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The purpose of this key

This key is intended to support the improved management of Lao rattans. Users of this key should, with practice and care, be able to identify most of the rattans they encounter. Once the scientific name of a rattan is known users can go on to learn all that has been discovered and published about that species, both in Lao and elsewhere. This is a crucial step in making the best use of rattans for the benefit of the Lao people.

Rattans contribute greatly to the Lao economy by producing flexible canes and edible shoots which are used within country or exported. They are a prime example of the value of biodiversity, the rich variety of living things which have made Lao their home. Maintaining this valuable resource is one of the reasons why Lao has recently declared many large protected areas. Yet the productivity of wild rattan populations is under threat. We believe there is scope for improved production both through cultivation (using seed from the protected areas) and better planning of harvests from the wild. There are many species of rattans in Lao and they vary greatly. For instance, some resprout after cutting, others die. The growth rates vary from a few centimetres per year to several metres. Stem quality, soil preferences and fruiting season all vary from one species to the next. Without this information, efforts to plant or manage rattans will falter. With it we hope that a more profitable and sustainable rattan sector can be developed in Lao.

What are rattans?

Rattans are spiny palms with scaly fruits. Most of them have long, flexible climbing stems and long hooked whips which they use to cling onto other trees for support. There are also includes several non-climbing species which are such close relatives that they might be confused in the field. The Lao word used for rattans (*wai*) is also applied to at least three other species, two of which are not even palms, so take care! To see illustrations of them, [click here](#).

The scope of this key

The focus of this key is Lao People's Democratic Republic (or simply 'Lao'). But since the rattan flora of Lao is not fully known we also include information for nearby parts of other countries. These are Vietnam, Cambodia, Xishuangbanna Prefecture in Yunnan, China and the following regions of Thailand used by the Flora of Thailand Project: North, North-east, East, South-east and Central. Together Lao and these neighbouring areas are called 'Indochina' in the rest of this key.

This key includes all 50 rattan species confirmed to occur in Indochina ([listed here](#)). They are in six genera: *Calamus*, *Daemonorops*, *Korthalsia*, *Myrialepis*, *Plectocomiopsis* and *Plectocomia*. We have recorded 32 species from Lao if we include three for which records have not yet been completely confirmed. One distinctive unnamed form, *Korthalsia* sp A from Lao, is also included but this may prove not to be a separate species. Many of the other Indochinese species in this key might be found in Lao if scientists search for them.

The key is based on a study of wild plants and herbarium specimens from Indochina. For each species we have only included information which is certain to refer to that species, because it is based on specimens. We have generally not used information from books and reports which do not mention specimens because we cannot check that the species were

identified correctly.

The scientific basis for this key will be published separately, hopefully in the Kew Bulletin. It will include a list of all the specimens we examined and it will justify the names which have been chosen for the species in this key. During research for the key four new species of *Calamus* were discovered and named (*Calamus solitarius*, *C. oligostachys*, *C. bimaniferus* and *C. laoensis*). Four others were discovered but had not yet been formally named when this key was published (*Calamus* sp A and sp B and *Daemonorops* sp A and sp B). Many other species were found to have two or more different scientific names. To avoid confusion each species should only have one name. According to international rules the oldest name is used and other names are discarded (see the book edited by W. Greuter in the Further Reading section). Below we give some [alternative names](#) which have been used in the past for the species in this key. These will be helpful if you look for information in other books using a different system of names. Further research in the future will probably cause further name changes, and may result in other new species being discovered and named.

How to collect rattans for the herbarium

It is easy to collect a bad herbarium specimen of a rattan. This is a waste of time because identification will not be possible. **Making a good specimen takes time** but so few have been collected in the past that each one you do get will form a significant addition to our knowledge. It might one day even be the basis for naming a new species. Many species (e.g. *Calamus poilanei*, *Calamus godefroyi* and *Daemonorops jenkinsiana*) were named after the first person who collected them.

Rattans are usually too large to collect whole, so you only take small parts. In particular **a complete specimen should include:**

- the leaf sheath (including any ocrea) and a 30 cm section of cane
- pieces of leaf taken from the petiole, middle and tip of the rachis. Snip off the leaflets on one side to save space but leave the bases to show their arrangement.
- the cirrus or flagellum
- the inflorescence. If it is too large cut a section of the axis which bears a major branch and all its sub-branches. Take care to include the upper part of one of the axis bracts.

Collect from the top of the plant if possible, but don't collect very immature parts (e.g. leaves which have not yet opened). Include leaves and sheaths from low down if they are markedly different. If you cut two stems from a clump look for connecting roots to check that it really is the same species.

When you cut up the rattan, each separate piece should have a numbered label attached. All the pieces you collect of one sex of one species collected in one place at one time form part of a single herbarium specimen and they should all have the same number. This number should be different from any other specimen you have collected. Rattan specimens take great delight in mixing themselves up with one another and without the label it will be impossible to be sure which piece belongs where.

Try to collect at least two complete sets of pieces. This will allow you to keep one set in Lao and send one set to a larger herbarium for critical naming if need be.

Bundle the parts in newspaper tied with string and seal them in strong plastic bags with enough **70% ethanol** to wet everything fully. On return from the field transfer them to a drying frame. Press the leaves and inflorescences but don't press the sheath and other very spiny parts – this will damage the spines.

Almost as important as the specimen are the **collection notes**. You can copy the field sheet ([click here](#)) to use in the field. As a bare minimum note your name, the date of collection, the habitat type, the altitude and the location. Give the location in as much detail as you can – it should include country, province, district, nearest village and the name of the nearest river, mountain or other geographical feature.

Also note the appearance of the living plant. It can be difficult to look at a herbarium specimen and get an idea of what the whole plant looks like. The notes do not need to describe the pieces you have collected – people will be able to see what shape the leaflets are or how long the sheath spines are! Instead you should **write those things which cannot be seen in the specimen** – especially those things listed on the sample sheet.

If you are collecting with one or more local people who know a lot about the rattans in that area write down the names they use for the species and any information they can give you about the uses, marketability, fruiting times and other interesting features.

Managing and conserving wild rattans

Harvesting rattan can sometimes reduce populations so much that future harvests are not possible. This is particularly likely for species with solitary stems which cannot resprout after cutting. The huge solitary species *Calamus poilanei* has been virtually eliminated from very large areas of forest in Lao by commercial harvesting. Because regeneration from seed is so slow, the chance of a future harvest has been lost for a long time. The same fate has befallen the giant solitary species *C. manan* in the Thai-Malay Peninsula. One other solitary-stemmed Lao species, *C. solitarius*, is commercially important and we predict that it too will be very vulnerable to over-harvesting.

For clustering species the risk of over-harvesting is a more long-term one since the individual clumps usually survive harvesting. Prolonged heavy harvesting will prevent seed being set so new clumps will not be produced and the population will gradually age and shrink. This is probably happening over large areas of Lao forest, since harvesting is so extensive.

Heavy harvesting of young canes may also lower the economic productivity of a rattan population. There is little available information on which to base management decisions and more studies are needed, both biological and ethnobotanical. Rattans perhaps grow faster once they reach the canopy and in that case it would be more profitable to wait until they have been in the canopy for a while before cutting them. Cutting them all while they were still in the shady understorey would mean no stem ever reached its maximum growth rate.

Managing the harvest of wild rattans will be difficult for many reasons, in particular the lack of legal tenure over forest resources. This means people from one village trying to manage a stand of rattans for the future cannot exclude people from elsewhere who wish to cut them all immediately. Other difficulties include the lack of cultural precedent for managing forest resources, the very large areas of forest involved, the low staffing levels of district forestry offices or protected areas and the poverty of many rural people which forces them to over-harvest in the short term just so that they can survive. The national programmes of land allocation, management around protected areas and improving rural education may all help but it is still going to be very hard to avoid rattans being completely over-harvested in most areas.

The Lao government has declared a large system of protected areas. Managing them is very difficult, but if they are well protected they could potentially ensure the long term survival of most Lao rattan species and most other plant species in the country. Most of the forest outside

them will probably be cleared or have their rattans over-harvested in the future, so protected areas will be the main sources of new species and seeds for cultivation.

Ten Indochinese species are listed as Threatened in the 1997 Plants Red Data Book. Two, *Calamus harmandii* and *Calamus poilanei*, are known from Lao whilst most of the rest are only known from Vietnam. Now there is better information from Lao this needs to be reviewed. As noted above, *Calamus solitarius* should perhaps also be considered for this list. Lao also has a special responsibility for *Calamus laoensis* and *Calamus bimaniferus* which are known only from Lao and for *Calamus oligostachys* and *Calamus hypoleucus*, each of which is known from only two sites, one of them in Lao.

Planting

Forest clearance, population growth and heavy harvesting are reducing the supply from the wild at a time of increasing demand. This is making plantations more economically viable. Commercial planting has already begun for shoot production, perhaps because convenient wild sources of this perishable vegetable have already been exhausted within reach of the main Lao towns. There is one *C. viminalis* plantation producing shoots in Bokeo Province and one village in Salavan Province where *Daemonorops jenkinsiana* is planted. *C. tenuis* has been grown in the Vientiane area since 1994 and is so successful that by late 1998 there were dozens of growers with over 70 ha of plantations in several provinces. The spread has continued since then. These plantations are grown in open fields with stocking of about 1600 plants/ha and can be very productive on good sites – reportedly up to 1 shoot per plant per month can be harvested (see the next section for more details). The inspiration to plant *C. tenuis* in Lao came from north-eastern Thailand where shoot plantations were first tried in 1991 and now cover several thousand hectares. In Thailand *C. viminalis* is the preferred species (although the plantation owners call it *C. siamensis*) with some true *C. siamensis* and *C. tenuis* also planted.

Commercial plantations for stem production do not exist in Lao. They cannot yet compete with the wild stocks which remain in remote areas. Also, cane plantations give a slow return. They can take 6-20 years to yield a harvest, depending on the species, compared with 1-2 years for shoot production. Nonetheless the Lao government can foresee cane shortages in the future and is supporting small plantation and nursery trials at the Forestry Research Centre's field station at Nam Xuang, near Vientiane (see next section).

In Ban Phon Pao, Tulakhom District, Vientiane Province there is a successful 3 ha *C. viminalis* rattan garden. It is not a true plantation since most of the plants are haphazardly self-seeded. The area is managed to encourage the rattans and a steady supply of canes, shoots and fruits is harvested for sale. The garden also produces grazing for livestock, firewood, mushrooms, fruit, and medicinal plants and it may be a useful model for integrating rattan into village gardens and agroforestry systems elsewhere in Lao.

In South Thailand there are small trial plantations of at least four species. In South Yunnan trials and government subsidised commercial plantations concentrate on *C. yunnanensis* (= *C. acanthospathus*) and *C. nambariensis*. In Vietnam there are reportedly thousands of hectares of rattans planted to produce stems for home use and sale, often as small areas along fences or in home gardens. The main species planted is reportedly *C. tetradactylus* (which has been planted for over 100 years) with smaller amounts of species given the names '*C. armarus*' (probably the same as *C. tenuis*), *C. platyacanthus*, *C. rudentum*, *C. poilanei*, *C. palustris*, *C. dioicus* (possibly *C. salicifolius* or true *C. dioicus*) and *C. tonkinensis* (which is the same as *C. walkeri*).

Cultivation techniques

What to plant and where

Rattans can be planted to produce stems or shoots. For shoot production *Calamus viminalis*, *C. siamensis* and *C. tenuis* grow well in central Indochina. Others may be suitable for different areas. For example, *Daemonorops jenkinsiana* may be suitable in hilly areas below 1000 m, including places at risk of occasional fires, and *C. nambariensis* may be good in very high altitude areas of northern Indochina.

No stem plantations have been tried in Lao so it is difficult to recommend which species to plant where, but some promising species are listed in the table below. *C. tetradactylus* and *C. platyacanthus* are especially recommended by Vietnamese scientists for planting to produce stems. We have not seen their specimens of these so we are not certain they are the same as the species with these names in this key, but the descriptions they give sound very similar.

Typical diameter	High quality	Moderate quality or quality uncertain
Large (≥ 2 cm)	<i>Calamus poilanei</i> , <i>C. rudentum</i>	<i>C. laoensis</i>
Medium (1-2 cm)	<i>C. nambariensis</i> <i>C. platyacanthus</i> <i>C. wailong</i>	<i>C. viminalis</i> , <i>C. siamensis</i> , <i>C. tenuis</i> <i>C. godefroyi</i> , <i>Daemonorops jenkinsiana</i> , <i>Myrialepis paradoxa</i> , <i>Plectocomiopsis geminiflora</i>
Small (≤ 1 cm)	<i>C. acanthospathus</i> , <i>C. gracilis</i> , <i>C. solitarius</i> , <i>C. tetradactylus</i> , <i>C. palustris</i>	<i>C. guruba</i> , <i>C. henryanus</i> , <i>C. oligostachys</i> , <i>C. bimaniferus</i>

Plantations producing shoots do very well in open fields with no shade, at least for the three lowland species mentioned above. Plantations for stems require supports for climbing, so they are usually put in tree plantations, orchards, logged or regenerating forest. Studies in Malaysia and Indonesia show that stems grow fastest with quite a lot of light; about 50% canopy cover seems ideal for many species. To achieve this select an area with few large trees, otherwise you may need to kill some of the canopy trees in the area you are planting.

Almost nothing is known of the soil preferences of Lao rattans, although *C. tenuis* seems to grow best in moist, alluvial soils which flood every year. Preferred altitudes can be estimated from the altitudes where the species occurs naturally. For example, wild *C. tenuis* has only been found below 300 m and wild *C. viminalis* has only been found below 600 m, so planting these species at higher altitudes will probably be difficult. Most species will probably grow best in provinces where they grow naturally, and from locally collected seed which will be fresh and adapted to local conditions.

Nursery techniques

Collecting seedlings from the wild gives very poor results for rattans. In North Vietnam people reportedly propagate one species ('*C. armarus*', probably the same as *C. tenuis*) by digging up parts of the mature rootstock and this is also done sometimes in Thailand when seed is not available, but this is unusual and only works on a small scale. It is usually best to grow from seed. In Lao nursery techniques are best developed for *C. tenuis* but are still being improved by experimentation. The following advice refers mainly to *C. tenuis*.

Firstly, it is important not to confuse this species with *C. viminalis* which grows in similar areas and is often also called *nyair* or *wai nyair* in Lao (see species account 4). In Lao *C. tenuis* begins to flower during September to November and the fruits begin to ripen during March

through to May. Ripe fruits have a skin which is whitish and a flesh which is reddish-brown with a sweet-sour taste. They are then ready for propagation. Collecting later in the season ensures the fruits are ripe and also means weather conditions are cooler and wetter, which is good for germination.

When collecting the fruits you should climb a nearby tree and cut the fruiting branch required. You should tie a string to the branch before cutting so that it does not fall and knock off the fruits. Once cut, the fruits should be removed from the branch. If you need to transport them, put them in a bag or sack which lets the air circulate, never a plastic bag. If you cannot plant them immediately they should be stored in a place which remains humid. Do not store them for more than a few days or germination will be poor.

Two alternative preplanting treatments can improve germination percentage and speed. For large quantities it is easiest to soak them in cold water for 7-10 days. Change the water every day to prevent mould. The skins and soft flesh should be removed, either before or after soaking. The second method is only practical for smaller quantities. After removing the skin and flesh, use a sharp pointed knife to remove a small cap which covers the embryo (also called the hilar cover). Take care not to cut the embryo.

Seedbeds are usually used for germination. However, we have found that it is easier for *C. tenuis* to mix the treated seeds with a deep bed of coconut fibres in a plastic bowl and keep them moist and covered in a cool place. Once they have germinated you can easily pick them out and plant them on. If you want to use a seedbed it should be aligned north-south and roofed with a net or coconut leaves to give about 50% shade. The soil should be turned over and carefully weeded a week before sowing. Raise the level of the bed 15-20 cm with a mix of 1 part sand to 3 parts soil.

Water the bed thoroughly, scatter the pre-treated seeds across the surface and then cover with a 1.5-3 cm layer of rice husks, sand or soil. This keeps water near the seeds and also stops them being washed away during watering. Water every day.

The seeds will begin germinating after about 15 days (untreated seeds would take 3-5 months) and continue to emerge little by little until 90 days, by which time almost all have sprouted. The first leaf appears when the seedling is one month old, at which time it will be 3 cm tall with a small root. This is the ideal time to transplant to polybags.

The polybag nursery should also have a net providing 50% shade. After one month you should remove the net so the seedlings can develop sunlight tolerance. Water the seedlings thoroughly before transplanting, transplant on a cool, cloudy day and separate the seedlings carefully with a stick to avoid damaging them.

You should make a hole about 10-15 cm deep in the soil of the bag the seedling is planted into. Plant the seedling upright then press the soil down firmly all around it. A usual size of bag is $3/5 \times 7$ to $4/6 \times 10$, and the medium one part sand to three parts soil.

Take good care of the seedlings, watering them daily if it is not raining. So far no serious losses due to disease have been reported from Lao, but to be safe remove diseased or dead seedlings quickly. Weed regularly to prevent weeds overtopping the seedlings. Once the seedlings have reached 45 days old we find it useful to add N:P:K 15:15:15 fertiliser, (one soup-spoon per 20 litres of water every 15 days), and increase this to two spoons when the seedlings are about four months old. Stop feeding two months before transplanting.

Plantation techniques

When the seedlings are 9-12 months old they will be strong and able to tolerate growing outside, so this is a suitable time to plant them out. At this time the rainy season should have begun so the soil will be good and moist. Suitable soil will be quite rich, a mix of sand and loam. If possible it should be close to water. This will be good because *Calamus tenuis* likes to grow in moist areas and it makes watering easier. Clear the area, plough a week before planting and use

a spacing of about $0.5-1 \times 2.5$ m.

We suggest adding some N:P:K 15:15:15 fertiliser in the bottom of each hole before planting, about 3 spoonspoons per hole. Take care not to break the ball of earth when removing the polybag because this will kill the seedling. Put the seedling in the middle of the hole, add more earth and tread it firmly.

After planting, water the plantation morning and evening for 2-3 days so the seedlings take and grow well. After that you can reduce it to once per week. After 2 months we find it useful to put N:P:K 46-0-0 or 18-46-0 fertiliser on at about 2 spoonfuls per plant, about 25 cm from the plant, or manure (about half the volume of the planting hole per plant). After fertilising you should water or the plant will die. When the plants have been out one year you should start to add fertiliser at the rate 1-2 g / plant / 2 months. Small grasshoppers may visit the plants, but this is unlikely to be a serious problem.

Shoots can be cut from the age of approximately eight months after planting (depending on the site and weather), by which time the clumps should have 4-5 shoots each. The first cut should be the longest stem; two weeks later you can probably cut again. On average a single clump can be harvested up to once per month. If you irrigate production is year-round, if not production is limited to the seven months of the rainy season.

You should cut shoots which are 1-1.5 m tall. Pick shoots which have the last exposed sheath about 10-15 cm long because this is when the edible part of the shoot is longest. Cut about 25 cm above ground level, because this seems to improve the growth of new shoots. Shoots stay fresh enough to sell for several days. Shoots for sun-drying are steamed first, which ensures quicker drying and prevents them going black.

The above method is probably adequate for other species but for the best results it may be necessary to change some details. Work on this subject is not complete but initial nursery trials with some other Lao rattan species have given the following results:

C. viminalis and *C. siamensis* – need to be pre-treated for good germination. Soaking for a week is effective. Removing the embryo cover works well in Thai studies.

C. solitarius – soaking the seeds for a week greatly improves germination.

C. poilanei and *Daemonorops jenkinsiana* – soaking improves the germination percentage but it remains slow (it can take 4-6 months).

Myrialepis paradoxa – 90% germination was achieved with no pre-sowing treatment, so treatment is probably unnecessary.

In South Yunnan at high altitudes *C. yunnanensis* (= *C. acanthospathus*) and *C. nambariensis* germinate well in nurseries with no pre-sowing treatment.

Detailed information for the species planted in Vietnam can be found in the book by Dung and Guang (1996) and for Thailand in the book by Kundilok and others (1997). These are listed in the section on Further Reading. The methods are generally similar to those described above, although the details vary for each species. *C. platyacanthus* is quite difficult to germinate so they recommend soaking the seeds in dilute sulphuric acid or hot water for a few minutes to encourage them. Both books state that seeds of some species can be stored for up to three months if kept in a fridge or in moist sand. In Vietnam they recommend planting for stem production in various places: home gardens, living fences, logged forest, stream sides, forest edges and scrub growing up after shifting cultivation. In scrub you need to plant some tall trees to provide shade and support in the future. In logged forest they suggest that you plant in cleared strips with 2-3 seedlings together in each spot, and make sure there is enough light by continually trimming trees and bushes.

Checklist of Indochinese rattans and alternative names

After each species name we list the person who first used it publicly. Becc. = Beccari.

- 1** *Calamus acanthophyllus* Becc.
2 *C. harmandii* Pierre ex Becc.
2a *C. oxycarpus* Becc.
2b *C. sp A*
3 *C. erectus* var. *erectus* Roxburgh
3a *C. dongnaiensis* Becc.
3b *C. sp B*
4 *C. viminalis* Willdenow
4a *C. thysanolepis*
var. *thysanolepis* Hance
5 *C. siamensis* Becc.
5a *C. walkeri* Becc.
6 *C. tenuis* Roxburgh
6a *C. godefroyi* Becc.
7 *C. guruba* Buchanan-Hamilton
8 *C. poilanei* Conrard
8a *C. ceratophorus* Conrard
9 *C. acanthospathus* Griffith
9a *C. bousigonii* Becc. ssp. *bousigonii*
10 *C. gracilis* Roxburgh
11 *C. henryanus* Becc.
12 *C. solitarius* T. Evans *et al.*
13 *C. oligostachys* T. Evans *et al.*
14 *C. tetradactylus* Hance
15 *C. kingianus* Becc.
15a *C. dioicus* Loureiro
16 *C. bimaniferus* T. Evans *et al.*
17 *C. hypoleucus* (Kurz) Kurz
17a *C. salicifolius* Becc.
18 *C. laoensis* T. Evans *et al.*
18a *C. longisetus* Griffith
19 *C. flagellum* Griffith var. *flagellum* and
var. *furvifuraceus* S.J. Pei & S.Y. Chen
20 *C. rudentum* Loureiro
21 *C. rhabdocladus* Burret
22 *C. palustris* Griffith
var. *cochinchinensis* Becc.
23 *C. nambariensis* Becc.
23a *C. obovoideus* S.J. Pei & S.Y. Chen
24 *C. platyacanthus* Warburgh ex Becc.
25 *C. wailong* S.J. Pei & S.Y. Chen
26 *D. jenkinsianus* Martius var. *jenkinsianus*
26a *D. sp A*
26b *D. sp B*
27 *Korthalsia laciniosa* (Griffith) Martius
27a *K. bejaudii* Gagnepain ex Humbert
27b *K. sp A*
28 *Myrialepis paradoxa* (Kurz) J. Dransfield
29 *Plectocomiopsis geminiflora* (Griffith) Becc.
30 *Plectocomia pierreana* Becc.
30a *P. kerrana* Becc.
30b *P. assamica* Griffith
31 *P. himalayana* Griffith
31a *P. elongata* var. ? Martius ex Blume.

Equivalent, alternative names which have been used in Indochina:

- 2** *Zalacella harmandii* (Pierre ex Becc.) Becc., **4** var. *fasciculatus* Becc. and subvars, **5** var. *malaianus* Furtado, **5a** *C. tonkinensis* Becc., **7** *C. multirameus* Ridley, **9** *C. feanus* Becc. and *C. yunnanensis* (and all its vars) S.J. Pei & S.Y. Chen, **11** *C. balansaeanus* Becc., **13** *C. pauciflorus* T. Evans *et al.* non Ridley, **14** var. *bonianus* (Becc.) Conrard, *C. cambojensis* Becc. and *C. bonianus* Becc., **17a** var. *leiophyllus* Becc., **19** var. *karinensis* Becc. and *C. karinensis* (Becc.) S.J. Pei & S.Y. Chen, **21** *C. pseudoscutellaris* Conrard and var. *cylindrocarpus* Conrard, **22** *C. loiensis* Hodel and *C. kerrianus* Becc., **23** the five vars named by S.J. Pei & S.Y. Chen, **24** var. *mediostachys* S.J. Pei & S.Y. Chen and *C. giganteus* var. *robustus* S.J. Pei & S.Y. Chen, **26** *D. schmidtianus* Becc., *D. pierreanus* Becc. and *D. margaritae* (Hance) Becc., **26a** *D. longispathus* Conrard non Becc. var. *mollispina* Conrard, **26b** *D. geniculatus* Conrard non (Griffith) Martius, **27** *K. grandis* Griffith, **28** *M. floribunda* (Becc.) Gagnepain and *Bejaudia cambodiensis* Gagnepain, **30** *P. cambodiana* Gagnepain and *P. barthana* Hodel

Further reading

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There are also useful articles in the journal *Palms* (formerly *Principes*) and the *Newsletter* of INBAR (the International Network for Bamboo and Rattans).

Leaflets on rattan cultivation are available from the Forest Research Centre, Vientiane.

Some other plants sometimes called 'wai' in the Lao language

Salacca wallichiana Mart.

Sometimes called wai louang.

A big spiny palm with scaly fruits, closely related to the rattans. The stem can be over 10 cm diameter and over 1 m tall. The lower part often lies down and produces extra roots. The leaves are over 4 m long, the petiole very deeply channelled and the leaflets strongly grouped. The inflorescences are pendulous and emerge through a split in the leaf sheath. In Indochina known from the lowlands at one or two sites in Bokeo Province, NE Lao (possibly introduced), and also in SE and Central Thailand. Planted commercially in Thailand for the big, sour-sweet fruits.



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NO SPECIMEN

Combretum roxburghii Spreng.

(= *Combretum decandrum* Roxb.)

Sometimes called 'wai din'.

A woody climber with no spines, no leaf sheaths, branching, unsegmented stems, rough bark, opposite leaves, a branched head of small flowers and winged fruits. It doesn't look much like a rattan but the flexible stems are a low-quality substitute for rattan cane.

◀ *Pothos scandens* L.

Sometimes called wai sanoy.

A climber with no spines. The leaves look a little like the pinnate leaves of a rattan, but in fact each 'leaflet' is a separate leaf and the 'rachis' is a stem of the plant. The petiole has expanded 'wings' similar to some *Citrus* species. The inflorescence is small, purple-yellow and stands on a sharply bent stalk.



NO SPECIMEN

Authorship

The key was developed by Tom Evans and Don Kirkup. The field guide upon which the key is based was jointly written by Tom Evans, Khamphone Sengdala, Oulathong V. Viengkham and Banxa Thammavong. All line drawings are by Banxa Thammavong. All photography is by T. Evans except in species accounts 15 and 28, right, (J. Dransfield), *Pothos scandens* (P. Boyce) and *Combretum roxburghii* (Media Resources).

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