soaking alone. Seedlings emerge in 7-14 days. Scarification with concentrated sulphuric acid for 15 minutes is more effective than the hot water treatment, but is more hazardous to the operator. Planting density varies according to the use. For large areas, it can be planted in rows 90 cm apart with a seed planted every 10-20 cm. For hedgerows, it is important to have minimal space between plants within the row if erosion control is to be effective. Weed control is necessary for 3-6 months after emergence, since early growth is slow and young plants are sensitive to competition. Although somewhat promiscuous, best to inoculate seed with strains of *Bradyrhizobium* such as CB 756, CIAT 4203, or CIAT 4215.

Fertiliser

Although adapted to infertile soils, limited fertiliser may be beneficial.

Compatibility (with other species)

Seedlings are slow to develop and cannot compete with other species. Once established, plants are strongly perennial and can tolerate competition from companion species. When grown in orchards, has a beneficial effect on trees. Acts as a trellis for twining legumes.

Companion species

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Grasses: *Brachiaria decumbens* .

Legumes: *Centrosema molle* (*pubescens*).

Pests and diseases

Not susceptible to any major diseases. Can be used to reduce nematode populations of *Paratylenchus* spp., *Helicotylenchus* spp. and *Rotylenchus* spp., but not of *Meloidogyne* spp. *Flemingia* is an off-season host for the pigeonpea pod fly, *Melanagromyza obtusa*, which can reduce seed yields.

Ability to spread

Spread by seed only.

Weed potential

Shows indications of becoming a major weed in some areas.

Feeding value

Nutritive value

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Lower leaf nutrient levels (especially K, Ca, and Mg) than *Leucaena leucocephala* and *Gliricidia sepium* - (1.8-3.9% N; 0.15-0.3% P; 1.0-1.4% K; 0.13-0.94% Ca; 0.20-0.3% Mg). NDMD values for foliage range from 11-53%, most values tending to be in the lower part of the range. Low NDMD values a result of high tannin and lignin levels in the leaves (2.4% tannic acid, 17.2% lignin).

Palatability/acceptability

Palatability is adversely affected by high tannin content of the leaves, immature leaves being considerably more palatable than mature herbage. Can be "disguised" by mixing with grasses and other legumes. More likely to be accepted by grazing ruminants during the dry season when alternative feed is limited or less attractive.

Toxicity

No apparent toxicities, but can lead to suppressed intake.

Production potential

Dry matter

Yields depends on growing conditions, and ranges from 3-12 t/ha/yr leaf DM, more commonly <8 t/ha.

Animal production

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Has been fed to lactating dairy goats for 120 days without harmful effects, although another report showed growth and milk production of goats decreased when the *Flemingia* foliage supplied more than 15% of the dietary DM.

Genetics/breeding

$2n = 22$.

Seed production

Produces flowers and seed within 6-7 months from planting, although first year seed yields are low. Pods are dehiscent, so need to be harvested regularly (twice per week handpicking of ripe pods) before the discharge of seeds. Cumulative yields of up to 200 kg/ha seed can be obtained. Pigeon-pea pod fly (*Melanagromyza obtusa*) can reduce seed yields if active.

Herbicide effects

No information available.

Strengths

- Strongly perennial, multipurpose legume shrub .
- Adapted to acid, infertile soils with high Al.
- Tolerant of waterlogging .
- Suited to low-input smallholder production systems.
- Drought and shade tolerant.
- Vigorous, leafy growth after cutting.
- Coppices readily after cutting.
- Slow breakdown of leaf when used as mulch .
- Dry season forage for (mainly small) ruminants.

Limitations

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- Very poor quality forage for ruminants.
- Low digestibility because of high tannin and fibre content.
- Low palatability to cattle, particularly in the wet season.
- Slow establishment.

Other comments

Selected references

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Internet links

<http://www.fao.org/ag/AGP/AGPC/doc/Gbase/data/pf000154.htm>

http://www.winrock.org/forestry/factpub/FACTSH/F_macrophylla.html

<http://www.cipav.org.co/lrrd/lrrd13/2/soke132.htm>

Cultivars

Cultivars	Country/date released	Details
'Chumphon' (CIAT 17403)	Thailand	Leafy, productive variety.

Promising accessions

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Promising accessions	Country	Details
3 elite accessions	Colombia	Erect or semi-erect types. Better DM yield and digestibility, lower tannin and fibre contents than CIAT 17403. Very low seed production in Colombia.
CIAT 18437 (<i>F. macrophylla</i>)		From West Sumatra, Indonesia (0° 29'S, 190 m asl, rainfall 2,430 mm)
CIAT 21083 (<i>F. macrophylla sensu lato</i>)		From Mae Hong Son, Thailand (18° 40'N, 620 m asl, rainfall 1,300 mm)
CIAT 21090 (<i>F.</i>		From Chiang Rai, Thailand (19° 12'N, 550 m asl, rainfall 1,350 mm)

<i>macrophylla</i> sensu lato)		
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