

The conservation status of plants used in *ikat* cloth production in Melolo, East Sumba, Indonesia

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ABSTRACT

The names and uses of ten plants commonly used to produce dyes and mordants for use in *ikat* cloth making in East Sumba, Indonesia, are presented. The effects of harvesting for *ikat* production on the conservation status of the plants are discussed, and are found to be sustainable for nine species. The use of *Symplocos fasciculata* appears to be threatening the local populations, even though the species is widespread in Malesia. The use of a commercial mordant to satisfy the tourist industry is recommended.

KEYWORDS: *ikat*, ethnobiology, *Symplocos fasciculata*, Melolo, Sumba, Indonesia.

INTRODUCTION

The aim of this paper is to record the plants used in the production of *ikat* cloth, and to assess the effects of this use on the plants' conservation status in relation to occurrence and distribution in East Sumba. While the names of some plants used in the *ikat* process have been recorded (e.g. Warming and Gaworski 1981, Hitchcock 1991), the effect of harvest on the conservation status has not been assessed.

Ikat is a traditional tie-dye method of decorating cotton cloth, dating back to AD 939 (Hitchcock 1991) and cloth is generally made into blankets, rugs, shawls and clothing. It is traditionally practiced in a few areas in eastern Indonesia, mainly Sumba, but also Bali, Flores and some other small islands. There is significant variation in technique and plants used in the process throughout Indonesia (Warming and Gaworski 1981).

Ikat cloth produced in East Sumba (see Fig. 1) is renowned throughout Indonesia as being of the highest quality and complexity of design. Traditional *ikat* cloth still plays an important role in the cultural and ceremonial life of the people of Sumba.

The fibre used to weave *ikat* is made from cotton (*Gossypium hirsutum*), generally purchased commercially, though occasionally grown on Sumba. The fibre is dyed and then woven on a loom. The process is very time consuming with larger pieces taking up to a

year to complete. Colours traditionally used were red, blue, purple (obtained by mixing red and blue), black (obtained by adding a darkening mordant and dyeing the fibre several times) and very rarely, yellow.

In recent times commercial dyes are being used as they are easier to obtain and quicker to use; they are particularly used to produce *ikat* for the tourist market. Whilst these dyes are considered inferior by Sumbanese artists, their use has had the effect of reducing the harvesting pressure on plants traditionally used as dyes and mordants.

METHODS

Information relating to plants used in *ikat* production was collected in March 1999 at Melolo in East Sumba, Indonesia (Fig. 2). Data collection was undertaken via informal interviews with Kanaweo Kana and Katarina Kana who are senior residents of Melolo and considered knowledgeable about *ikat*. Direct observation of preparation of some of the dyes also occurred. Data were also collected by interview and direct observation during a broader survey of useful plants in East Sumba during 1997 and 1998 (S. Hidayat and coll., unpublished data).

Plant scientific names follow that in use at Herbarium Bogoriense (BO), while family names follow Mabberley (1990). Voucher specimens for each species are lodged at Herbarium Bogoriense in Bogor, West Java.



Fig. 1. 'Double ikat' weaving and completed cloths from Tenganan, Bali, Indonesia.

RESULTS

Information is presented alphabetically by scientific name, with family following. The local name (generally from the Kambera language) used in East Sumba for

the species is given in bold italics, right justified on the first line. Information about each plant is presented in the following order: use of plant in *ikat* cloth production; habitat and distribution in East Sumba; broader distribution; apparent effects of harvesting for *ikat*.

Caesalpinia sappan, Leguminosae **Hapang**

The stems are used to obtain a red dye. The stem is pounded and soaked in water in a vessel. The fibre to be dyed is then soaked in the red liquid. This species is not commonly used to obtain a red dye, as *kombu* (*Morinda citrifolia*) is preferred.

Hapang is uncommon, and is found in the foothills and up to 300 m above sea level, generally in forest areas. It also occurs throughout south-east Asia and is cultivated and naturalised in Malaysia, India, Taiwan and the Pacific. It is a prickly, scrambling, multi-stemmed plant, which is often eaten by cattle. The harvest of some or all of the stems to obtain dye generally does not kill the plant.

The harvest for *ikat* does not effect the conservation status of this species. However, in conjunction with destruction by cattle and habitat clearing, its range and population numbers could be reduced.

Ceriops tagal, Rhizophoraceae **Biko**

The red inner bark is used to obtain a red dye. The bark is sun dried and then powdered. The powder is added to water where it produces a red dye. This species is not often used for *ikat*, as *kombu* (*Morinda citrifolia*) is preferred.

This species is common in landward mangrove areas in East Sumba. It also occurs from eastern Africa to India, through Asia to Australia and the Pacific. The removal of patches of bark usually does not kill the plant, though complete bark loss over a large area can be fatal.

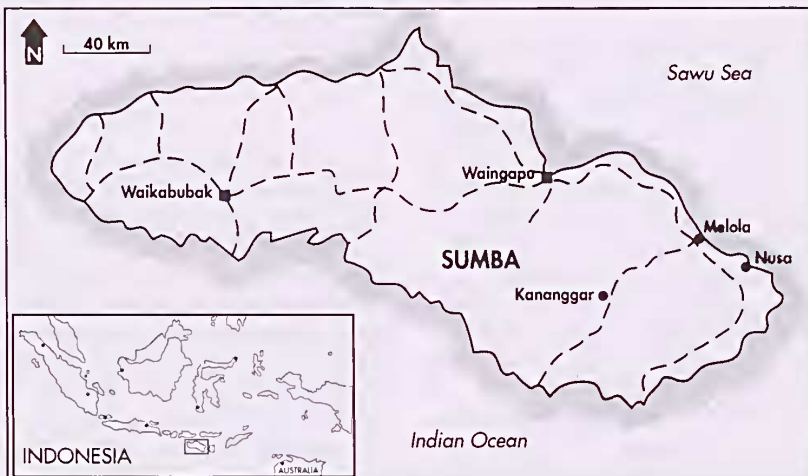


Fig. 2. Locality map of field sites on Sumba, Indonesia.



Fig. 3. Katarina Kana crushing the leaves of *wora*, *Indigofera tinctoria*, with lime and water, Melolo, Sumba, Indonesia.

The use of this species in *ikat* does not effect its conservation status.

Dendrobium affine, Orchidaceae

Dadilai

The pseudobulbs are scraped and a green, sticky juice is obtained. This juice is rubbed into the tassels at each end of *ikat* cloth. It produces a smooth finish and prevents the fibres of the tassels from fraying. However, it is not used on all *ikat* cloth as many pieces have loose fibre at the ends, not tassels.

This species is common in forest areas in East Sumba, and also occasionally found in mangrove forests. It also occurs in Timor, New Guinea and northern Australia. The bulbs are collected a few at a time from each plant, allowing continued production of new pseudobulbs. Each pseudobulb furnishes a fairly large quantity of 'glue', which is used sparingly on tassels.

The use for *ikat* does not threaten the conservation status of this species.

Indigofera tinctoria, Leguminosae

Wora

The leaves are used to obtain a blue-coloured dye. The leafy twigs are harvested in the wet season when

this species is available. The leaves are soaked in water for a short period, then handfuls, with a large pinch of lime powder, are vigorously crushed and squeezed in the same bowl in which they were soaking (Fig. 3). The crushed leaves, lime and water are allowed to soak overnight and then the leaves and twigs are taken out in the morning. Overnight, the mixture separates into an upper layer of grey-coloured liquid and a lower layer of dark blue water and sediment. The upper level provides a light grey-coloured dye, while the lower level, which also contains sediment, produces a dark blue dye (Fig. 4). After three days of soaking, the sediment becomes black.

This species is of Asian origin but now has a pantropical distribution. It is common during the wet season in East Sumba, growing in gardens, forest margins, roadsides and occasionally in savanna areas. The leafy twigs are stored in vessels for use during the dry season. Harvesting of this species does not kill plants as only the leafy twigs are taken. This species is extensively used to produce the popular blue colour seen in most *ikat*.

The use of this species for *ikat* does not affect its conservation status.

Maclura cochinchinensis, Moraceae

Taramanu

The wood is used to obtain a yellow dye. The wood is chipped off the trunk of this woody, erect climber, generally in a fashion that does not kill the plant. The wood is occasionally sold for up to Rp20,000 (SAUD 4) for one kilo to other handicraft centres in Indonesia. It is not commonly used for dyeing as yellow colours are not often seen in *ikat* cloth, but when present are generally from commercial dyes.

This species occurs in forest areas, but is uncommon in East Sumba. It has a wide distribution from Nepal and India to Japan and through Malesia to eastern Australia.

Given that harvest generally does not kill the plant, and is rarely undertaken, the use of this species for *ikat* does not appear to threaten the species.

Moriuda citrifolia, Rubiaceae

Kombu

The bark of the roots is used to obtain a red dye. This is the preferred red dye for most artisans and it is extensively used in East Sumba. The roots are harvested from the base of the tree leaving enough roots for the tree to survive and replace the roots taken. The root bark is chipped off and pounded, often using a large mortar and pestle. Water is added to produce the red dye. The colour may be strengthened and darkened by pounding the bark and leaf of *luaba* (*Symplocos fasciculata*) at the same time as the root bark. The fibre to be dyed is first soaked in the oil of *Aleurites moluccana* then sun-dried. When dry, it is soaked in the dye from *kombu*, or *kombu* and *luaba* together.



Fig. 4. The blue colour from *wora*, *Indigofera tinctoria*, on Katarina Kana's hands after preparing the dye, Melolo, Sumba, Indonesia.

Kombu is found in coastal forest areas and behind mangroves; and is also grown in some gardens for use as a dye. This species is fairly common and widespread in East Sumba; it also occurs in northern Australia and is widespread in south-east Asia and the Pacific.

Given the continued non-lethal form of root harvesting, the use of this plant in *ikat* will not change its conservation status.

Pahabori, Kalihi wanangu

Pittosporum moluccanum, Pittosporaceae

The stem bark is used to obtain a black dye which may also be used as a mordant to strengthen and darken other colours. The bark is chipped off the trunk and then pounded, and water is added. Fibre to be dyed is soaked in this dark liquid, to produce a dark or black colour. The pounded bark may be added to other dye materials as a mordant. This species is not commonly used in *ikat* production.

This species is relatively common in the inland forest areas of East Sumba. The bark harvest is generally non-lethal but may result in the occasional death of individual trees.

The use of this species in *ikat* does not appear to threaten the species.

Rhizophora apiculata*, Rhizophoraceae *Kayn donga

The stem bark is used to make a red dye. The bark is chipped off and pounded, then water is added. The fibre to be dyed is then soaked in this liquid. *Kombu* (*Morinda citrifolia*) is preferred as a red dye and *kayu donga* is only used when *kombu* is not available.

This plant occurs in mangrove forests in East Sumba, especially those that receive some fresh water input all year round. It is relatively common in the landward areas of mangroves. It also occurs from Sri Lanka to the Pacific, including northern Australia. This species is

capable of withstanding significant lower stem bark removal, in part due to the copious aerial roots it produces which bypass the lower trunk. It is unlikely that bark removal from the lower stem could kill this plant.

The use of this species in *ikat* does not affect its conservation status.

Sterculia foetida*, Sterculiaceae *Kelumbang

The fruit mesocarp is used as a mordant, to make colours more vibrant and to last longer. The soft portions of the inner fruit are burned to ash and then water is added. The resulting liquid is added to any dye to make it vibrant and longer lasting.

Sterculia foetida is common in savanna areas in East Sumba; it also occurs from eastern Africa to India, Malaysia, eastern Australia and Hawaii. The mesocarp is obtained from fallen fruit that have already shed the seeds.

Kelumbang in *ikat* production does not affect the conservation status of this species.

Symplocos fasciculata*, Symplocaceae *Luaba

The bark and leaves are used as a mordant. However, the bark is preferred as it has stronger effects. The leaves and bark may be pounded and added to dye or soaked in water and the resulting liquid added as a mordant to make existing dyes brighter and longer lasting.

This plant is found in elevated, primary forest and open, secondary forest and thicket areas, and is also common in disturbed areas. *Luaba* is apparently restricted in distribution in East Sumba and eastern Indonesia. However, this species also occurs in southern Thailand, Malaysia, the Philippines and in Indonesia mainly in Borneo, Java and Sulawesi, where it is relatively common (Nooteboom 1977). The sparse populations in Sumba appear to represent the most easterly range of the species in Indonesia.

People from Melolo travel past Kananggar, a trip of 5-6 hours, to obtain bark and leaves. Often entire stems are cut down to obtain bark, which results in the death of the plant. Large bags of leaves and bark are available for purchase at the Melolo and Waingapu markets, where it is sold in small bundles for 500Rp (\$AUD 0.10).

The harvesting of bark and leaves for use in *ikat* production could threaten the conservation status of the few populations of this species in East Sumba.

DISCUSSION

From our observations of plants used in *ikat* cloth production in East Sumba (Table 1), most processes are non-lethal and appear not to threaten the species involved. The most widely used dyes, from *Morinda citrifolia* and *Indigofera tinctoria*, are common and currently used in a sustainable fashion.

Table 1. Plants used in producing *ikat* in East Sumba, Indonesia. * These species have also been recorded in the following publications as being used in *ikat* production: 1; Hitchcock 1991; 2; Warming and Gaworski 1981; 3; Lemens and Wulijarni-Soetjipto 1992 [this reference refers to dyes but not *ikat* specifically].

Scientific name, references	Family	Local name	Part used	Effect produced
<i>Caesalpinia sappan</i> L. ^{*1,3}	Leguminosae	<i>hapang</i>	Stem	Red colour
<i>Ceriops tagal</i> (Perr.) C.B.Rob ^{*1,3}	Rhizophoraceae	<i>biko</i>	Bark	Red colour
<i>Dendrobium affine</i> Steud.	Orchidaceae	<i>dadilai</i>	Pseudobulb	Glue for tassels
<i>Indigofera tinctoria</i> L. ^{*1,2,3}	Leguminosae	<i>wora</i>	Leaf	Blue colour
<i>Maclura cochinchinensis</i> (Lour.) Comer ^{*3}	Moraceae	<i>taramanu</i>	Wood	Yellow colour
<i>Morinda citrifolia</i> L. ^{*1,2,3}	Rubiaceae	<i>kombu</i>	Root	Red colour
<i>Pittosporum woluccanum</i> (Lam.) Miq.	Pittosporaceae	<i>kalili</i>	Bark	Black colour
<i>Rhizophora apiculata</i> Blume	Rhizophoraceae	<i>kayu donga</i>	Bark	Black colour
<i>Sterculia foetida</i> L.	Sterculiaceae	<i>kolumbang</i>	Inner fruit	Mordant
<i>Symplocos fasciculata</i> Zoll. ^{*1,3}	Symplocaceae	<i>luaba</i>	Bark	Mordant

However, the use of *Symplocos fasciculata* does not appear to be sustainable based on the type of harvest and its restricted distribution on Sumba, and in fact in eastern Indonesia. Unfortunately there are no published reports regarding the population dynamics or reproductive biology for this taxon. It appears that the continued destructive harvesting of *Symplocos fasciculata* for use as an *ikat* dye could result in the local extinction on Sumba, or at least in certain areas.

It may be necessary to introduce measures to control its harvest or provide an easily obtained replacement mordant. Given the difficulties and costs involved in monitoring the use and possible rehabilitation of *Symplocos fasciculata*, it may be simpler and more effective to identify a commercial mordant to introduce to the commercial and tourist *ikat* industry in East Sumba.

The use of *Symplocos fasciculata* for ceremonial and spiritual items is expected to continue, as the use of a non-traditional dye is considered culturally improper. However, this represents only a small part of the total *ikat* industry, significantly less than 10%, as only a few of these items are produced annually.

The people in the *ikat* industry in East Sumba have already demonstrated an ability and willingness to use commercial dyes. This has greatly reduced the collecting pressure on the plants producing traditional dyes. Consequently it has increased the long-term sustainability of the industry, even though *ikat* cloth production has increased dramatically in the last 15 years to cope with demands from an expanded tourist market in eastern Indonesia.

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