Mahogany

Swietenia macrophylla King

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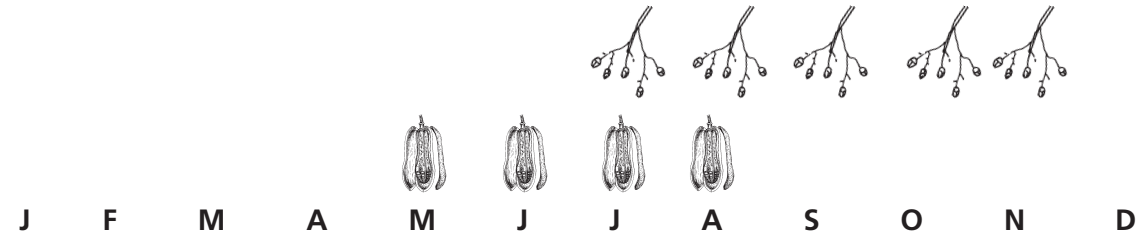
Perhaps more than any other tree, mahogany connects Amazonian forests to the world outside through its gorgeous, durable wood. Many loggers have penetrated the heart of the forest in search of this valuable wood, often referred to as ‘green gold’. Mahogany trees are easy to identify from the ground owing to their massive buttresses, up to 5 m high. Mahogany forms a broad crown from a few large branches, with leaves that shine like no others in the forest. It is distributed in southern and western Amazonia and in the forests along the Atlantic coast of Central America. Mahogany should be treated well as its timber is valued at four times the price of any other wood.

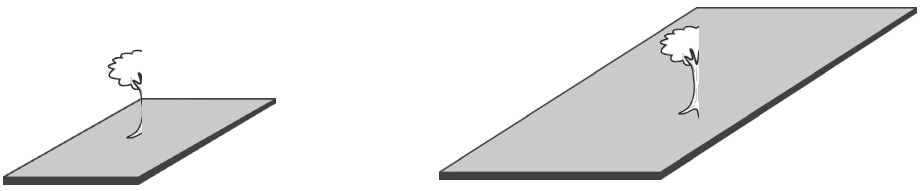
ECOLOGY

Flower and fruit season



Mahogany flowers in the Amazon between July and November, from the middle of the dry season until the beginning of the rainy season. Fruit reach full size in the crown by the middle of the rainy season, but the seeds inside are mature only at the beginning of the following dry season, from May to August. Fruit capsules pop open as the tree drops some or all of its leaves early in the dry season, and the wind disperses the winged seeds.

Density



Mahogany occurs at low densities in South America compared to Central America and Mexico. In southwest Amazonia, in the Brazilian state of Acre, Peru, and northwest Bolivia, densities are typically one tree in 5–20 ha where mahogany occurs, or on average about 0.1 tree/ha. It occurs more frequently in southeast Amazonia in the Brazilian state of Pará, along the banks of seasonal streams and smaller rivers at densities up to 2.5 trees/ha and even up to 6 trees/ha in local groups. But these populations were nearly completely logged out during the 'mahogany rush' of the 1980s and 1990s.

A whale of a species

Viewing a map of South America, mahogany's distribution looks like a great whale with its head starting in Pará, Brazil, its body passing across southern Amazonia and its tail rising up west and north towards the Atlantic Ocean, covering parts of Brazil, Bolivia, Peru, Ecuador, Colombia and Venezuela. In Central America, mahogany can be found along the Atlantic coast, from Panama to Mexico. Some researchers believe that it is widely distributed in Mexico and Bolivia because hurricanes and floods have allowed mahogany to flourish in these regions by opening large swaths of forest for regeneration.[1]

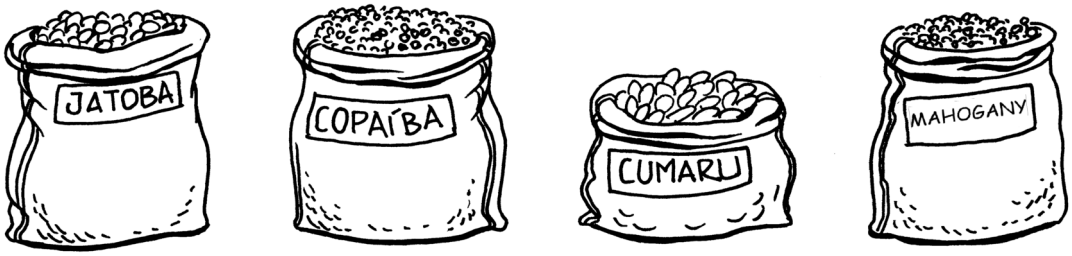
Production

Mahogany produces two valuable commodities: extremely beautiful wood (easy-to-work and prized by people all over the world) and seeds.

an average of 3 000 seeds/tree

Mahogany trees begin to flower and fruit annually when they are about 30 cm in diameter, though even smaller trees are capable of producing fruit. The rate of fruit production generally increases as the tree grows in diameter, though some small trees are capable of producing many fruit, and some large trees rarely produce fruit at all. High fruit production for a tree 30–70 cm in diameter is around 50 fruit capsules. Trees larger than 70 cm in diameter may produce up to 200 fruit in a single year, though this is rare (the most fruits ever counted on a single tree were 780 on a 132 cm diameter tree in Acre). Fruit production by individual trees and by groups of trees varies widely from year to year, as trees often "rest" between years with heavy fruit set.

A single fruit contains up to 60 large, winged seeds, but on average only 35–45 of these will germinate. Fruit size may vary considerably, both within a tree's crown and among different trees. Larger fruit produce larger seeds that are more likely to germinate and will produce larger seedlings. Even though most seeds fly less than 100 m from the parent tree, they are difficult to collect on the ground once dispersed, and they quickly lose the ability to germinate once exposed to the elements. The seeds are best collected from the crown, before the fruit capsule bursts open, by using proper tree-climbing equipment and an extendable pruning pole to sever the fruit where it attaches to the tree's smallest branches. The larger branches should not be cut just to bring down a few fruit – this will reduce fruit production in years to come.



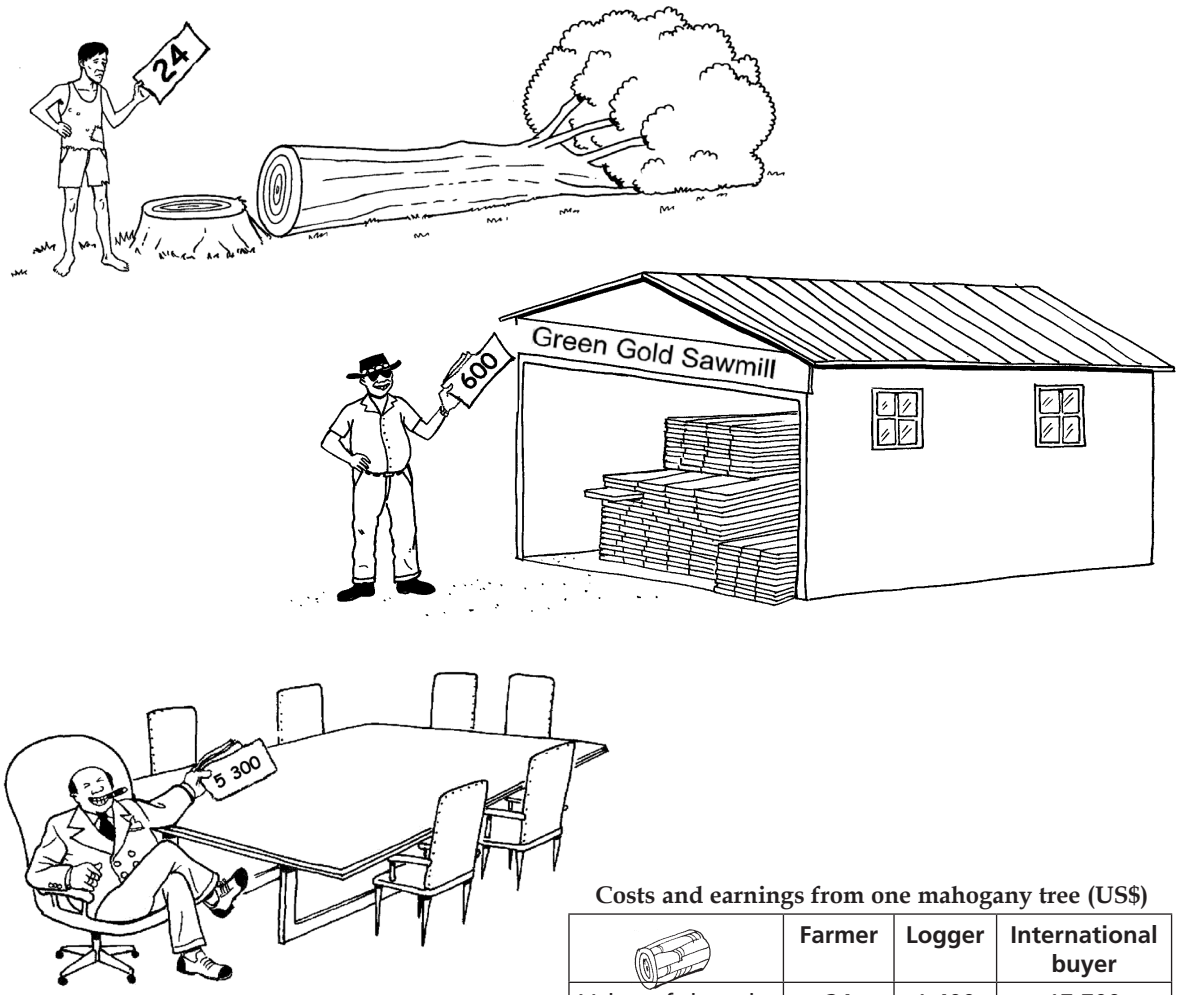
300 SEEDS US$4	2 360 SEEDS US$2	56 FRUITS US$4	2 500 SEEDS US$50

A cooperative of communities near Brasiléia in Acre, called Nossa Senhora da Fátima, collects mahogany seeds and seeds from other valuable timber species to sell profitably throughout Amazonia. The cooperative employs community members who are trained as tree climbers and collectors. One kilogram of mahogany seeds contains between 2 000 and 3 000 seeds after the wings have been removed. It takes about 50–75 fruit capsules at 40 seeds/capsule to produce 1 kg of cleaned seeds. In 2000, this cooperative earned about US$50/kg for the mahogany seeds that they collected, dried and packaged for sale.

ECONOMIC VALUE

Mahogany is the most valuable timber species in the Brazilian Amazon, worth up to four times the value of its nearest competitor. One cubic metre of first-quality sawn mahogany – imagine a solid cube of stacked mahogany planks, 1 m wide by 1 m long by 1 m tall – is worth about US$1 800 when it departs the docks of Belém or Paranaguá for the United States of America or Europe. A single large tree, 80 cm in diameter or a bit larger than 250 cm in circumference, on average can produce more than 2 m^3 of sawn timber worth about US$4 100 if the wood is of high quality. However, smallholder farmers and indigenous peoples who sell mahogany trees to loggers rarely receive more than US$6–24/tree, if they receive any money at all. Similarly, mateiros (woodsmen) who search the forest for mahogany, chainsaw operators who fell the trees, and logging crews who drag the trees out of the forest and transport them to the nearest sawmill are poorly paid. In fact, most of the tree's value goes to the middlemen who finance mahogany's harvest, processing and resale to foreign buyers.[2]

Earnings from a typical mahogany tree (2.4 m^3) along the production chain

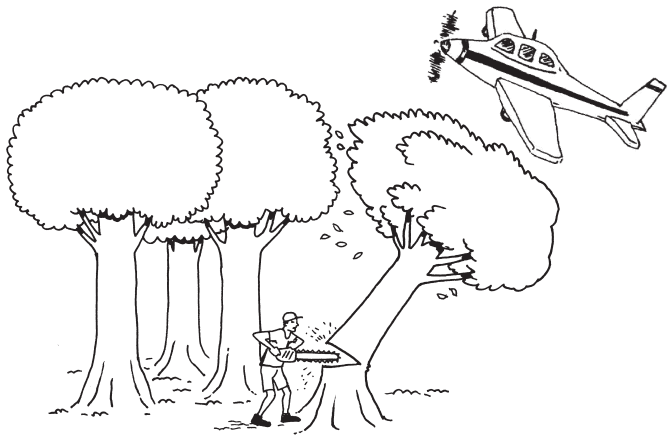


Costs and earnings from one mahogany tree (US$)

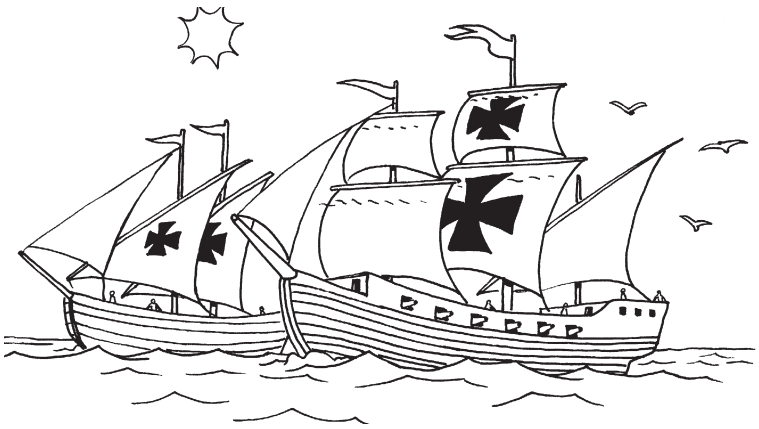
	Farmer	Logger	International buyer
Value of the sale	24	1 400	17 700
Costs	0	800	12 400
Earnings	**24**	**600**	**5 300**

USES

Mahogany is highly valued because its wood combines many rare qualities. It has a beautiful colour and grain; it is lightweight yet exceedingly strong and resistant to rot; and it has excellent workability – just ask any carpenter. For these reasons, it is a luxury wood used throughout the world for producing high-priced furniture, panelling, musical instruments and yachts. Mahogany's extraordinary value has pushed loggers into the heart of Amazonia where people have never heard a chainsaw before. The loggers fly in, using small planes to spot mahogany crowns in forests far from the nearest road or settlement. Loggers will try to buy trees cheaply unless landowners learn to negotiate fair prices.

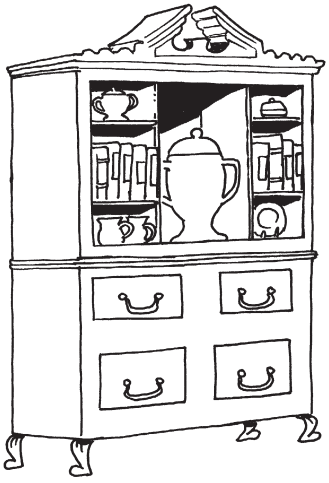


The cannonball test



In the sixteenth century, after the Spanish arrived in Central and South America, they discovered that mahogany was a superior wood for shipbuilding than the European timbers used up until that time. It resisted rot in warm, tropical waters and had the enormous advantage of not splintering when hit by cannonballs, absorbing the impact without shattering and injuring sailors with flying wooden shrapnel. When the English defeated the Spanish Armada in a great naval battle in the sixteenth century, their main prize was the Spanish fleet, built largely out of mahogany.

The English are primarily responsible for the modern-day use of mahogany as a luxury wood in furniture. They discovered in the eighteenth century that mahogany's great strength allowed massive bureaus and wardrobes to be built on legs so thin and delicate that they looked insufficient to bear their weight. This style was so popular that even the royal family insisted on having furniture built from mahogany.[3]

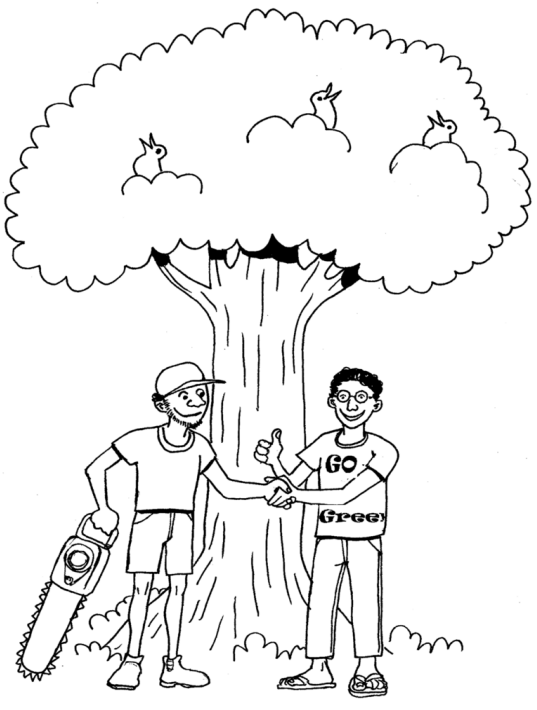


Consumers, communities and conservation

By shopping for and requesting certified sustainable forest products, consumers can help communities and governments maintain functioning forest ecosystems. Although nearly every North American and European has heard of mahogany, how many consumers know where this timber comes from, and at what cost? Since the 1970s, mahogany has been under intense exploitation pressure to supply international consumers, leading to commercial extinction across most of its range in South America. Mahogany received additional protection when it was listed on CITES (Convention on International Trade in Endangered Species) Appendix II in 2003, but this is no guarantee that significant natural populations will survive in the wild.[4] More than any other Amazonian resource, including gold, mahogany has catalysed the invasion of previously unexploited forests and indigenous areas across Amazonia by loggers, ranchers and industrial farmers.

The majority of mahogany is logged illegally, extracted from uninhabited government lands and indigenous areas hundreds or even thousands of kilometres from the nearest legally registered management plan. Often loggers fell every mahogany tree they can find, including trees too small to harvest legally and large hollow trees with no commercial value (but that still flower and produce seeds each year). Predatory logging ignores sustainable management guidelines that require the retention of small trees to provide future harvests and large 'mother' trees to produce and disperse seeds representing future generations of mahogany trees.[5]

Yet mahogany could also represent the vanguard of positive change in Amazonia. If consumers demanded certified forest products, foresters and governments alike would have an incentive to sustainably manage their forests. By far the most valuable timber tree in Amazonia, mahogany could provide great incentive for management plans that allow for continued commercialization while maintaining healthy populations of trees in the forest, thus ensuring harvests for generations to come.



MANAGEMENT

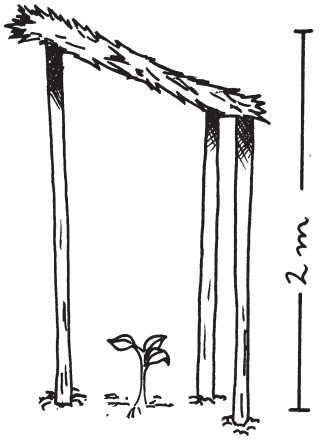
germination
2–4 weeks after
wetting the seeds

growth
1–2 m/year
in the first years

seed production
when the trunk reaches
30 cm in diameter

Seeds and seedlings

Mahogany seeds will germinate within 2–4 weeks once they have been watered. Break off the wings and plant the seeds tip down in well-draining soil (for example, sandy soil), nearly but not quite buried. In the nursery, use black polyvinyl planting bags 10–12 cm in diameter by 30 cm deep to allow the seedling to root deeply. It's best to try to use the same kind of soil in the nursery that the seedling will encounter in the forest after planting. Keep the soil damp, but not too wet, or else seeds will catch fungal infections and die. The best overhead cover is half shade using a single layer of babaçu or inajá leaves suspended about 2 m over the plantings.



Once the seeds begin to germinate, the seedlings will sprout leaves quickly, standing 15–25 cm tall, with 4–8 simple leaves. They will rest for about a month before producing new leaves again – some of these will be compound leaves, and if the seedling is healthy, it can grow 10–15 cm during the second flush. The best time to plant seedlings into forest gaps or into agricultural clearings is after the second batch of leaves has sprouted. Prune off all but the highest four or five leaves to reduce heat and water stress when planting in bright sun. Dig a hole the exact size of the seedling bag with a posthole digger and slide the seedling soil core into this hole intact, making sure to re-establish soil contact between the seedling and the forest soil.

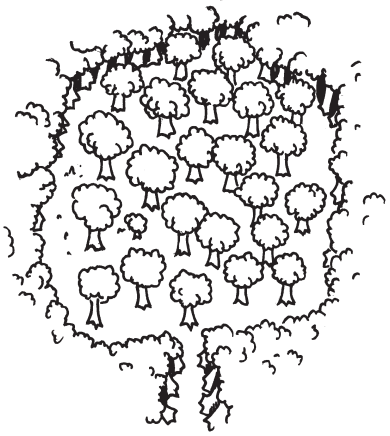
It is also possible to plant mahogany seeds directly into gaps and agricultural clearings, especially in areas that have been cleared by burning, as the burned areas offer reduced root and above-ground competition. Keep seeds dry after collecting them, because there is a tendency for moulds and fungi to damage them without any sign of attack.

Wait until after the rainy season has begun to plant seeds, so they will germinate more quickly. This will reduce the time they are exposed to forest animals, like rats and agoutis, and to insects that eat or damage seeds. If possible, loosen the soil before planting to about 30 cm depth with a posthole digger, refill the hole, and then plant the seed at the soil surface. Plant two or three seeds per site to make sure at least one survives to germinate and grow. Later, if necessary, weed out the small or less vigorous seedlings. Mahogany grows especially well beside dead trees or palm stumps that do not sprout.

Growing and tending

Mahogany seedlings prefer a lot of light – the more the better. Plant seeds or seedlings as near as possible to clearing centres, at a spacing of 8–10 m. It is best to orient a long clearing east-to-west so that the sun will pass overhead longer during the day.

Mahogany is capable of growing very fast under the right conditions – in a clearing with lots of sunlight, in fertile soil and without vines smothering its crown. Some seedlings can grow up to 2–3 m/year during the first years. Secondary vegetation growing near the seedlings can help them hide from the shoot borer moth, whose larval caterpillars eat expanding stem tissues and destroy the sapling's straight-as-an-arrow form. It is also good to plant mahogany at low density and widely spaced, so that one fast-growing seedling does not attract the shoot borer to its slower-growing neighbours.



Mahogany needs care, but not too much. Once mahogany is growing well in small- to medium-sized clearings, it needs tending only every two or three years. Vines should be cut if they've climbed onto its crown, and competing trees can be cut if they are casting too much shade on the mahogany trees. In the long term, these efforts may be well compensated. Mahogany is likely to be much more valuable by the time the next generations – your children, and their children – wish to cash in.

[1] Snook, L.K. 1996 / Gullison, R.E. *et al*. 1996
[2] Veríssimo, A. *et al*. 1995
[3] Raffles, H. 2002
[4] Blundell, A.G. 2004 or Grogan, J. & Barreto, P. 2005
[5] Grogan, J., Barreto, P. & Veríssimo, A. 2002