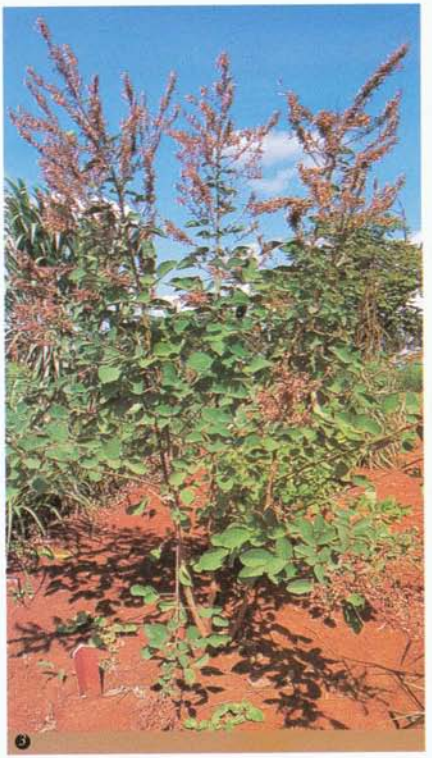
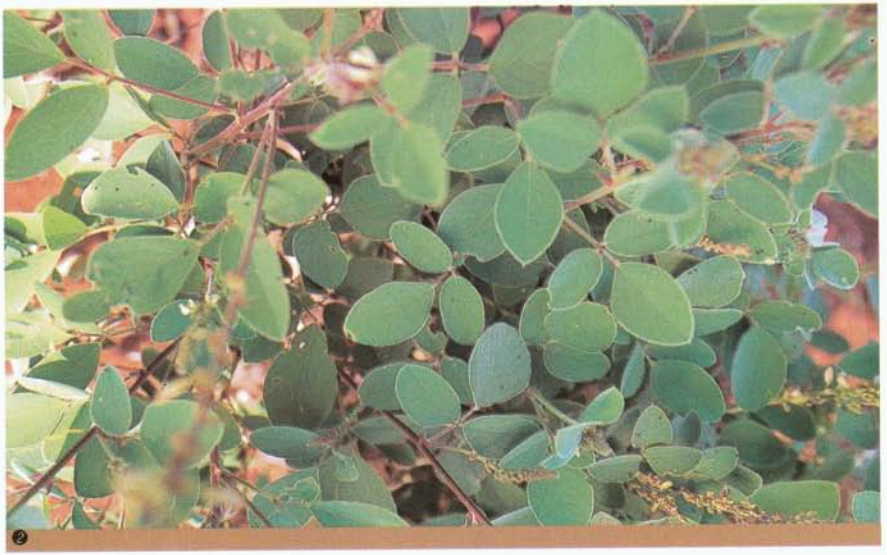
The use of 'Las Delicias' in hedgerows has been promoted widely by the Mindanao Baptist Rural Life Center in the Philippines. It is a high-quality feed supplement which is readily eaten by most animals.

It has to be planted from seed. Seed production is high in most areas where it is adapted.

Note:
A related species is *Codariocalyx gyroides* (see page 71).





❶ *'Las Delicias' grown as hedgerows in Indonesia (WS)*
❷ *It has distinctive round leaves (JH)*
❸ *It produces a lot of seed in most areas of Southeast Asia (JH)*

# Legumes

## *Gliricidia sepium*

**Recommended varieties:**
**'Retalhuleu'**
**'Belen Rivas'**

- easy to plant from stem cuttings
- useful as a living fence
- grows in moderately acid soils
- good dry season feed supplement

*but*

- low palatability for cattle
- susceptible to pests

*Gliricidia sepium* is a medium-sized tree which produces a high leaf yield under frequent cutting. It has pink flowers which distinguishes it from the white flowering *G. maculata*. 'Retalhuleu' and 'Belen Rivas' are more productive and leafy than other varieties of *G. sepium*.

*G. sepium* is one of the few tree legumes that can be propagated easily from stem cuttings. This makes it particularly suited to living fences.

It grows best in wet tropical areas with short to moderate dry seasons. It can grow on acid soils but requires moderate fertility. It will not grow in very acid soils or in cool areas (eg. elevations > 800m). It does not tolerate long periods of waterlogging.

The leaves of *G. sepium* are a high-quality feed supplement that are readily eaten by sheep and goats. Cattle and buffalo often need to be trained to eat it but, once used to its smell, will eat it readily. Mixing leaves of *G. sepium* with other forages is a good way to train animals to eat it. It is successfully used for fattening of cattle in Bali.

During the dry season it normally drops its leaves. If cut late in the wet season, it produces new leaves which stay on the trees until late in the dry season.

There are only a few areas in Southeast Asia where *G. sepium* produces seed. These are areas with a distinct dry season, such as eastern Indonesia. This is not a major problem since it is easily propagated from stem cuttings. Planting from cuttings may give a shallower root system than planting from seed, making the trees less productive in dry conditions.

In humid areas it can be susceptible to insect pests.


❺


❹

❶ Gliricidia sepium *is ideally suited for living fences (PH)*
❷ *'Sheep like eating* G. sepium *(WS)*
❸ Gliricidia sepium *has distinctive pink flowers (WS)*
❹ Gliricidia maculata *has white flowers (PH)*
❺ *'Retalhuleu' produces high leaf yields (WS)*


❷


❸

# Legumes

## *Leucaena leucocephala*

**Recommended varieties:**
**'K 636'**
**'K 584'**

- highly productive
- tolerant of heavy cutting and grazing
- high-quality feed supplement
- good fire wood
- good dry season growth

*but*

- not for acid, infertile soils
- not for monogastric animals
- susceptible to psyllid insects
- needs to be planted from seed

*Leucaena leucocephala* is a long-lived tree that is highly productive under regular cutting. Once established it is extremely tolerant of cutting, and can also be grazed. The leaves can be used as a high-quality feed supplement, especially in the dry season. It produces good-quality firewood.

'K636' and 'K584' are the most productive *L. leucocephala* varieties. 'K636' tends to have a single tall main stem, but produces more branches when cut frequently. 'K584' has more branches than 'K636'. *L. leucocephala* is well adapted to wet tropical areas with a distinct dry season. It grows best on heavy fertile soils with neutral or high pH. It does not tolerate infertile, acid soils or soils prone to waterlogging. It is not well suited to cool conditions.

It can be grown as intensive backyard plots, hedgerows or living fences. It must be planted from seed. Seed production is usually easy. The seed has a hard coat which prevents germination unless it is scarified (refer to the booklet 'Developing forage technologies with smallholder farmers - how to grow, manage and use forages').

As with all tree legumes, seedling establishment is slow and seedlings must be protected from grazing animals, weeds and fire.

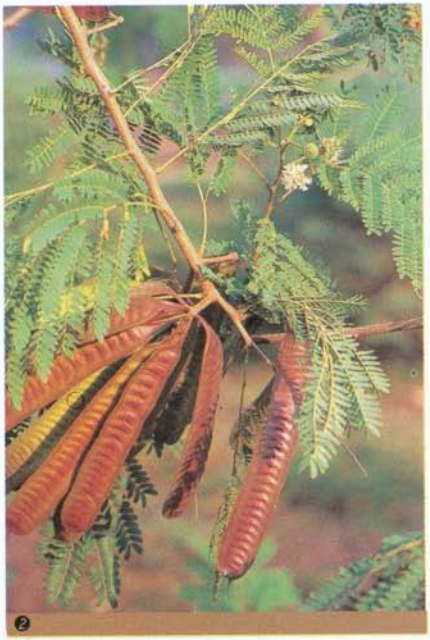
All *L. leucocephala* varieties are susceptible to damage by psyllid insects. 'K636' and 'K584' are more tolerant of psyllids than other varieties (eg. cv. Cunningham).

*L. leucocephala* should not be fed to monogastric animals in large amounts (page 28).

Note: In the future, F1 hybrids between 'K636' or 'K584' and other *Leucaena* species may become available. These are likely to be more productive than 'K636' and 'K584' in areas with high psyllid attack.

❶ Leucaena leucocephala *is often grown with other crops (PH)*
❷ *It is usually planted from seed (JH)*
❸ *It is protein-rich feed (JH)*
❹ *It produces good firewood (PH)*
❺ L. leucocephala is *hardseeded and needs to be scarified before sowing (JH)*


❺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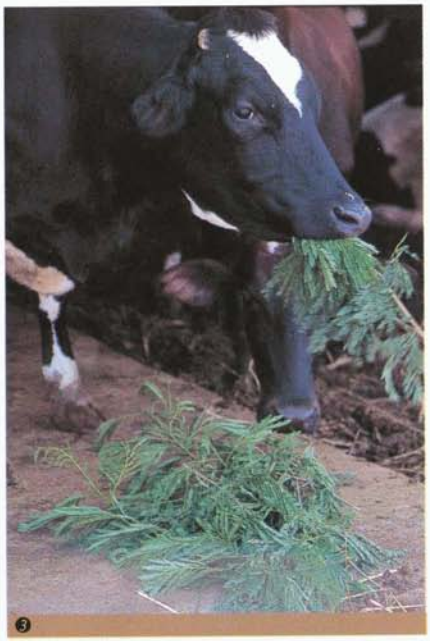
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❹

# Legumes

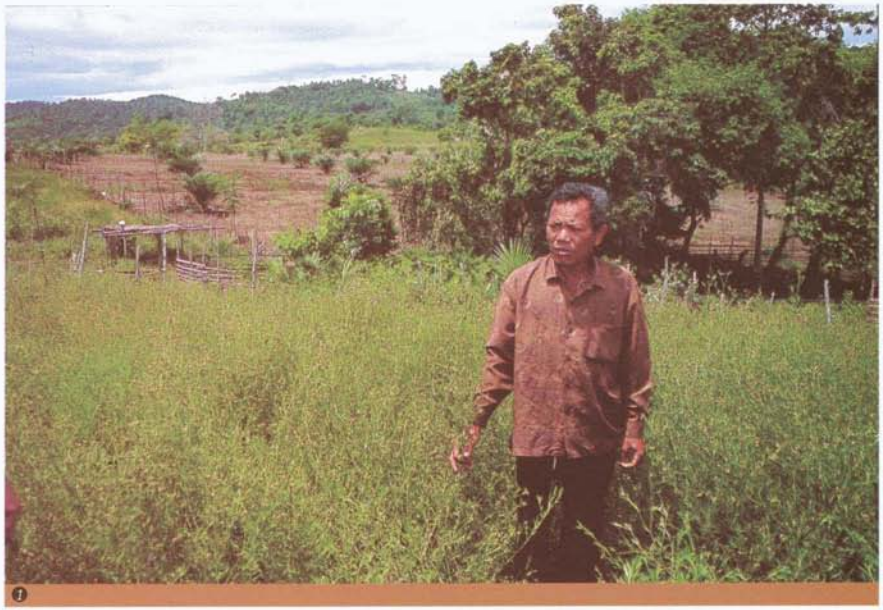
## *Stylosanthes guianensis*

**Recommended variety:**
**'Stylo 184'**

- erect, robust legume for cutting
- highly productive
- good quality feed
- many uses including leaf meal production
- widely adapted to low fertility and acid soils
- leaf stays green into the dry season
- resistant to the fungal disease anthracnose

*but*

- short-lived (2-3 years)
- not tolerant of heavy grazing or frequent cutting



'Stylo 184' is a short-lived perennial legume (2-3 years) that grows into a small shrub with some woody stems.

It is adapted to a wide range of soils and climates but is one of the few herbaceous legumes which will grow well on infertile, acid soils. It will not grow on very alkaline soils (pH >8). Unlike earlier varieties of *S. guianensis* (eg. cv. Schofield, Cook and Graham) 'Stylo 184' has shown good resistance to the fungal disease anthracnose in Southeast Asia.

It is usually grown as a cover crop which is cut every 2-3 months. It effectively suppresses weeds and is a good feed supplement for animals including chickens, pigs and fish. 'Stylo 184' can be fed fresh or dried for hay and processed into leaf meal.

It does not tolerate being cut close to the ground since there are few buds on the lower stem for regrowth. This can be improved by making the first cut at 10-20 cm to encourage branching close to the ground. Subsequent cuts must be made higher (>25 cm) to ensure good regrowth.

It is usually planted from seed, although some farmers are using stem cuttings. Seed production is possible in most areas but is best in areas with a distinct dry season.

Note: It is possible that 'Stylo 184' may one day become susceptible to anthracnose. New varieties of *S. guianensis* are being evaluated in Hainan, China for better resistance to this disease.

❶ *Stylo 184 grown as a fallow crop and fed sheep in Indonesia (WS)*
❷ *It produces seed in most areas in Southeast Asia (EO)*
❸ *It can be easily recognised by its leaf shap and yellow flower (WS)*
❹ *Stylo 184 is a protein-rich feed (JH)*

# Other potentially useful forages

The following potentially useful forage species are only for special situations, or have yet to be proven in smallholder farming systems:




## Grasses

***Brachiaria mutica* 'Para' ❶**
It is common throughout the region in poorly drained and flooded soils. In Thailand it is grown for dairy cattle in paddy fields which were previously growing lowland rice. It is not suited for drier conditions.

***Digitaria milanjiana* 'Jarra' ❷**
It is a low-growing, stoloniferous, perennial grass with soft leaves. It is best suited to areas with a short dry season. Its adaptation is similar to that of *Brachiaria decumbens* and is of particular interest because it can be fed to sheep, goats and young cattle.

***Paspalum guenoarum* 'Bela Vista' ❸**
It is very similar to P. atratum. It is less productive, but has softer leaves and is very palatable. It is not suited to very high rainfall areas where it is susceptible to leaf spot fungus.

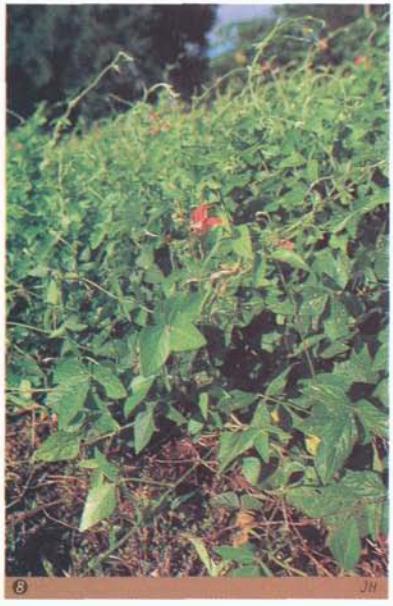

***Stenotaphrum secundatum* 'Vanuatu' ❹**
It is a strongly stoloniferous grass suitable for grazed plots in moderate shade. Smallholder farmers in Vanuatu use it extensively in grazed pastures under coconuts. It is adapted to the humid tropics with no or only a short dry season, and grows best in soils with high organic matter. Its feeding value is slightly lower than that of *B. humidicola*. 'Vanuatu' produces no viable seed but is easily propagated by stolons. Here grown with 'Amarillo'.


## Legumes


***Centrosema pascuorum* 'Cavalcade' ❺**
It is an annual, twining legume which may be used as a cover crop or fallow species. Its adaptation is similar to that of *Macroptilium gracile* (see below). In Thailand it is used for making hay.

***Codariocalyx gyroides* 'Belize' ❻**
It is a short-lived (3-4 years), small woody shrub which is very similar to *Desmodium cinerea* (previously *D. rensonii*). 'Belize' grows best in the wet tropics and can tolerate waterlogging.

# Other potentially useful forages


***Flemingia macrophylla* 'Chumphon' ❼**

It is a long-lived, large woody shrub. 'Chumphon' is the most leafy and productive variety available. *F. macrophylla* is one of the very few shrub legumes which will grow well on very infertile, acid soils. It is best suited to the wet tropics. Leaves are not readily eaten by animals, since they contain high levels of tannins. Goats will eat leaves of *F. macrophylla* if they are mixed with other feed. Cut branches are useful for improving soil fertility, since leaves break down slowly in the soil.

***Macroptilium gracile* 'Maldonado' ❽**

'Maldonado' is a short-lived (1-2 years), twining legume that is particularly vigorous for the first few months after sowing. It is an excellent short-term cover crop and can be used for grazing in mixtures with grasses. 'Maldonado' can be grown in a wide range of soils, including infertile and sandy soils. A special feature is that it survives waterlogging and short-term flooding.

### *Sesbania grandiflora 'Turi'* ❾

It is a fast growing, short-lived (3-5 years), single-stemmed tree. It is a high-quality feed supplement, especially for the dry season, but leaf yields are low. It is well adapted to areas with a long dry season but needs moderate soil fertility. 'Turi' dies if the main stem is cut but side branches can be trimmed regularly. Local varieties are available in many parts of Southeast Asia.


### *Stylosanthes hamata 'Verano'* ❿

A very hardy short-lived (1-2 years) legume for heavily grazed plots in areas with a long dry season. In northeast Thailand it has been oversown along roadsides and vacant areas.