

AMPELODESMOS MAURITANICUS

The role of *Ampelodesmos mauritanicus* and fibre plants in central Italy

Recognition of the importance of non-wood forest products in developed countries has grown steadily in recent years. A research project in the mountains of the Aurunci Regional Park (central Italy) has been initiated and aims at identifying practical solutions for integrating traditional knowledge of NWFPs into the management of protected areas. To date, the study has focused on the role of fibre plants in the village of Maranola in the southernmost area of Latina province, central Italy.

From time immemorial, the population of Maranola has relied on a rural economy mainly devoted to subsistence farming, stock-raising and trade of minor timber and non-timber forest products. Trade in myrtle (*Myrtus communis* L.) leaves existed up to the early 1950s. Official documents of the early nineteenth century show that the dried leaves were sold to leather tanners. Myrtle twigs were also utilized in the manufacture of fish traps by fishers in the neighbouring coastal town of Formia. Ropes of *Agave americana* L. (locally known as *pugnale*) were much appreciated for their durability and strength. Agave fibres made the strings of traditional footwear (*ciocce*) and livestock gears, such as *capezza*, a loose head-holder for mules and donkeys. Of particular importance was the use of *Ampelodesmos mauritanicus* (Poiret) T. Durand et Sch. The word *ampelodesmos* originates from two old Greek cognates *âmpelos* (vine) and *desmòs* (tie) and, traditionally, Aurunci farmers have used *ampelodesmos* leaves exactly for the purpose implied.

Today this species is mainly regarded as an invasive grass; however, until the mid-/late 1950s, it played an important role in the household economy, was traded regionally and represented an emergency source of income. In Maranola, the weaving and trading of *ampelodesmos* (locally known as *stramma*) were female prerogatives. The women were responsible for trading the raw fibres in Formia. A full donkey-load of *stramma* made one *salma*, and consisted of two to three sheaves of unprocessed leaves, depending on the animal's capacity. In the absence of donkeys, women would cover the same distance (4–6 km) on foot, carrying "one sheaf of *ampelodesmos*" on their heads. In addition to the raw material, women sold

finished *stramma* products, e.g. brooms and trays (*spaselle*), to fishmongers.

The Second World War saw an intensification of the *stramma* trade, providing an emergency source of income for local communities. According to elders, between 1939 and 1945, the inhabitants of Maranola and neighbouring communities were engaged in the production of rough *ampelodesmos* sacks used during trench warfare. These were commissioned by the government and sent to the frontline, where they were filled with sand.

The *stramma* trade died out completely at the beginning of the 1960s, when synthetic materials (such as nylon ropes) made their way into the regional market and, more important, because of the disappearance of donkeys, the introduction of alternative means of transportation and the drastic transformation of the rural economy.

Ampelodesmos items are long-lasting. According to elders, the quality and durability of material depends upon how it is stored, and also upon the period of harvesting (e.g. collection must take place during "moon-less days").

The pounded fibres are dried in the open until their colour turns from green to a yellowish shade. Then the fibres are wetted and pounded with a wooden beater (*mazzucco*), before being worked into ropes. Occasionally, for the manufacture of long-lasting items, *stramma* fibres were smoked with sulphur to prevent damage from woodworm.

The basic techniques for rope making were acquired around the age of eight to nine. Small-size ropes (*funinciegli*) were widely used in agriculture. Stronger ropes were used for various purposes, such as for securing heavy fruiting branches to the main trunk, and heavy-duty ropes were highly sought after by youngsters for making swings. A different type of weave produced the so-called *trezza* (plait). A long and curved iron needle was used to insert additional fibres during the weaving of *iettola* (a wider "plait" made of six to seven sets of pounded

leaves). Glass demijohns were coated with *stramma* plaits to prevent them from breaking and to protect their content (wine or oil) from direct light. *Iettola* was also used to weave a large flexible container (*sporta*) that was tied on the back of mules and donkeys. More pieces of *iettola* were joined together to produce rough carpets and the flat rectangular trays used by fishmongers to display their merchandise. In the old days, fish was also sold in containers made of *ampelodesmos*.

Other *stramma* items in the Aurunci Mountains included shopping bags, sun hats, round baskets for bread, eggs and mushrooms and cylindrical containers for grains and legumes, up to 2 m in height. *Stramma*, together with straw, was also used as a filling for mattresses. The same plant provided roofing material for *pagliare* (shepherds' huts). *Ampelodesmos* brooms are still occasionally made for household needs. The most common broom type is used for sweeping floors and consists of three bundles of pounded leaves bent together and tied firmly with a string of the same material. There were also other types of *stramma* brooms: i) a miniature-like broom used as a device against witches; ii) one specifically designed for cleaning fireplace chimneys; iii) a longer one for cleaning bread ovens; and iv) a roughly made one for cleaning wine barrels.

Although *stramma* items are now rarely made, small-scale production of new *ampelodesmos* crafts is emerging, and some young people are trying to revive the tradition. Artist and basket weaver Giovanni Morra believes that one of the challenges ahead is to win over local prejudices attached to the use of *ampelodesmos*. "Stramma is still associated with poverty and the hardship of war" he claims, "and often local people regard it as a low-class material." Another problem constraining the marketing of *ampelodesmos* items is the competitive prices of imported Chinese baskets.

According to local elders, the abandonment of sustainable *stramma* harvesting has led to an increase in fire hazards. Livia Forte, an *ampelodesmos* master weaver, claims: "Today, *stramma* has grown old, too dried and tall because no one gathers it. So when fire arrives, it is difficult to control. Flames are high and burn so quickly."

Undoubtedly, in the past, traditional grazing patterns, the harvesting of *stramma* and other minor NWFPs, as well as the clearing of underbrush, played a major role



in fire control and management. At present, government prohibition on grazing on fire-damaged land is fostering uncontrolled growth of *ampelodesmos* at the expense of other valuable species of the Mediterranean shrub. Preliminary research findings indicate that a combination of selective grazing and sustainable *ampelodesmos* harvesting could benefit and enrich post-fire landscapes and the upland ecology as a whole. This, of course, challenges the logic of strict/no touch protection embraced by the Regional Park authorities and calls for the active participation of local resource users and community experts in the management of protected areas.

Future research into *ampelodesmos* will have to include a preliminary computation on its potential commercial value, at least for the village of Maranola. Such computation should be based on projections (gatherers willing to get involved, harvesting patterns, seasonality, availability of *stramma*, etc.). It is unlikely that the harvesting and sale of *ampelodesmos* will return to their past glory but steps can be taken to identify new market opportunities for *stramma*. This, indeed, might have positive repercussions for both the local economy and upland ecology. (*Contributed by: Dr Dario Novellino, Research Fellow, Department of Anthropology, Marlowe Building, University of Kent, Canterbury, Kent CT2 7NR, United Kingdom. E-mail: dario.novellino@libero.it; www.kent.ac.uk*)



BARK

Uses of birch bark in the northern hemisphere

Historically, indigenous cultures in the northern hemisphere have utilized birch bark to build canoes, houses and make baskets, shoes, etc. For the Anishinaabe people, this bark was the primary resource used and the birch tree is still valued as a sacred tree of life. The bark was peeled from the tree in June and sewn into useful objects that were light, waterproof and durable. Designs were scratched on the surface for decoration.

For the indigenous Scandinavians, birch was also used for these purposes, although strips of bark were typically woven, rather than sewn into useful objects.

Both methods of working with birch bark will be demonstrated and displayed during "The Art of Birch Bark", to be held in July in Wisconsin, United States. (*Source: Ashland Daily Press* [United States], 30 June 2006.)

Birch bark: prostate cancer treatment?

The bark of the white birch tree contains a compound – betulinol – that might help fight prostate cancer. This finding is based on research in mice and has yet to be tested on people.

Preliminary tests show that betulinic acid, made from betulinol, may discourage human prostate cancer cells from dividing, and spur these cells to die. The tests were conducted by scientists at Cornell University's Weill Medical College. (*Source: WebMD* [United States], 28 July 2006.)



Natural pine bark extract relieves muscle cramp and pain

A study published in the June 2006 issue of *Angiology* shows that supplementation with the pine bark extract Pycnogenol® improves blood flow to the muscles, which speeds recovery after physical exercise. The study of 113 participants demonstrated that Pycnogenol significantly reduces muscular pain and cramps in athletes and healthy normal individuals.

Researchers at L'Aquila University in Italy and at the University of Würzburg in Germany studied the effects of Pycnogenol on venous disorders and cramping in two separate studies.

Pycnogenol is a natural plant extract originating from the bark of the maritime pine that grows along the coast of southwest France and contains a unique combination of procyanidins, bioflavonoids and organic acids, which offer extensive natural health benefits. The extract has been widely studied for the past 35 years and there are more than 220 published studies and review articles ensuring its safety and efficacy as an ingredient. Today, Pycnogenol is available in more than 400 dietary supplements, multivitamins and health products worldwide. (*Source: Medical News Today* [United Kingdom], 18 June 2006.)

Mahogany bark may hold colon cancer cure

An unexpected entry in a traditional medicine book from Guinea has led a University of South Carolina cancer researcher to study whether medicinal properties in the bark of mahogany trees may hold clues to understanding colon cancer.

Funded by a US\$300 000, two-year grant from the National Cancer Institute, Dr Michael Wargovich will examine mahogany – and four other medicinal plants native to West Africa – in a quest to discover novel, anti-inflammatory compounds that could prevent or treat colon cancer. The study, the first of its kind, could be a major first step towards other studies on medicinal plants and cancer. Specifically, Wargovich is looking at how native medicinal plants in West Africa, used traditionally for pain relief, fever and inflammation, interact to inhibit the growth of cancer tumours.

While visiting Guinea and meeting some of the country's top health officials, the university cancer researcher was given a book, *Pharmacopée traditionnelle guinéenne*, that highlighted around 60 of the country's different plants and their health properties. He found that about 15 plants had anti-inflammatory properties.

For his study, Wargovich will focus on extracts from five West African plants: the neem tree, baobab tree, Senegal mahogany, African basil and kinkirissi bush.

Wargovich is working with Clemson University researcher Dr Feng Chen, whose expertise is in the chemistry of natural products. Chen is looking for the compounds in the mahogany bark that may be responsible for inhibiting inflammation. West Africa has a low incidence of colon cancer, and the reason for this may be in the natural plants used by traditional healers. (*Source: News-Medical.net* [Australia], 27 March 2006.)



BUSHMEAT

Bushmeat Research Programme

Bushmeat is the meat of wild animals hunted by local people for income or subsistence. The harvest of wild meat is a focus of global concern. Unsustainable levels of hunting are believed to threaten the survival of many target species around the world, particularly in the tropics. These extinctions will not only threaten ecosystem services but are also likely to impact seriously upon the food security and livelihoods of those people who use the resource. There is therefore an urgent need to develop successful initiatives that will promote the long-term sustainability of the bushmeat harvest – both to protect threatened biodiversity and to secure the trade's social and economic values.

The Bushmeat Research Programme at the Institute of Zoology, the research arm of the Zoological Society of London (ZSL), is involved in research to enhance understanding of the bushmeat trade in West and Central Africa. A better understanding of the trade will assist both policy-makers and project managers to develop effective methods of regulation and management for sustainability. This work is interdisciplinary in its design: it tackles the biological, economic and social aspects of the trade, using a variety of approaches including field research and mathematical modelling.

The Bushmeat Research Programme currently incorporates the following ten projects across West and Central Africa.

1. Bioeconomic modelling of bushmeat harvesting systems
2. Trade and sustainability along a bushmeat commodity chain (Ghana)
3. Park protection, armed conflict and the bushmeat trade (Democratic Republic of the Congo)
4. The bushmeat trade around Virunga National Park (Democratic Republic of the Congo)
5. Incentives for the sustainable hunting of bushmeat (Equatorial Guinea)
6. Poverty, sustainable livelihoods and the bushmeat trade (Equatorial Guinea)
7. Simple indices of hunter effort and sustainability (Equatorial Guinea)
8. Solutions to bushmeat exploitation in the Sanaga-Cross region (Cameroon-Nigeria)
9. Habitat quality and bushmeat surveys (Sierra Leone)
10. Species vulnerability to bushmeat hunting

This work encompasses several countries in the region (Cameroon, Democratic Republic of the Congo, Equatorial Guinea, Ghana, Nigeria and Sierra Leone) and involves collaboration with a variety of institutions in both the host countries and in the United Kingdom.

The Bushmeat Research Programme is also a component of the ZSL's Bushmeat and Forests Conservation Programme. Through a combination of field projects, applied research, policy work and education activities, the programme aims to protect habitats and wildlife through the management of the bushmeat trade to achieve long-term sustainability.

FOR MORE INFORMATION, PLEASE CONTACT:

Dr Guy Cowlshaw, Senior Research Fellow
or Marcus Rowcliffe, Institute of Zoology,

**Zoological Society of London, Regent's Park,
 London NW1 4RY, United Kingdom.**
E-mail: Guy.Cowlshaw@ioz.ac.uk or
marcus.rowcliffe@ioz.ac.uk;
www.zoo.cam.ac.uk/ioz/projects/bushmeat.htm

Bushmeat trade in Indonesia

Medan. The eight fruit bats dangle from a stick alongside one of the busiest streets in this teeming city. They hang head down, their feet and mouths bound tightly with rubber bands. The bats, with black wings and reddish-brown fur, are caught in the rain forest about one hour from the city by stringing a net between two trees. They are kept tied up day and night until they are sold. Yet they are not destined to suffer long: they will be sold to passing motorists as a cure for asthma. The recommended treatment is to cook the bat's heart and eat it. "There is always a buyer," said one roadside bat vendor, who estimates that he and his partners have sold as many as 500 bats at about US\$3 apiece in the last three years.

Bats are not the only unusual animals on the menu in Indonesia. In various parts of the country, cobra blood, bear paws, sea turtle eggs, orangutan meat, crocodile and tiger penises, geckos, dried seahorses, monitor lizards, goat testicles, shark cartilage, pythons, sperm whales, rhinoceros horns and monkey brains are consumed as health remedies, impotency cures or gourmet treats.

In a nation with 300 ethnic groups scattered across 17 000 tropical islands, it is not surprising that Indonesians have a wide variety of eating habits. In addition, Indonesia is a country where health care is inadequate and established medical treatment can be prohibitively expensive. Some people suffering from long-term illness or impotency are desperate enough to try anything. "These animals are endangered not because they cure ailments but because people believe they can," said Meutia Swasono, Professor of Medical Anthropology at the University of Indonesia.

Small restaurants and shops cater to popular demand for monitor lizard meat, bat hearts, raw monkey brains and cocktails made with cobra bile and blood. In the central Jakarta neighbourhood of Kota, a shopkeeper specializes in selling snakes, bats and dried lizard meat. He said he gets ten to 20 orders a year for monkey brains and that each week he sells about 100 cobras, all caught in the wild.

The quest for cures is contributing to the near-extinction of some animals, particularly the rhinoceros, valued for its horn, and the

sun bear, prized for its gall bladder and bile. Some bears are smuggled to China, where their parts are even more valuable. Although the Sumatran tiger is highly endangered, tiger penis can be found for sale in Jakarta, the capital, as a cure for impotence. The price: \$40. (Source: Dr Syed S. Ahmed on tropical biodiversity listserve, 22 May 2006.)



The Wildlife Conservation Society estimates that one million tonnes of bushmeat are taken from African forests every year. Another study puts bushmeat consumption at 10 oz (284 g) a day per person. Jane Goodall, the well-known primate expert, warned last month that gorillas, chimpanzees and orangutans "are being eaten into extinction". (Source: *The Baltimore Sun*, 12 August 2006.)

Roads and bushmeat hunting

A new study links the presence of roads to bushmeat hunting in the Congo rain forest and also raises important questions for global conservation. The study, published in *Conservation Biology*, found that roads and associated hunting pressure reduced the abundance of a number of mammal species including duikers, forest elephants, buffaloes, red river hogs, lowland gorillas and carnivores. The research suggests that even moderate hunting pressure can significantly affect the structure of mammal communities in Central Africa. (Source: R.A. Butler, mongabay.com, 9 May 2006.)

Researchers in Africa warn about bushmeat

Researchers in Cameroon are trying to stop the spread of viruses by educating villagers about the meat they cook. The researchers from the Johns Hopkins Bloomberg School of Public Health in Baltimore are studying

blood from monkeys, in an attempt to find viruses that could conceivably transfer from apes to humans. The goal is to find emerging diseases and stop them from spreading around the world.

Cameroon is not far from West-Central Africa where, decades ago, chimpanzees are believed to have planted the seeds of the AIDS pandemic.

Monkey meat or bushmeat is a common and popular fare in the West African forest. Researchers have been warning villagers not to cook the meat if they have a wound on their hand and advised not to sling dead monkeys over their backs, since blood can be transferable if the person has cuts or scrapes.

Although many have been compliant with the researchers, others are not worried and say that disease has never been a problem. [Source: United Press International [United States], 16 July 2006.]

Gorillas on the menu in meat trade

Chimpanzees and gorillas are finding their way on to dinner tables in western Europe and the United States, an investigation has found. The investigation, by biologist Justin Brashares from the University of California at Berkeley, has discovered that primates, including the great apes, make up nearly one third of the illegal trade in African bushmeat.

Brashares recruited 15 volunteers, all expatriates from West Africa, to visit clandestine meat markets in London, Paris, Brussels, New York, Chicago, Montreal and Toronto. They discovered that just over 6 000 kg of bushmeat move through the seven markets each month. Prof. Brashares believes that this could be an underestimate. Guenon monkeys and baboons formed a large part of the trade. Also sold were duikers, as well as rodents, reptiles and birds.

Bushmeat was often smuggled in from Africa concealed beneath legal shipments of smoked or dried fish. The investigation, published in *New Scientist*, has confirmed long-standing rumours of such an illegal market.

Glyn Davies, Director of Conservation at the Zoological Society of London, said that bushmeat traders were occasionally arrested in London. "The bushmeat trade is huge and supports thousands of people in Africa," he said.

African governments needed to be made aware of the millions of dollars spent on the parallel economy of the bushmeat trade.

International demand for bushmeat was not driven by need, Prof. Brashares pointed out. "It's part of what is clearly a luxury trade," he said. And intercontinental trade, he adds, is again a tiny fraction (he estimates less than 1 percent) of total bushmeat kill, most of which stays in the country of origin. [Source: *Melbourne Herald Sun* [Australia], 7 July 2006.]

Bushmeat boom benefits Ghana's farmers

Grasscutters are such a delicacy in Ghana that they are now being farmed to meet demand. Teye Ocansey started to farm grasscutters as a hobby ten years ago. Since then, he has seen his business grow to generate a healthy profit from the 260 grasscutters he keeps in a small shed in the Accra suburb of Awoshie. "It is a delicacy meat and people prefer it to other meats," says Mr Ocansey, a member of a grasscutter farmers' cooperative. "The cholesterol is very low. There is no religious barrier. Everybody likes grasscutter."

The farming may be new, but Ghanaians' taste for grasscutter is hallowed by tradition. But the old ways of hunting the animals – by starting bushfires to scare them and other kinds of bushmeat out of their natural habitat – have prompted environmentalist concern.

"So if we have this market demand, how can we satisfy it without destroying the environment?" says Rita Weidinger, who works for the German Agency for Technical Cooperation (GTZ). "Grasscutter hunting is a lucrative business, so we need to provide alternatives or hunters will continue to exhaust grasscutters." For Ms Weidinger, that alternative is to encourage people to farm grasscutters. As a commercial enterprise grasscutter farming remains the preserve of no more than a handful of people. But with thousands keeping them as a hobby, GTZ is working with the Ministry of Agriculture to train farmers how to rear the animals for the pot. The farmers say that their business is a more attractive proposition for customers than simply buying on the street.

The next step could be to look further afield. On the one hand, Ghana's grasscutter farmers are preparing to rear breeding stock for neighbouring countries. On the other, the huge diaspora of Ghanaians overseas longing for a taste of home could also prove lucrative. But with local demand for grasscutters booming, most farmers are unlikely to need to seek markets far from home. [Source: BBC News, 3 April 2006.] (Please see p. 44 for more information.)



Future of cork oak forests hangs in the balance

Three-quarters of the western Mediterranean's cork oak forests could be lost within ten years, threatening an economic and environmental crisis, according to a new World Wide Fund for Nature (WWF) report.

WWF warns that up to two million ha of cork oak forests will suffer a heightened risk of desertification and forest fires because of a predicted decline in the market for cork stoppers.

The report *Cork screwed?* says that the future survival of cork forests strongly depends upon the market for cork wine stoppers. However, the trend away from cork stoppers could lead, in the worst-case scenario, to synthetic and screw tops holding 95 percent of the closure market by 2015. This would result in the loss of 62 500 jobs in the cork-producing regions. Endangered species such as the Iberian lynx, Barbary deer and imperial Iberian eagle would be put at further risk of extinction.

Cork stoppers, which are biodegradable and can be recycled into other products, represent almost 70 percent of the total cork market value.

Every year over 15 billion cork stoppers are produced and sold to the wine industry. The cork landscapes provide a vital source of income for more than 100 000 people in the cork-producing countries of Portugal, Spain, Algeria, Morocco, Italy, Tunisia and France.

Cork harvesting is an environmentally friendly process during which not a single tree is cut down. Synthetic and screw top closures are more harmful to the environment because they use more energy in production and are oil-based products.

WWF is calling on the cork industry to continue to invest in the quality of cork stoppers, and the wine industry to make cork the preferred closure option. Better

management practices in cork oak landscapes also need to be coupled with Forest Stewardship Council (FSC) accreditation – the highest environmental certification system.

The report can be found at: www.wine.co.za/attachments/PDF-View.asp?PDFID=38
[Source: WWF, 16 May 2006 [in *South African Wine News*].]



Sustainability of cork

Cork is a truly sustainable product – it is renewable and biodegradable and cork harvesting is an environmentally friendly process with no loss of trees. As well as providing a valuable source of income to more than 100 000 people, these landscapes also support one of the highest levels of biodiversity among forest habitats.

Traditional cork oak *Quercus suber* landscapes, which cover approximately 2.7 million ha in Portugal, Spain, Algeria, Morocco, Italy, Tunisia and France, are under threat from a number of pressures. In particular, the increasing risk of decline in the global cork stopper market for the wine industry, because of the growing use of non-cork substitutes, is threatening to reduce the market value of cork and the incentive to preserve and manage cork oak landscapes. [Source: *Cork screwed. Environmental and economic impacts of the cork stoppers market*. WWF [in *TRAFFIC Bulletin*, 21(1), 2006].]

Cork harvest in 2006 biggest in latest nine-year cycle

While Europe had another hot summer in 2006, it also had the biggest cork harvest in the last nine years, bringing in a total of 140 000 tonnes of raw cork, according to the Cork Supply Group, the largest provider of premium natural cork wine stoppers in the United States.

This year Portugal, the largest producer of raw cork, will produce 110 000 tonnes, while

the number two producer, Spain, will see 30 000 tonnes.

Cork is produced from the bark of the *Quercus suber* tree, also called cork oak, which grows predominantly in Portugal and a few other countries around the Mediterranean. The trees are stripped every nine to ten years, when the bark is thick enough for viable commercial use. By cycling the production schedule of trees, cork foresters maintain a consistent and reliable source of wood.

Nearly 99 percent of all cork harvested is used for commercial purposes in one way or another. The highest-quality cork is generally reserved for wine stoppers, with lower grades used in a host of products ranging from linoleum and ceiling tiles to car parts and shoe soles. Protected by the Portuguese Government as a renewable resource, the average life span of a cork tree is more than 200 years. [Source: *South African Wine News*, 25 August 2006.]



Cultivation of NTFPs as the best measure of poverty eradication of poor tribal cultivators. A case study of lac cultivation

Non-timber forest products (NTFPs) have always played a central role as a source of income generation in community forestry projects throughout the world. Forests are generally inhabited by tribal people, especially in India, who are protected by law and given the constitutional right to derive their livelihood from forest produce. They are assigned the special status of scheduled tribes. Most of the tribal population generally reside in the vicinity of a forest and are exclusively dependent on forest produce for their daily needs.

A recent study by the authors focuses on lac, which is a secretion of the insect *Laccifer lacca* and is an important NTFP. Until the 1950s, India virtually had a world monopoly in its production and trade and accounted for nearly 90 percent in both. This scenario changed in recent years, with domestic production declining from 45 000 tonnes in the 1950s to about 12 000 tonnes in 2000. However, there has been a revival in lac production which, by 2003, exceeded 20 000 tonnes, with lac exports exceeding Rs100 crore.

Lac cultivation in India is spread over major forest areas in Jharkhand, Chhattisgarh, Madhya Pradesh, Maharashtra, West Bengal, parts of Uttar

Pradesh and the northeastern Himalayan region, with Jharkhand contributing about 68 percent of total production, followed by Chhattisgarh, West Bengal and other states. Lac cultivation is carried out in four crop seasons during a crop year, with each crop contributing different amounts, e.g. the summer crop season contributes about half of total annual lac production.

Lac is a cash crop by nature, thus enhancing the cash flow of a large number of people involved in its cultivation, processing and trade.

In order to examine the current status of lac cultivation and the problems in the higher production of stick lac, the study selected a sample of 152 cultivators spread over major lac-growing areas in Jharkhand, Chhattisgarh, Madhya Pradesh and Maharashtra. The selected cultivators were classified into three categories based on the number of lac hosts: i) small cultivators (up to 100 trees); ii) medium cultivators (from 100 to 250 trees); and iii) large cultivators (more than 250 trees).

The study revealed that palas remains the main lac host tree (81.4 percent), followed by ber (14.1 percent) and kusum (4.5 percent).

The gross return from lac cultivation on ber host trees in different categories of cultivators revealed that large cultivators were earning the highest amount per tree (about Rs122), while small cultivators were earning the least (about Rs59) and medium cultivators about Rs98.

The study of gross returns from lac cultivation on different types of host trees among different categories of cultivators suggested that the difference in gross return per host tree was mainly a result of the varying crop yield rates realized. The price of lac obtained from kusum fetches a comparatively high market price because of its superior quality, whereas lac obtained from palas fetches a lower price mainly because of its inferior quality and colour.

The study further revealed that lac cultivation is the most lucrative enterprise for tribal cultivators, where little effort is maximized in the form of higher cash earnings and the conservation of trees. However, in spite of such a lucrative return from lac cultivation, a large number of lac host trees remain unexploited every year. Constraint analysis was carried out to identify factors that affect lac production adversely and restrict higher production at the farmer level. [Contributed by: Dr S.P. Bhardwaj, India.]

FOR MORE INFORMATION, PLEASE CONTACT:

Dr S.P. Bhardwaj (Director) and Dr S.D. Sharma (Principal Scientist), Indian Agricultural Statistics Research Institute, New Delhi 110012, India. E-mail: sdsaharma@iasri.res.in or bhardwaj@iasri.res.in



MAPLE SYRUP

Maple syrup tapping in the United States

To obtain sap for syrup, a hole is drilled into the maple tree and the sap drips through a spout or tube into a bucket or plastic bag. Black maple and sugar maple are the trees commercially tapped in Michigan (United States), although the sap from red and silver maples can also be made into syrup.

A tree needs to be about 40 years old and at least 10 in (25 cm) in diameter to be tapped; it can then be tapped for more than a century. Springtime is tap time, because warmer days and freezing nights make the sap flow. Once a tree starts budding, the syrup will taste bitter.

One tap will yield about 10 gallons of sap per season, and it takes about 40 gallons of sap to make 1 gallon of syrup. The colourless sap is 2–3 percent sugar, and is boiled to reduce the water content and concentrate the sugar until it becomes syrup.

Syrup comes in four United States Department of Agriculture (USDA) grades: Grade A Light Amber is the lightest in colour and tastes the mildest. Grade A Medium Amber is a little fuller in flavour and is usually used for pancakes and waffles. Grade A Dark Amber is even fuller in flavour and is used on breakfast cereals, and for cooking and baking. The darkest, Grade B, is best suited for baking. [Source: *Detroit Free Press* (United States), 6 March 2006.]

Maple syrup production in the United States

Maple syrup production rose by 12 percent in New Hampshire and Vermont and 13 percent in Maine in 2006, while production

nationwide increased 17 percent, according to Department of Agriculture statistics.

As usual, Vermont was the No. 1 syrup state with 460 000 gallons produced. Maine was the No. 2 state with 300 000 gallons, followed by New York with 253 000 gallons. New Hampshire produced 64 000 gallons of syrup, Massachusetts 40 000 gallons and Connecticut came in at 10 000 gallons.

The rise in production is credited to an increase in yield as well as an increase in the number of syrup taps. [Source: Associated Press [in *Portsmouth Herald News* (United States)], 16 June 2006.]

Maple syrup production in Canada

Canada accounts for 85 percent of the world's maple syrup production, with the United States supplying the remainder. More than 80 percent of Canada's production is exported to the United States. Japan is the second largest market with sales to this country growing significantly in recent years – doubling, in fact, from 2001 to 2003.

In 2004, Canada's production of maple products dropped by 3.6 percent while exports increased by 4.1 percent. Even though production declined, Canadian suppliers were able to satisfy domestic and foreign markets by drawing on the high inventory left over from the exceptional 2000 harvest. Quebec is Canada's biggest producer of maple products (93 percent), with Ontario and New Brunswick accounting for most of the remainder.

In 2005, the Canadian maple products industry received a boost when the *Fédération des producteurs acéricoles du Québec* (Quebec Federation of Maple Syrup Producers), in conjunction with the federal government, announced plans to promote maple products on international markets and to make the maple industry more innovative. [Source: *The State of Canada's Forests 2005–2006*.]



MEDICINAL PLANTS AND HERBS

Terminalia pallida Brandis

Terminalia pallida Brandis is an endemic plant of medicinal importance in the Seshachalam hill range of the eastern Ghats in India. It is a deciduous tree of the family Combretaceae, regionally called *tella karaka*, and is a dominant tree on the Tirumala hills. It has the following characteristics.

- It is a semi-evergreen tree, 8–10 m tall with greyish bark and glabrous branchlets.
- The leaves are simple, 6–12 x 3–5.5 cm thick, coriaceous, alternate, subopposite, broadly oblong to elliptic-oblong, glabrous, glaucous beneath, apex obtuse or emarginate, margin entire or slightly crenulate, base rounded with glands at the base of the leaf blade; petiole to 1 cm, orange-reddish, stipules absent; secondary nerves seven to nine pairs.
- The flowers are pale yellow, small and bisexual, in terminal spikes up to 8 cm long, bracteoles small and deciduous. Calyx tube ovoid, constricted above the ovary, limb campanulate with five triangular, valvate lobes. Petals are absent; there are ten stamens, in two series – the upper five alternate with the calyx lobes, the lower five inserted opposite; filaments are subulate, exerted; anthers small; disc five-lobed, villous. Ovary one loculed, ovules two to three pendulous; style subulate; stigma small.
- Fruit drupe, obovoid, green when young, later turning brown, 1.4–2.5 x 1.3–1.7 cm, very faintly five-ridged when dry, glabrous, indehiscent; seed solitary, exalbuminous; cotyledons convolute.

The leaves usually fall from December to February and new foliage and flowering start from March onwards and continue until the end of April. Fruits appear at the beginning of August until end-September.

The fruit has high medicinal value as an antipyretic, a purgative and a diuretic. The local tribal people use it:

- as a decoction orally to prevent diarrhoea;
- as a powder applied externally on the affected part and given orally for swellings and fever;
- with honey, taken orally to cure peptic ulcers;
- as a powder, given orally with water to control diabetes;
- as an infusion, with the tuberous root of *Pimpinella tirupatiensis*, in the treatment of venereal diseases;
- as a powder given orally as a remedy for coughs and colds;
- as a paste, mixed with turmeric and applied externally to the toes and feet to cure fissures and cracks; and
- in veterinary medicine.

Terminalia pallida is being exploited excessively for its fruit. Hence, immediate

steps must be taken to conserve this endemic plant before it becomes endangered. [Contributed by: Prof. (Mrs) N. Savithramma, Department of Botany, Sri Venkateswara University, Tirupait 517 502, Andhra Pradesh, India. E-mail: drnsavithri@yahoo.com]

Moringa oleifera has multiple healing properties

The *Moringa oleifera* tree can save millions of lives around the world through its high nutritional and medicinal properties. Every part of the tree is valuable as it is said to have beneficial properties that can cure various ailments. For instance, its leaves can cure high blood pressure, diabetes, diarrhoea and fever.

Dr Jean Baptiste Nduwayezu, Moringa Project Coordinator for the southern African region, said research had also shown that consumption of fresh moringa leaves and dry leaf powder increases the milk production of breastfeeding mothers and improves babies' health. Nduwayezu said that *Moringa oleifera* seeds, which have properties similar to olive oil, are used in water purification and also provide edible oils. Moringa seed oil is used in lubrication, soaps and cosmetics and as a remedy for prostate cancer, bladder problems, gout and skin diseases, among other functions.

Nduwayezu, however, warned that excess consumption of moringa roots in powder form could be toxic and result in cardiac arrest or paralysis. He said that recent reports from Francistown and Gaborone showed that some people were now selling the powder from moringa roots in different dosages. Furthermore, some unscrupulous vendors are making huge profits by selling products labelled moringa tea leaves but that are in fact from the ground roots or stems of any tree or shrub species.

He said there was a need for the establishment of a farmers' association to be responsible for setting standards, testing and approving moringa products. [Source: Daily News [Botswana], 14 September 2006.]

Healing plants found in threatened Borneo forest

Plants thought to help treat or cure cancer, AIDS and malaria have been found in the rain forests of Borneo according to a new WWF report – *Biodiscoveries, Borneo's botanical secret*. But the rapid destruction of trees, much of it by illegal logging, could

wreck any chance of using these discoveries in the fight against disease, WWF declared.

A promising anticancer substance has been found in a Borneo shrub by researchers for an Australian pharmaceutical firm, while a chemical found in latex produced by the bintangor tree appears to be effective against the replication of HIV, the report said. The report further says that researchers found a powerful and previously unknown antimalarial agent in the bark of a local tree traditionally used by the Kenyah people of Kalimantan to treat malaria. In laboratory tests this substance appears to kill the human malaria parasite.

In all, the report stated, 422 new plant species have been discovered in Borneo – shared by Malaysia, Indonesia and Brunei Darussalam – in the last 25 years and many others that could have medicinal applications are believed to be there. But "all these promising discoveries could eventually be lost if the disappearing rain forests of the heart of Borneo are not adequately protected", WWF said. Borneo's forest cover has shrunk to 50 percent of its territory today from 75 percent in the mid-1980s. [Sources: Reuters, 27 April 2006 and others.]

Anti-inflammatory properties of copaiba

A study conducted by Brazil's University of São Paulo's Ribeirão Preto Science Department has certified the anti-inflammatory properties of the copaiba plant (*Copaifera officinalis*).

In testing on mice, this tree native to the tropical regions of Latin America and western Africa showed anti-inflammatory properties twice as strong as diclofenac sodium, a synthetic medication.

To date, copaiba has been used in scents and varnishes, but it has also been used in traditional medicine to prevent scarring and against inflammation. [Source: Tierramérica, 3 August 2006.]

China launches international project on herbal medicine

China, the world's main producer of traditional and herbal medicines, has launched an international project to modernize the sector. The Ministry of Science and Technology pledged an initial 100 million yuan (US\$12.7 million) for projects that focus on developing new treatments for diseases such as cancer and HIV/AIDS. It is the first time that China has initiated a multinational research project of this kind, which it hopes will provide an

opportunity to boost health research in developing nations.

A senior ministry official says it is likely that China will launch research on artemisinin, a herbal medicine from *Artemisia annua* regarded as the best treatment for malaria, with African countries such as Kenya and South Africa.

The scheme has already attracted countries including the United States, Japan and Singapore, says Shang Yong, Vice-Minister of Science and Technology. The first 50 programmes, which will be selected by his ministry and matched with international partners, will start by the end of 2006.

China hopes the project will help increase its share of the global market for traditional medicines. Until now, entry into global markets has been hampered by a lack of consensus as to how to measure the efficacy of traditional medicine. Thus the project will also include efforts to develop international standards for traditional remedies. "It is much cheaper to develop a new herbal medicine than a Western one," says Shang. "So our programmes will have a strong appeal for transnational companies."

Such companies will be able to express their wish to participate through their embassy or their home country's science administration. Shang added that companies, rather than colleges or research institutes, would play the major role in each programme, with an aim to "foster domestic pharmacists".

Chinese drug companies will gain extra funding and access to advanced facilities in developed nations to help them develop their traditional medicines. [Source: SciDev.Net Weekly Update, 3–10 July 2006.]

Ginkgo biloba: how a herb could help the brain

Researchers have identified a key cellular pathway by which the herbal medicine *Ginkgo biloba* may protect brain cells. If the results are confirmed in humans, *G. biloba* might one day be used to lessen the effects of strokes.

For centuries, traditional Chinese physicians have used extracts from leaves of the maidenhair tree, *G. biloba*, to treat asthma, bronchitis and brain disorders. Although many of *G. biloba*'s purported benefits remain unproven, doctors in the United States are studying the herb's potential to slow memory loss and ease confusion in patients with Alzheimer's disease. No one knows for sure how the herbal extract affects the brain. [Source: ScienceNOW Daily News, 30 May 2006.]

MULBERRY



Mulberry leaves nutritious for livestock

Mulberry (*Morus alba*), locally known as *nenene*, is a multipurpose fodder shrub. It plays an important role in the nutritional security of both animals and people. Its sweet fruits are extremely valuable and eaten mainly by children, while its leaves provide high-quality feed for small ruminants.

Kenyan farmers have been feeding cows and goats on mulberry leaves since the 1990s. Ugandan farmers have also begun making use of the shrub. Mulberry was previously planted for the silkworm industry and eaten as a fruit but now it is mixed with fresh forages (grasses and legumes) and given to livestock for a balanced diet. Fresh grasses such as Tanzania (*kakira kambwa*), elephant and Guatemala are a source of carbohydrate and contribute 70 percent to the diet. Fresh legumes such as mulberry, *Calliandra* (*kalibwambuzi*), *Sesbania* (*muzimbandegeya*), *Leucaena*, *Tephrosia* (*muluku*), lablab, *Gliricidia* (*mutamesse*) and *Ipomea temirostris* (*ekabowabowa*) are protein-giving foods.

The cows and goats graze and browse every type of grass and shrub but, among the legumes, it is mulberry and *Calliandra* that are consumed first. Fresh forages are cut on a daily basis, chopped, mixed and fed to the animals.

According to the *Paths to Prosperity* 1998–99 report by the International Centre for Research in Agroforestry (ICRAF), a similar experiment was carried out in central Kenya from 1997 to 1998 to determine the voluntary intake of tree-shrub fodder supplements by heifers. Mulberry had the highest voluntary intake of the fodder used in this trial, compared with dairy meal. This high intake and the fact that the bark was eaten are indications of mulberry's high nutrition. Sweetness is an important factor in intake.

With each type of fodder, cattle were able to select the more nutritious parts. And their selective feeding, together with the

level of supplement intake, determined the amount of nutrients they consumed. As a result, cattle produced more milk when given mulberry than when given *Calliandra* or *Leucaena*. The extent to which farmers used mulberry as fodder for dairy cattle was similar to the extent *Calliandra* and *Leucaena* were used. [Source: *New Vision* [Kampala], 23 May 2006.]

Silkworm cocoon production shifts from east to west

In a bid to improve the silkworm cocoon industry, the Chinese Bureau of Commerce plans to support nine silkworm cocoon production areas under the project "West shift of east mulberry". The project includes 200 huge silkworm mulberry bases, which will form the new cocoon production areas, focusing on central and west China. Major provinces include Guangxi, Jiangxi, Sinkiang, Liaolin and Sichuan. Guangxi has replaced Jiangsu Province as the most important in the Chinese silkworm cocoon industry.

The Government of China will supply special funds and necessary support to carry out this project. [Source: *Fibre2fashion.com*, 22 August 2006.]

Extensive mulberry plantations to be raised in Indian state

Rajahmundry. Plans are afoot to raise mulberry plantations in 10 000 acres (4 047 ha) in Andhra Pradesh during 2006 in addition to the existing 90 000 acres (36 422 ha), according to the Sericulture Commissioner. She said that so far eight crore saplings had been planted in 3 500 acres (1 416 ha). As many as 5 000 tonnes of silk had been produced from 55 000 tonnes of cocoons.

Steps were taken to produce 75 000 cocoons in 2006. The existing production in the country is 14 000 tonnes as against a 25 000-tonne demand. The Government is planning to set up spun silk mills in the state in a phased manner. [Source: *FreshPlaza*, the Netherlands, 22 August 2006.]

OAK GALLS

Galls are tumorous mutated oak leaves. They serve as both protective homes and food supply for tiny wasps that alternate between sexual and asexual generations.

All galls are aberrant plant growths caused by a variety of micro-organisms, nematodes, mites and insects, particularly

flies, wasps and aphids. Galls can be found on all groups of plants and come in all sizes, textures and shapes, resembling everything from marbles to dunce caps, spikes, cups or buttons.

Most insect galls develop on oaks and are caused by cynipid wasps, a diverse group of small wasps numbering over 600 species in North America and many thousands more worldwide.

Some oak galls are quite valuable since they have a concentrate mixture of resins and tannins, used commercially to make permanent inks and astringent ointments. Inks of the best quality have been made from oak galls, the most prominent coming from the Aleppo galls of Europe and Asia.

Commonly seen oak galls are thin-shelled, spongy "apples" that start out green and slowly turn brown during the summer. They are formed by the cynipid *Amphibolips confluenta*, a tiny dark-coloured ant-like wasp. During the summer, each gall contains a single male or female wasp. The galls are stimulated to grow by chemicals in wasp saliva that mimic the effects of plant hormones.

In late June or July winged adults emerge from their oak apple condominium to mate. After this brief sexual phase, the males die and the females burrow into the ground and lay fertilized eggs on oak roots. These hatch into all-female larvae that begin feeding on root tissue, which stimulates development of another type of gall below ground. This phase of the life cycle lasts more than a year, and then the larvae develop into wingless asexual females that look completely different from their sexual parents. These crawl up the oak tree to lay unfertilized eggs on developing leaves. No males are required. Oak apple gall wasps of both sexes and all life-cycle phases are stingless. [Source: Sara and Jim Lawrey, *Rappahannock News* [United States], 28 June 2006.]



SANDALWOOD

Sandalwood oil – aromatherapy for the mind, body, and spirit

Sandalwood is one of the world's most widely used essential oils, prized for its scent in perfumery, for its therapeutic effects in Chinese, Ayurvedic and Tibetan medicine systems, and for its ability to focus the mind in meditative yogic traditions.

Sandalwood essential oil is most often extracted via steam distillation from the wood of the sandalwood tree, with the heartwood of the roots producing the highest-quality oil. Sandalwood is an evergreen tree, growing to a height of 9 m, with leathery leaves and small purple flowers. Native to southern tropical Asia, the tree is parasitic, gaining its nutrients from one of several other tree species. Because it can only be grown this way, and as a result of its seemingly strict set of environmental conditions, sandalwood is difficult to propagate. To add to the challenge of successful cultivation, sandalwood takes nearly 30 years to mature before yielding oil of any worth.

Sandalwood oil has a woody, balsamic, sweet and slightly musky aroma; it is a pale yellow, greenish or brownish liquid with excellent tenacity (the aroma tends to last a long time) and superior fixative properties. There are several varieties available, with *Santalum album* considered the most important therapeutically. The Mysore region of eastern India is thought to produce the highest quality of this oil type, although its harvesting is creating a strain on the area's natural environment. Recently, an oil of the *Austrocalledonia* species has been produced on the South Pacific island of Vanuatu from successfully cultivated sandalwood trees. This oil has a fantastic aroma, with a woody, smoky scent that is an excellent base note in perfume and cosmetic blends.

In the West, sandalwood oil is perhaps best known as a natural, woody, sweet body perfume used "as is", or as a familiar aroma in many cosmetics, aftershaves and the like. In the East, however, sandalwood's importance in cultural and spiritual traditions cannot be overstated. The wood is carved into furniture and religious icons, used to build temples and burned as incense in a great variety of ceremonies. The oil is used to anoint the dead. In Myanmar, women sprinkle it on passers-by on the last day of the year. In Hindu marriages, sandalwood is burned in a tent so that the

smoke surrounds the bridal couple. For the meditative yogi, the oil and incense encourage a serene state of mind.

Sandalwood is valued in the traditional Indian medicine system of Ayurveda. It is indicated for inflammatory, intestinal and genito-urinary conditions that require cooling. Modern aromatherapy considers the oil an effective skin care agent for dry skin, general irritation and acne; it can help in cases of bronchitis, catarrh, dry persistent coughs, laryngitis and sore throats; it may relieve diarrhoea and nausea, and can be supportive in cases of cystitis. Sandalwood essential oil is also a great tonic for the hyperactive mind.

Finally, sandalwood is one of the few essential oils that improve with age. Because of increasing demand, the price of the oil is climbing significantly every year. [Source: Market-Day.net [United States], 14 September 2006.]

India, Australia and the sandalwood market

India's 5 000-year-old sandalwood industry is in its last gasp, thanks to smugglers who have ensured that the official trade is killed. Sandalwood production in the country has fallen from about 4 000 tonnes/year in the 1960s to under 1 000 tonnes during the 2000s.

Three years ago India exported 1 800 tonnes of hard-core sandalwood, of a world trade of 6 000 tonnes. In 2005 it was a bare 400 tonnes. As a result, India, once the undisputed leader in the 1 800 crore-a-year market for global sandalwood exports, has lost its position to suppliers in Australia and Indonesia. India's own local requirements are about 150 tonnes a year; in 2006 supplies can continue for about two more years since stocks are on the decline.

A sandalwood tree lives for 60 to 70 years. When it is brought down for profit, it is never felled like other trees, but uprooted in the rainy season, when the roots are richest in the precious essential oil. The yield of oil is highest in the roots, about 10 percent, and lowest in chips, which are a mixture of heartwood and sapwood (1.5–2 percent). The oil content of the heartwood varies from tree to tree and is higher in older trees. One tonne of sandalwood yields 40–50 litres of oil. The bulk price at the factory is more than Rs50 000 a litre. On the Internet the oil retails at Rs1 350 for 10 ml. Each tree yields around 30 kg of heartwood.

Environmentalists say the smuggling of sandalwood could be well in the region of Rs500 crore annually. Marayoor has the

best-quality sandalwood in the world and is the only place in Kerala where it grows naturally. Smuggling of this costly wood is rampant, where a single tree can fetch more than a lakh of rupees. Marayoor, which earlier had over one lakh sandalwood trees, now has only 59 000.

Except in some patches of Kerala and Karnataka forests, there are no sandalwood trees left in India and it will be some time before the industry can be resuscitated, since it takes conservatively 50 years before a sandalwood tree can be uprooted for its valuable oil. In the 1990s the price was 3 lakh rupees per tonne and in 2006 it was 30 lakh rupees per tonne.

Who will fill the gap to supply the 6 000 tonnes of sandalwood logs required annually for the world trade? Other nations, mainly Australia with its vast uncultivated lands, have stepped in. The greatest advantage of Australia is that its sandalwood farms are in the private enterprise sandalwood industry. It is already ensuring the topmost security of its sandalwood, and there are no poachers or smugglers.

Australia has become the home for sandalwood plantations with a total annual harvest currently standing at 2 000 tonnes. It has embarked on a long-term sandalwood tree project and the largest sandalwood farm in the world is at Kunnumurra in western Australia, with 12 000 sandalwood trees in each of its 300-acre (121.4-ha) farm segments. The oil content of Australian-grown trees is between 1 and 2 percent, which compares with 6 percent from Indian trees. But now plant scientists in Australia have developed a method of extracting sandalwood oil from trees as young as 15 years, unlike in India where the trees are not touched until they are 40 years old. That means for one extraction cycle in India, there are three in Australia. The Australian scientists are also striving to achieve an oil production figure closer to the Indian trees.

Scarcely two decades old, the Australian sandalwood industry has today the green sandalwood resources available for harvest in excess of 200 000 tonnes and the quantity of dead sandalwood available for harvest was in excess of 15 000 tonnes. At the same time, Australia does not want to flood the market by lowering prices and its Ministry of Agriculture has decided to keep exports locked at around 3 000 tonnes a year.

India is already importing hundreds of tonnes of sandalwood from Australia and the famous Australian red sanders sandalwood is very well received in India for

its oil content. Many Indian companies are also interested in investing in Australian sandalwood plantations and setting up units over there. [Source: *Navhind Times*, 21 August 2006.]

Indian perfume capital on the brink

With sandalwood hardly available for the *attar* or *itr* distilleries in Kannauj, the “perfume capital of India” might lose its status in the next few years. Of 21 sandalwood oil distilleries, 19 have shut down, while the remaining distilleries are functioning with cheaper African wood. And every perfumery owner now relies on a second business for a living.

Virendra Dixit, the owner of Pandit Chandrabali Sandalwood Distillery, one of the oldest, blamed the situation on the “shortsighted policies of successive governments”, with no efforts being made to increase the area under cultivation and/or improve production. Dixit, who is also president of the Perfumer’s Association, said the government has imposed 16 percent excise duty on sandalwood and 10 percent on other perfumes, thus forcing the collapse of surviving distilleries. He added that sandalwood oil, which was available for Rs7 000–8 000 about ten years ago, is sold for no less than Rs50 000 now, and the profit margin per kg is between Rs200 and Rs1 000.

Another perfumery owner stated that “there is no life left in the industry”. He said many people have closed down their units and have moved out of Kannauj. [Source: Lucknow Newsline [India], 10 July 2006.]



Big expansion for sandalwood plantation in Australia

An Indian sandalwood plantation in the Ord Valley is undergoing its biggest expansion in seven years. Tropical Forestry Services is planting a further 235 ha of the exotic hardwood, increasing its total plantation to more than 800 ha. The company plans to harvest its first crop in 2012, banking on continuing strong demand from Asia, Europe and the United States. Premium sandalwood is fetching more than A\$100 000 a tonne at global auctions and

has risen in value by a compound 22 percent a year over the past 15 years.

The other major grower of Indian sandalwood in the Ord, ITC Limited, has now planted 750 ha; its first harvest is planned for 2014. [Source: ABC Online [Australia], 19 June 2006.]

Vanuatu sandalwood competes with Indian product

Recent field surveys of natural stands of sandalwood in Vanuatu have uncovered a range of varieties that possess exceptional oil qualities. The main survey was carried out in 2004 by local and Australian experts on six islands in Vanuatu – Malakula, Santo, Moso, Erromango, Tanna and Aniwa – in order to quantify morphological and genetic variation. The survey was also intended to domesticate the good-quality trees for expanding plantings to meet international standards for sandalwood oil.

This new development opens the way for local communities to make a greater contribution to the sandalwood industry through planting superior varieties. The sandalwood oil industry also stands to benefit through future access to a consistent supply of quality oil that is required for developing premium branded products.

Individual sandalwood trees (*Santalum austrocaledonicum*) were assessed and wood core samples collected from nine populations on the six islands. A total of 28 percent of trees sampled in the two northern islands produced a natora oil meeting the international standard, with a content of more than 41 percent a-santalol and more than 16 percent b-santalol. The selected trees from the remaining southern populations had a mean of 31 percent of a- and b-santalol.

The survey now places Vanuatu in second position after Indian sandalwood, *Santalum album*, in the world market. *Santalum austrocaledonicum* is mainly found in Vanuatu and Mare island in New Caledonia compared with *Santalum yasi* in Fiji and Tonga with poor-quality oil. [Source: Port Vila Presse [Vanuatu], 21 February 2006.]

Saving the sandalwood tree in Kenya

Residents of Majani village in the Laikipia district of Kenya’s Rift Valley Province recently noticed that sandalwood, known locally as *muthirioni*, was being uprooted and taken away at night. Even those in private farms were not being spared. The residents later learned that this was happening

because of a huge demand for sandalwood products – bark, stem and seeds – in India. Smugglers working with some residents were buying the wood at K Sh3/kg. In collaboration with other stakeholders, members of Laikipia Conservancy have been trying to stop the illegal harvesting of the tree.

Sandalwood, which was originally found in India and Australia, is a small evergreen tree that grows up to 4 m high in Kenya and up to 20 m in India. It sometimes attains 2.4 m in diameter. Its bark is dark brown, reddish, dark grey or nearly black in younger trees.

“The bark when boiled produces a dark-coloured solution which was used to flavour tea. It was also used together with other herbs for cleaning blood. For others, the boiled product was given to women after giving birth to boost their appetite,” remembers Joseph Thuita, a resident of Majani village. Another elder, Charles Ndun’gu, says: “The wood of the sandal tree was sold in many markets in central Kenya just before independence. It was boiled and used as tea and some people said it lifted their mood.” After Kenya gained independence, sandalwood products were abandoned as better branded and packed products hit the market.

In India, however, the tree products have attained sacred status. When harvested, the stem, which is known as heartwood, is ground and its steam distilled into oils for use in manufacturing cosmetics, soaps, candles, medicines and perfumes. The wood yields between 4 and 10 percent oil when distilled.

Because of the rising demand for sandalwood products, the tree is considered endangered in India, which is why smugglers have found East Africa an easy source of the products.

The Kenyan Government has banned harvesting of the tree, but the lure of quick money has forced people to target isolated forests and bushes where it is found. [Source: *The East African* [Kenya], 5 September 2006.]



STEVIA

The changing market for stevia

Stevia, also called sweet leaf or honey leaf, is a medicinal plant indigenous to South America, where it has been used for centuries by the Guarani Indians to sweeten foods and beverages. An estimated 280 species of stevia now grow wild in North and South America. However, the only species with the sweetening properties that have

attracted so much attention to the herb is *Stevia rebaudiana*.

Despite the challenging regulatory obstacles that stevia products have faced over the past 15 years, sales continue to climb year after year in both the natural and conventional markets. Currently, sales of stevia and medicinal tea with added stevia total US\$14.4 million in the natural channel, up by 32 percent over the previous year. Total dollar sales are lower in the conventional channel, but they have grown nearly twice as much in the same period – 63 percent over the previous year to \$3.6 million.

From Latin America to Asia, stevia is used as a natural and safe non-caloric sweetener. For example, the herb accounts for 40 percent of the sweetener market in Japan, where artificial sweeteners have been banned as a result of strict food additive regulations. Stevia has been used in Japan for approximately 30 years with no reported negative effects.

Stevia is almost completely free of calories, making it a wonderful natural alternative to synthetic non-nutritive sweeteners such as sucralose, acesulfame-K and aspartame, which many natural consumers tend to avoid. Stevioside and Rebaudioside A are two chemical components present in stevia. Together, they give the plant a taste that is 200 to 300 times sweeter than refined sugar, without a single side effect.

Besides being a natural alternative to sugar, stevia has a number of other healthful benefits that make it an ideal sweetener for anyone with blood sugar problems. Rebecca Wood, author of *The New Whole Foods Encyclopedia*, noted that stevia has traditionally been used to balance glucose levels because, unlike refined sugars, it does not cause spikes in blood sugar. Blood sugar regulation is increasingly important to consumers in the United States.

Because of its regulatory action on the pancreas, stevia also helps to maintain proper digestion and appetite. Regular use of the herb can help minimize hunger sensations and cravings for sweets or fatty foods. In addition, stevia has an antifungal effect and can be used to combat topical fungal infections such as athlete's foot. It is ideal for candida sufferers, as it does not feed yeast or other micro-organisms. It also has antibiotic properties that have been shown to prevent oral bacterial conditions, specifically cavities and gum disease.

During the late 1980s, stevia was quickly gaining momentum as a popular sweetener

in the United States. Around the same time, an anonymous firm lodged a trade complaint with the Food and Drug Administration (FDA), stating that stevia was being used as an unapproved sweetener in the products of a successful tea company. As a result, FDA banned its import in 1991 and changed its classification from a food to a food additive.

This change in classification was a blow to producers. Foods do not need pre-market approval before they enter into the food supply, as they are automatically considered safe. Food additives, however, must undergo expensive toxicological research studies in order to meet FDA's safety requirements. While owners of patented food additives are guaranteed large profits because of their lack of competition in the marketplace, stevia would be impossible to patent. As soon as the herb had been approved for sale as a food additive, anyone could manufacture and sell it as a sweetener. Understandably, manufacturers were reluctant to invest millions of dollars on product research that cannot promise a return on investment.

Since 1992, the American Herbal Products Association (AHPA) has submitted at least two petitions to FDA challenging stevia's status as a food additive. In September 1995, FDA finally lifted its four-year import ban on stevia. However, the reintroduction of stevia to the United States was limited to its sale as a dietary supplement and prohibited its use as a sweetener or flavouring ingredient in any food products.

Today, stevia is sold in most natural food stores in the supplement department. It is available in several forms, including powder and plain and flavoured liquid. Although it has been banned for sale as a sweetener, consumers still purchase stevia for this purpose. Unlike aspartame, stevia is heat stable up to 392°F (200°C). However, baking with stevia is not the same as baking with sugar. The molecular structures of the two sweeteners are completely different. Sucrose (sugar) will caramelize when heated, giving baked goods a brown crust. Stevia, on the other hand, does not have this browning quality. Cooking times may differ from traditional recipes, and ingredient measures are not the same (since stevia is 200 to 300 times sweeter than sugar).

As more studies question the safety of non-natural sweeteners such as sucralose, acesulfame-K and aspartame, consumer demand for safe non-caloric sweeteners is increasing considerably. In spite of federal

regulations limiting the sale of stevia products to supplements and medicinal teas, the herb continues to grow in popularity among natural and mainstream consumers alike. [Source: K. Rourke, Natural Products Insider [United States], 18 September 2006.]



Stevia can help meet sugar crisis

Stevia serrata (family name Asteraceae), a herbal plant widely used as an alternative to sugar in many developed countries such as Australia, Canada, China, Japan and the United States, can help meet a country's growing demand for sugar. Herbal scientist Dr Alamgir Mati said the compound made of stevia leaf (sometimes known as sweet leaf or *chinipata*) is 300 times sweeter than common sugar: 5 g stevia leaf has the same effect as 1 kg sugar.

Dr Mati said that 1 kg of sugar is being sold at Tk65 while it takes at best only Tk5 to produce 5 g of stevia. Since Bangladesh is an agrobased country, he believes that the plant could be easily cultivated in its vast char lands since it grows well on open land with regular sunlight. He added that "after 60 days of cultivation, the leaf of the plant can be harvested and turned into granules like those of sugar". This could help minimize sugar imports as well as create job opportunities for a large number of unemployed youth.

Dr Mati stated that stevia has no side effects as an alternative to sugar; rather it reduces blood pressure, risks of obesity and diabetes because it has a low carbohydrate content. [Source: *The New Nation* [Bangladesh], 2 June 2006.]

Sugar-free honey project

In an effort to motivate beekeepers to produce sugar-free herbal honey, India has introduced a new ecofriendly beekeeping system in the state of Himachal Pradesh. The National Horticulture Board (NHB) has sent the state 5 000 beekeeping boxes together with the bees, to be distributed in ten of the 12 districts in 2007, an official said.

These bees will be fed on stevia herbal plant leaves that are said to produce sugar-

free honey. The plant is considered a natural sweetener and also attracts bees.

These leaves will come in handy in the countryside during dry winters and the rainy season when the bees are unable to fly out in search of food. In the lean season, the hungry bees are normally fed sugar by beekeepers, resulting in the production of poor-quality honey. Stevia will change this practice.

Sugar-free honey is much in demand by diabetics and those who do not wish to gain weight but at the same time want to enjoy the taste of honey. It is also said to reduce cravings for sugar and fat besides being helpful in controlling blood sugar and high blood pressure.

An official said the project was sent to NHB by the Himachal Organic Association to popularize healthy sugar-free honey. Eventually the state government plans to procure some 100 000 beekeeping boxes to produce herbal honey. (Source: India eNews.com, 28 August 2006.)

TRUFFLES

Burgeoning business in truffles in Hungary

Truffling is becoming big business in Hungary, where its natural environment for the rare tubers that grow around tree roots is slowly being recognized by the international truffling community.

While French and Italian truffles fetch huge sums on the market, it is still possible to find truffles relatively cheaply in Budapest markets: 1 kg can be bought for as little as 60 000 forints (€230) from stall sellers compared with thousands of euro in culinary centres such as London.

Hungarian truffle gatherers collect 6–7 tonnes of wild truffles a year. Approximately 25 farmers have started cultivating truffles, although their farms will only start to yield them after several years. European farmers, mainly in France, Italy and Spain, produce 60–400 tonnes of truffles each year, accounting for almost all of the global production. (Source: MTI [Hungary], 14 September 2006.)

Namibia's four-star fungus

Black truffles have long been prized in France, where pigs or trained dogs snuffle about under oak trees to bring the treasured delicacies to market for as much as US\$1 200/kg when truffles are scarce. But in the Kalahari Desert in southern

Namibia, the Nama people will sell you the odd kilo of truffles for a few dollars or so, unless they are keeping them to eat.

Kalahari Desert truffles (*Terfezia pfeili*) are distantly related to French black truffles, but they are not so aromatic. Unlike the black French truffle, with its hard, knobbly outer layer, Kalahari truffles have a smooth brown skin similar to a small round potato. Like the French truffle, which is always found near the roots of oaks, the Kalahari truffle has a symbiotic relationship with a plant – the desert melon.

The Nama recommend carrying a stout stick when truffle hunting to flip aside adders, although it seems that they rarely bother with such fancy precautions themselves, thrusting their hands into the dense grasses to pluck out the truffles that are betrayed by a small crack in the red sand.

Namibians are as inventive about Kalahari truffles as others are about the potato. They bake them, boil them, mash them, slice them raw with salt or serve cooked slices in a salad. They barbecue them, grate them over pasta and fry them in lashings of butter and eat them on toast. Some recommend wrapping small ones in bacon and baking them whole.

Kalahari truffles are cheap in Africa: collectors are often poorly paid or ask little for their goods. But if the Kalahari truffle ever found its way into the markets of Paris or Rome, it would doubtless create ripples of excitement, attract curious buyers and command higher prices – if not the sky-high prices of European black or white truffles.

The difficulty with exporting truffles, however, is not just their short shelf-life – about a week – but regularity of supply. This wet season desert fungus is widely available one year and scarce the next.

Prof. Varda Kagan-Zur of Ben-Gurion University in Israel has been studying the cultivation of the Kalahari truffle and melons in Namibia in an effort to commercialize them. Dave Cole, who belongs to a Namibian non-profit association of development experts, the Centre for Research Information Action in Africa, is helping to coordinate the project, now in its final year. He says it has had mixed results, “but we have learned quite a few good things”.

The study, under way for the better part of a decade, aims to create a predictable supply for markets and provide a livelihood for poor rural farmers. One fear Cole has is

that cultivating truffles may create a viable industry for large commercial farmers and bypass small-scale, destitute farmers. (Source: *Los Angeles Times*, 15 May 2006.)

Mad about truffles in New Zealand

Waipara truffle grower Gareth Renowden is confident that the delicacy will become a big export earner for New Zealand.

Renowden has established a truffière on the steep and stunning terrain of north Canterbury's Waipara Gorge. He is convinced that truffle farming has a huge future in New Zealand and that truffles will one day sit beside other boutique agricultural enterprises and become an important export earner.

There are few truffle experts in the world but Renowden, the New Zealand Truffle Association president, is fast becoming recognized as knowledgeable about the edible fungi that can command up to NZ\$3 500/kg. This is despite his 0.5-ha truffle enterprise being in its infancy and that it has so far yielded only one black truffle in nine years. He quickly does the mathematics and says that a hectare of land with a conservative yield of 20 kg could make \$60 000.

Renowden says that truffles are a high-value product not vulnerable to the commodity market because they are at the top end of the hospitality industry, which is in its early stages in New Zealand.

However, those who have entered the market have proved that quality truffles can be grown and harvested in New Zealand. There is a huge market in the northern hemisphere just waiting to be tapped because the southern hemisphere can produce truffles outside the northern season, he says. “We know the challenge is to grow enough to be able to meet demand. I think the industry is going to start to take off big time within the next five to ten years.” All New Zealand growers have to do is to produce enough not only to satisfy the local market, but also to get quality fresh truffles to northern hemisphere chefs. “But we cannot even supply the local demand yet, let alone the international demand.”

Big plantations are being planted in Australia, but rather than seeing them as competition, he says that the two countries are working together to develop the industry and set up quality control standards and a marketing infrastructure to protect the international market potential. (Source: Stuff.co.nz [New Zealand], 8 September 2006.) 🍄