

Final Monitoring Report

DOI MAE SALONG FRAMEWORK SPECIES EXPERIMENTAL PLOT



Patchy canopy closure is being achieved in the demonstration forest restoration plots at Doi Mae Salong, 18 months of after planting 28 framework tree species.

Stephen Elliott, Kwankhao Sinhaseni and Greuk Pakkad

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Background

Thailand's Supreme Command, in collaboration with IUCN and FORRU-CMU (Forest Restoration Research Unit, Chiang Mai University), aims to restore forest to 1,440 ha of degraded land at Doi Mae Salong (DMSL), Chiang Rai Province (more than 1,200 m above sea level). This 14-year project has been adopted by IUCN's 'Livelihoods and Landscapes' Initiative, with the forestry component sponsored by Plant a Tree Today. The sites being restored are exhausted former agricultural areas on steep land at risk of soil erosion and landslides. The objectives are i) to transform degraded areas into forest to honour the Royal Family and ii) to prevent soil erosion.

FORRU-CMU contributed to this project by providing technical and scientific assistance to restore the forest landscape so that a self generating ecosystem can once again be created. Sixty participants from the DMSL (including village leaders, local authority officers, school teachers and forestry officers) attended 3 workshops, implemented by FORRU-CMU staff in Chiang Mai, on the general concepts and skills needed for forest restoration. We are now providing training in tree nursery techniques on-site at 8 school tree nurseries, throughout 2009.

As part of this program, an experimental plot was established to test the suitability of the framework species method of forest restoration (FORRU, 2006) in the project area. FORRU-CMU and IUCN staff visited the project area in April 2008 to select a suitable site for a framework species experimental plot, near Ban Lo Yo, in collaboration with the village committee there. Arrangements were made with the villagers to plant the site the following June and subsequently take care of the planted trees.

The Planting event

FORRU-CMU supplied 5,000 saplings of 28 framework species from our research tree nursery and supervised transport of the trees to the planting site on 4th June 2008. On 6th June 2008, FORRU-CMU staff assisted IUCN and the Supreme Command to establish the framework species experimental plot. An area of 10 rai was planted with 500 trees per rai, resulting in an average spacing between the planted trees of 1.8 m. Several military units, local governments, villagers and FORRU-CMU staff (totally more than 200 people) all shared in the work of planting day. FORRU-CMU staff provided instruction to the tree planters.



*Planting day
June 2008.*

Table 1 - Scientific and Thai names of planted framework tree species for the demonstration plot

Species	Family	Thai name
<i>Acrocarpus fraxinifolius</i>	Leguminosae(C)	สะเดาข้าง
<i>Adinandra integerrima</i>	Theaceae	พิกุลป่า
<i>Albizia lebbeck</i>	Leguminosae(M)	พฤษภ
<i>Aphanamixis polystachya</i>	Meliaceae	ตาเสือ
<i>Betula alnoides</i>	Betulaceae	กำลังเสือโคร่ง
<i>Bridelia glauca</i>	Euphorbiaceae	สีวละที
<i>Castanopsis acuminatissima</i>	Fagaceae	ก่อเด็ดย
<i>Castanopsis calathiformis</i>	Fagaceae	ก่อหมุดอย
<i>Castanopsis tribuloides</i>	Fagaceae	ก่อใบเลื่อม
<i>Duabanga grandiflora</i>	Sonneratiaceae	ลำพูป่า
<i>Erythrina subumbrans</i>	Leguminosae(P)	ทองหลางป่า
<i>Eugenia tetragona</i>	Myrtaceae	หว่าป่า
<i>Ficus semicordata</i>	Moraceae	เตือปล้องหิน
<i>Hovenia dulcis</i>	Rhamnaceae	หมอนหิน
<i>Lithocarpus polystachyus</i>	Fagaceae	ก่อนก
<i>Lithocarpus sp.</i>	Fagaceae	ก่อ
<i>Litocarpus sootepensis</i>	Fagaceae	ก่อหัวหมู
<i>Magnolia liliifera</i>	Magnoliaceae	มณฑาขาว
<i>Manglietia garrettii</i>	Magnoliaceae	มณฑาแดง
<i>Magnolia baillonii</i>	Magnoliaceae	จำปีป่า
<i>Michelia champaca</i>	Magnoliaceae	จำปา
<i>Nyssa javanica</i>	Nyssaceae	คางคาก
<i>Podocarpus neriifolius</i>	Podocarpaceae	พญาไม้
<i>Prunus cerasoides</i>	Rosaceae	นางพญาเสือโคร่ง
<i>Quercus brandisiana</i>	Fagaceae	ก่อสีเสียด
<i>Sapindus rarak</i>	Sapindaceae	มะขี้ก
<i>Sarcosperma arboreum</i>	Sapotaceae	มะยาง
<i>Spondias axillaris</i>	Anacardiaceae	มะกัก

The following year, in last week June, 2009, saplings of various economic species were supplied to the villagers from the Royal Project on Doi Angkhan. Although these trees were meant to be planted in Ban Lo Yo's community forest area, some saplings of "Junthong" (*Fraxinus griffithii*), an exotic species, were inter-planted amongst the framework trees in the demonstration plot. This is valuable, fast-growing, timber tree species, favoured by the local community. Inspection of the site in November 2009 revealed that these trees are healthy and vigorous and are currently about 40-50 cm tall.

In addition, in the planting season of 2009 FORRU-CMU provided 2,600 additional trees of 20 species to Gen. Chaluy for planting in 3 other areas in the DMSL LLS site. Most of the trees were planted on 80 rai (along with trees from other sources) near Ban Mai Santi by children from 7 schools in July, with a few trees planted at social centres, Sumnak Song Santitum near Ban Tat and Suan Samun Plai (medicinal plants garden) near Sumnak Song Krubah Boonchum. Six hundred remaining trees were planted elsewhere to celebrate the Queen's birthday.

Table 2 – Trees supplied to the project from FORRU-CMU for the 2009 planting season.

Species	Family	Thai name	No. of seedlings
<i>Acrocarpus fraxinifolius</i>	Leguminosae(C)	สะเดาข้าง	100
<i>Alangium kurzii</i>	Alangiaceae	ฝาดะมี	200
<i>Alseodaphne andersonii</i>	Lauraceae	ทังใบช่อ	200
<i>Artocarpus lakoocha</i>	Moraceae	หาด	100
<i>Baccaurea ramiflora</i>	Euphorbiaceae	มะไฟ	100
<i>Betula alnoides</i>	Betulaceae	กำลังเสือโคร่ง	200
<i>Elaeocarpus lanceifolius</i>	Elaeocarpaceae	พีพาย	40
<i>Elaeocarpus prunifolius</i>	Elaeocarpaceae	พอหะแย้	60
<i>Erythrina subumbrans</i>	Leguminosae(P)	ทองหลวงป่า	100
<i>Horsfieldia thorelii</i>	Myristicaceae		200
<i>Hovenia dulcis</i>	Rhamnaceae	หมอนหิน	200
<i>Lithocarpus elegans</i>	Fagaceae	ก้อหม่น	200
<i>Lithocarpus garrettianus</i>	Fagaceae	ก้อก้างด้าง	100
<i>Litsea salicifolia</i>	Lauraceae	พะไล	150
<i>Litsea semecarpifolia</i>	Lauraceae	ช่อข้างสูง	100
<i>Manglietia garrettii</i>	Magnoliaceae	มณฑาทาแดง	100
<i>Melia toosendan</i>	Meliaceae	เลี่ยน	50
<i>Michelia floribunda</i>	Magnoliaceae	จำปีป่า	150
<i>Nyssa javanica</i>	Nyssaceae	คางคาก	150
<i>Podocarpus neriifolius</i>	Podocarpaceae	พญาไม้	100
		Total	2600

Maintenance of the plot

The following maintenance and monitoring procedures were carried out in the framework species demonstration plot.

Table 3 – Maintenance and Monitoring Activities

Action	Date	Remark
Clearing weeds and preparation of the plot for planting.	May 2008	
Planting day	6 th June	Fertilizer applied
Baseline monitoring	7 th June	
First weeding	Last week of August to first week of September.	Fertilizer applied
Second weeding	Last week of November to first week of December	No fertilizer applied
End-of-first-rainy-season monitoring	10 th December	
Fire break and fire control	February – April 2009	Partial weeding
End-of-first-dry-season monitoring	20 th April	
Third weeding	15 th -20 th June	No fertilizer applied
Planting economic species in the community forest area.	24 th 30 th June 2009	Some <i>Fraxinus griffithii</i> trees (exotic species) were planted in the framework species demo plot.
Fourth weeding	August (1 st week) 2009	Fertilizer applied
Fifth weeding	12 th November 2009	No fertilizer applied
End-of-second-rainy-season monitoring	14 th November 2009	With CMU students and Ban Lo Yo villagers.

The maintenance regime was less intensive than is recommended for successful establishment of framework tree species. Although site preparation, application of fertilizer at planting time and fire prevention were carried out as recommended, weeding and fertilizer application fell short of the recommended 3 times in the first rainy season and an additional 3 times in the second rainy season. In particular, fertilizer was applied only once in the critical first rainy season after planting (instead

of the recommend 3 times). This may have contributed to the low survival rates of some of the tree species.

Monitoring

A sub-sample of 1,500 trees representing all 28 species, were labelled in the nursery before planting. The labels used were thin bands of aluminium, manufactured for bundling electrical cables and capable of being fastened into a circle about 3 cm in diameter. Unique identification numbers were punched into the labels, which were then placed around the stems of the seedlings to be planted. Samples sizes for most species were 60 individuals, but for a few species sample sizes were different (from 15 for *Spondias axillaris* to 120 for *Erythrina subumbrans*).

Planted trees were first monitored the day after planting to determine their initial size. The second monitoring was carried out on 11th-12th December 2008, to determine growth over the first rainy season (6 months report) and the third monitoring was carried out on 20th April 2009, to determine mortality and growth over the first dry season after planting. The final monitoring was carried out at the end of the second rainy season on 14th November 2009, 18 months after planting.

Measurements included height (distance from ground level to the highest meristem measured by tape measure or telescopic measuring pole); root collar diameter (measured using callipers with a vernier scale); canopy width (at widest point using a tape measure); health score (3 = perfect or nearly perfect health, 2 = slight insect damage or discoloration, 1 = severe insect damage or discoloration and 0 = believed to be dead); weed score (also measure on a 3 point scale indicating zero to full cover of weeds in a 1 m circle around the base of the tree) and shade score (from 3 = canopy of planted tree totally shade by other vegetation to 0 = canopy of planted tree totally exposed). Monitoring was carried out by FORRU-CMU staff together with Lo Yo villagers. Ban Lo Yo villagers also took care of weeding and fertilizer application 3 times during the rainy season.



Far left: teaching Ban Lo Yo villagers how to use Vernier callipers to measure root collar diameter. Left: Measuring a Podo-carpus tree.

Results

Survival

Survival of most species was lower than expected, compared with similar plots established by FORRU-CMU at the same elevation elsewhere in N. Thailand. Only 3 species ranked as “excellent” (>70% survival at the end of the second rainy season after planting) (*sensu* Elliott et al., 2003): *Albizia lebbbeck*, *Lithocarpus sp.* and *Sapindus rarak*, whilst 6 more could be classified as “acceptable” (50-69% survival): *Adinandra integerrima*, *Erythrina subumbrans*, *Eugenia tetragona*, *Hovenia dulcis*, *Sarcosperma arboretum* and *Spondias axillaris* and 5 others were “marginal” (45-49% survival): *Bridelia glauca*, *Ficus semicordata*, *Acrocarpus fraxinifolius*, *Castanopsis calathiformis* and *Prunus cerasoides*.

Per cent survival, averaged across all planted tree species at the end of the second growing season, was only 40%; well below normal. Greatest mortality occurred during the critical first rainy season after planting (34%). Mortality over the first dry season dropped to 27%, whilst over the second rainy season, mortality fell to only 18%, since most of the planted trees had either established well or died by then.

The recommended maintenance regime was fertilizer application (50-100 g/tree) 3 times in the rainy season, which had been proved necessary to ensure high survival and rapid establishment of planted framework tree species at other similar sites (Elliott, et al., 2000). However, fertilizer was applied only once during the first rainy season. Another reason for abnormally high mortality was accidental cutting of trees during weeding. Many stems were found sliced through by machetes, as a result of careless weed cutting. Also some framework trees had been removed, to make way for planting of *Fraxinus griffithii* trees.

A large number of trees had had their labels removed and sometimes labels had been removed from one tree and placed on another tree of a different species. To try to overcome this problem, CMU students and Ban Lo yo villagers were trained in November 2009 to be competent at recognizing all species planted. Therefore, we were able to re-label most of the trees that had been interfered with. This means that survival rates may have been underestimated in previous reports (since missing, un-labelled trees that had been counted as dead previously were re-discovered and re-labelled in the final survey). Therefore, in Table 4 we have re-calculated survival rates for all monitoring times.



Hovenia dulcis
18 months after
planting.

Table 4 – Survival Data

Species	% Survival ¹ at end of...			RANK ²
	1ST RS	1ST DS	2ND RS	
Acrocarpus fraxinifolius	66	56	46	M
Adinandra integerrima	88	68	64	A
Albizia lebbeck	89	78	76	E
Aphanamixis polystachya	72	29	5	R
Betula alnoides	44	15	10	R
Bridelia glauca	74	57	48	M
Castanopsis acuminatissima	79	45	27	R
Castanopsis calathiformis	80	71	45	M
Castanopsis tribuloides	60	38	36	R
Duabanga grandiflora	7	5	4	R
Erythrina subumbrans	85	69	60	A
Eugenia tetragona	92	73	62	A
Ficus semicordata	63	55	47	M
Hovenia dulcis	62	56	54	A
Lithocarpus polystachyus	34	24	14	R
Lithocarpus sp.	93	83	76	E
Litocarpus sootepensis	70	30	18	R
Magnolia liliifera	82	27	21	R
Manglietia garrettii	31	15	10	R
Michelia baillonii	34	20	18	R
Michelia champaca	43	33	33	R
Nyssa javanica	50	31	27	R
Podocarpus neriifolius	84	54	34	R
Prunus cerasoides	61	53	40	M
Quercus brandisiana	72	59	34	R
Sapindus rarak	100	96	93	E
Sarcosperma arboreum	88	66	63	A
Spondias axillaris	62	62	62	A
Average	67	49	40	
% Mortality for each period	34	27	18	

¹RS=rainy season; DS = dry season

²E=excellent; A=acceptable; M=marginal; R=rejected (sensu Elliott et al., 2003)

Growth

When the trees are planted, they are usually 30-50 cm tall. The highest achievable performance is a doubling in size in the first rainy season and a further doubling in the second rainy season. Therefore, a mean height of 2 m or more by the end of the second growing season is classed as excellent growth, 1.5-1.9 m is acceptable, whilst 1.25-1.49 m is considered marginally acceptable (Elliott et al., 2003). Seven species had “excellent” growth (*Erythrina subumbrans*, *Acrocarpus fraxinifolius*, *Ficus semicordata*, *Prunus cerasoides*, *Betula alnoides*, *Spondias axillaris* and *Hovenia dulcis*); 5 were acceptable (*Albizia lebeck*, *Michelia champaca*, *Duabanga grandiflora*, *Manglietia garrettii* and *Castanopsis calathiformis*) whilst 3 were marginal (*Sapindus rarak*, *Castanopsis acuminatissima* and *Eugenia tetragona*).

Such growth requires a relative growth rate of 100% per year. The most reliable indication of sapling growth is relative growth rate (RGR) of the root collar diameter (RCD). Growth rates based in height tend to be more unreliable, since damage (e.g. cut during weeding, insect damage or fungal infections) may reduce shoot height, leading to a false negative growth rate, when in fact the tree is continuing to grow. A respectable 17 species exceeded this standard: *Hovenia dulcis*, *Prunus cerasoides*, *Ficus semicordata*, *Erythrina subumbrans*, *Spondias axillaris*, *Albizia lebeck*, *Betula alnoides*, *Duabanga grandiflora*, *Acrocarpus fraxinifolius*, *Michelia champaca*, *Eugenia tetragona*, *Nyssa javanica*, *Sapindus rarak*, *Manglietia garrettii*, *Michelia baillonii*, *Adinandra integerrima* and *Castanopsis tribuloides*.

During the November inspection of the site, partial canopy closure was already beginning to occur in scattered patches across the site, particularly along the mid-slope (see cover photo). We would have expected more extensive canopy closure, had survival been higher. Usually weeding and fertilizer application can be scaled back in the third rainy season, but in this case, it will be necessary to maintain intensive weeding into the 3rd and possibly 4th rainy season, since weeds continue to dominate most of the site.

Canopy closure is a critical milestone in forest restoration, creating shadier conditions which suppress weed growth which enables establishment of forest tree seedlings. Since trees were planted 1.8 m apart, a crown width of 1.8 m or more, by the end of the 2nd growing season, enables a tree to close canopy with its nearest neighbours. A mean crown width of 1.8 m by the end of the second growing season after planting is therefore classed as “excellent”, 1.5-1.8 m as “acceptable”, 1.0-1.5 m as marginal and less than 1.0 m as unacceptable. Five species achieved exceptional crown widths: *Erythrina subumbrans*, *Ficus semicordata*, *Duabanga grandiflora*, *Acrocarpus fraxinifolius* and *Prunus cerasoides*; three were acceptable (*Hovenia dulcis*, *Betula alnoides* and *Spondias axillaris*), whilst two were marginal (*Michelia champaca* and *Albizia lebeck*).



Castanopsis calathiformis, 18 months after planting.

Table 5 – Growth Data

	Size							Relative growth rate			
	RCD		Height		Canopy width		N	RCD		Height	
	Mean	SD	Mean	SD	Mean	SD		Mean	SD	Mean	SD
<i>Acrocarpus fraxinifolius</i>	42.7	18.8	281.0	134.5	185.7	71.6	10	132.0	55.3	146.2	51.2
<i>Adinandra integerrima</i>	17.4	6.8	78.5	21.2	51.3	21.0	5	113.9	19.2	32.1	32.8
<i>Albizia lebbeck</i>	38.8	17.4	193.7	98.4	103.9	36.8	14	137.8	54.7	88.0	57.9
<i>Aphanamixis polystachya</i>	16.0	4.1	82.0	15.6	61.5	10.3	4	75.7	7.5	58.2	22.1
<i>Betula alnoides</i>	37.6	8.8	228.4	63.7	157.6	53.0	1	136.9	0.0	111.9	0.0
<i>Bridelia glauca</i>	15.7	5.5	97.4	38.5	46.3	24.7	10	80.7	15.1	39.5	35.0
<i>Castanopsis acuminatissima</i>	18.7	9.8	137.5	57.1	86.9	33.3	6	82.1	60.9	82.8	26.2
<i>Castanopsis calathiformis</i>	21.7	16.9	156.4	99.6	98.7	65.1	14	89.3	58.9	68.4	49.5
<i>Castanopsis tribuloides</i>	20.6	8.6	74.8	70.7	94.8	61.9	14	107.3	28.9	-12.0	56.1
<i>Duabanga grandiflora</i>	34.0	11.5	160.7	29.7	198.3	62.5	3	136.5	16.4	99.1	7.2
<i>Erythrina subumbrans</i>	86.1	59.2	298.6	85.0	230.8	93.7	24	154.6	36.5	105.1	28.1
<i>Eugenia tetragona</i>	20.4	11.0	123.8	63.9	67.8	42.3	19	121.1	40.9	85.0	37.4
<i>Ficus semicordata</i>	53.7	17.5	278.4	87.3	230.8	102.6	13	156.9	24.7	114.2	22.7
<i>Hovenia dulcis</i>	37.2	9.0	214.5	68.6	166.9	56.2	16	171.0	27.5	105.6	24.6
<i>Lithocarpus polystachyus</i>	11.5	3.3	98.3	41.5	64.3	21.8	3	91.7	38.2	81.4	35.4
<i>Lithocarpus sp.</i>	14.3	5.5	107.6	38.4	63.5	37.1	13	59.9	30.1	41.4	36.5
<i>Litocarpus sootepensis</i>	15.8	1.5	119.0	15.5	68.2	19.9	3	74.1	8.2	36.2	9.8
<i>Magnolia liliifera</i>	16.0	4.7	66.3	15.8	51.0	16.7	10	78.4	23.4	59.5	22.2
<i>Manglietia garrettii</i>	30.2	15.7	156.8	43.3	95.4	33.0	5	114.6	47.3	81.2	23.4
<i>Michelia baillonii</i>	22.4	10.6	118.0	51.7	83.1	46.6	4	114.2	16.5	77.8	22.3
<i>Michelia champaca</i>	41.4	19.1	175.4	57.4	134.5	74.3	10	123.0	28.9	90.1	15.5
<i>Nyssa javanica</i>	28.6	12.4	114.7	42.0	88.1	36.4	4	115.9	37.1	75.7	26.2
<i>Podocarpus neriifolius</i>	10.7	5.2	80.7	26.9	40.5	17.1	10	42.4	21.7	36.2	15.6
<i>Prunus cerasoides</i>	36.7	16.0	267.1	83.6	181.2	94.4	13	160.5	40.0	117.6	42.0
<i>Quercus brandisiana</i>	16.3	8.6	74.6	36.8	46.4	14.7	15	83.5	49.0	14.9	49.7
<i>Sapindus rarak</i>	22.7	9.4	143.1	61.5	86.3	28.4	29	115.4	28.3	111.0	42.2
<i>Sarcosperma arboreum</i>	17.2	6.6	87.5	29.2	67.6	25.6	20	93.1	25.1	44.7	29.2
<i>Spondias axillaris</i>	40.9	19.9	224.6	84.0	153.7	66.3	4	143.9	11.2	66.2	8.7

Recommendations

1. The following species should be retained as framework species suitable for DMSL: *Sapindus rarak*, *Albizia lebbek*, *Spondias axillaris*, *Eugenia tetragona*, *Erythrina subumbrans*, *Hovenia dulcis*, *Ficus semicordata*, *Acrocarpus fraxinifolius*, *Castanopsis calathiformis* and *Prunus cerasoides*. In addition, *Duabanga grandiflora*, *Michelia champaca*, and *Manglietia garrettii* have good overall growth characteristics and could be planted again, provided attention was paid to better plot maintenance and more care during weeding, to increase their survival rates. Collection of seeds of these species is recommended for the schools nurseries.
2. Maintenance planting (with the above-listed tree species) is recommended in June 2010. The planting density should be about 300 per tree per rai.
3. Weeding and fertilizer application must be continued to ensure adequate performance both of the trees planted in 2008 and those that should be planted in 2010.

Right: Part of the plot system before planting in April 2008 (the site had previously been prepared for planting of corn). Below: partial canopy closure beginning to occur along the lower and mid-slopes, despite unusually high mortality over the first rainy season.



Below: Parts of the plot are beginning to close canopy. Bottom left: Sapindus rarak – excellent all round performance in the plots. Bottom centre: Betula alnoides – high growth, but very low survival rates. Bottom right: Manglietia garrettii could be suitable for re-planting with better plot maintenance.



References

ELLIOTT, S., P. NAVAKITBUMRUNG, C. KUARAK, S. ZANGKUM, V. ANUSARNSUNTHORN and D. BLAKESLEY, 2003. Selecting framework tree species for restoring seasonally dry tropical forests in northern Thailand based on field performance. *Forest Ecology and Management* 184: 177-191.

ELLIOTT, S., P. NAVAKITBUMRUNG, S. ZANGKUM, C. KUARAK, J. KERBY, D. BLAKESLEY and V. ANUSARNSUNTHORN, 2000. Performance of six native tree species, planted to restore degraded forestland in northern Thailand and their response to fertiliser. Pp 244-255 in ELLIOTT, S., J., KERBY, D. BLAKESLEY, K. HARDWICK, K. WOODS and V. ANUSARNSUNTHORN (Eds). *Forest Restoration for Wildlife Conservation*. Chiang Mai University.

APPENDIX

Before final monitoring in November 2009, we held a meeting with the villagers of Ban Lo Yo in order to 1) make sure they could recognize the species of trees planted, 2) learn Akha names of the tree (to help communication during the monitoring) and 3) ask them about usefulness of tree planted. The results revealed a surprising lack of knowledge of local tree species among the community. Only 10 species were recognized by the group, of which only 9 had known local names.

Table 6 - Species local names and uses, known in Ban Lo Yo

Scientific name	Thai name	Arkha name	Local utilization
<i>Sapindus rarak</i>	มะขี้ก	Ah-Yer	Use fruit as detergent. Dried fruit made into whistle (children's toy)
<i>Acrocarpus fraxinifolius</i>	สะเดาข้าง	Tree was recognized by local name unknown	Wood for construction and furniture
<i>Betula alnoides</i>	กำลังเสือโคร่ง	Jue-Kong	Bark is a "refreshing" medicine. Wood used for construction.
<i>Spondias axillaris</i>	มะกัก	Shi-Nor	Fruit is eaten raw and made into a refreshing drink. Young leaves eaten with chili paste, Wood for construction.
<i>Prunus cerasoides</i>	นางพญาเสือโคร่ง	Ah-Lae	Planted as ornamental. Fruit is known to be edible but is rarely eaten.
<i>Michelia champaca</i>	จำปา	Pong-Long	Wood for construction
<i>Castanopsis acuminatissima</i>	ก่อเด็ดย	Jue-Shae	Fruit is eaten. Wood for construction
<i>Ficus semicordata</i>	เดื่อปล้องหิน	Shiku-Maser	Edible fruit. Wood used to make the rice pounders. Sap used make glue for insect traps.
<i>Erythrina subumbrans</i>	ทองหลวงป่า	Ja-Zor	Wood used for cooking Fuel
<i>Castanopsis calathiformis</i>	ก่อหมุดอย	Hae-Ba	Wood used for cooking fuel, Wood for construction