



Brazilian super food going down a storm in the United Kingdom

A Brazilian berry straight from the Amazon rain forest called *açaí* (*Euterpe oleracea*) has quickly become the world's number one most powerful and nutritious food according to many environmental organizations and leading doctors.

A staple part of the Brazilian diet where they consume millions per day, already a big hit in the United States of America with a band of celebrity worshippers, and although still very new to the United Kingdom market it is fast becoming known as the "next big thing".

For many people, the *açaí* berry is probably still unknown. But if you have ever visited the new wave of juice bars now on many high streets, you may have had some in your smoothie or health drink and not even realized it.

Packed full of antioxidants, high in omega 6 and omega 9 oils, a rich source of protein and dietary fibre to name just a few of the benefits, this is probably why the *açaí* berry is such a huge success.

Operating from the United Kingdom, Sublime Food Ltd has been importing and distributing frozen fruit from Brazil for the past three years. Ronan O'Meara, its director, explains: "The *açaí* berry has been consumed by the indigenous people of the Amazon since time began; the berry is the size of a large blueberry, purple almost dark black in colour. It grows wild in the Amazon rain forest, which is the only place on earth where it grows. It has three times more antioxidants than blueberries and pomegranates. Antioxidants are vital because they mop up free radicals which can cause cancer and cell damage."

With his brother living and running a juice bar in Brazil for the past nine years, these two brothers have formed a unique international partnership where they are at the forefront of importing the *açaí* berry to the United Kingdom. "Once the berries are in season there are huge quantities; an area about half the size of Switzerland is completely covered in *açaí* trees. Berries are picked by small teams, often husband and wife that look after areas that are unique to them. One member of the team will climb up the tree, cut the branch or pull the berries off and drop them to the person waiting below who will put them into baskets. The baskets are then taken down the river to the local buyers, often

cooperatives. Our buyer will inspect the berries and buy the best ones. He then takes them off and on that day places them in warm water for about an hour; he will then mash them through the first sieve, at which point the stones are removed. They are then mashed through a smaller sieve to break up the fibre inside the berries. A pulp is formed which is packed and shipped in frozen containers over to the United Kingdom," says Ronan.

The frozen pulp is then sold on to juice bars, smoothie bars, health shops and supermarkets.

Greenpeace champion the *açaí* berry because although they are aware that a wide range of sustainable and effective initiatives are needed to prevent the continuing destruction of the Amazon, they accept it as an important environment step forward as the berry is derived from a non-timber forest product within the Amazon rain forest and it gives the people a sustainable way of maintaining their livelihoods. [Source: FreshPlaza [the Netherlands], 18 June 2007.]



ACROCOMIA TOTAI

El cocotero, mbocayá o nuez del Paraguay (*Acrocomia totai*) es una planta de la familia de las arecáceas, nativa del Paraguay. El aceite de la semilla y la pulpa se utilizan en la alimentación y en la fabricación de jabones.

A. totai es una palmera de entre 15 y 20 m de altura, con uno o, en raras ocasiones, varios estípites de unos 20 a 30 cm de diámetro, cubierto de una corteza lisa y oscura, dotada de espinas fuertes y rectas. El sistema radicular es extenso y profundo. Muestra hojas palmadas, en forma de abanico, con el raquis duro y espinoso. El fruto es una drupa globosa. No requiere de un clima cálido o húmedo para

desarrollarse. Crece en diferentes tipos de suelo, aunque parece preferir los arenosos, bien drenados, aún en zonas de altitud, pero no crece en suelos anegados.

Los aceites de la semilla y la pulpa se emplean en la fabricación de jabones, llamados de coco. La pulpa es comestible, de ella se extrae un aceite ligero y con su fermentación se elabora un licor de sabor agradable. El interior del tronco se muele para obtener una harina muy fina y sabrosa y el cogollo se consume como palmito.

Las hojas de *A. totai* se usan como forraje para el ganado; tras una maceración, se extrae de ellas una fibra útil en la confección de sogas, redes, etc.

El fruto sólo se industrializa en el Paraguay y es completamente aprovechable, se compone de 15 a 20 por ciento de cáscara (alimento de ganado, combustible de hornos). La pulpa comprende el 30 al 40 por ciento del peso del fruto y su tenor oleico varía desde un 20 hasta un 36 por ciento (expeller utilizado en alimentación de animales). El exocarpio compone el 30-40 por ciento de la fruta (combustible de calderas, materia prima para carbón de alta calidad). Un 7 a un 12 por ciento lo compone la almendra, que es oleosa en un 50-60 por ciento (expeller comestible para animales y seres humanos).

En cuanto a producción de aceites vegetales, esta especie nativa que posee el Paraguay, es la segunda en rendimiento por hectárea en el mundo entero, sólo superada por la palma africana. Los aceites de pulpa y almendra de coco tienen la ventaja de ser aceites de fácil conversión a biodiesel. [Aportación hecha por: Maura Isabel Díaz Lezcano, Escuela Técnica Superior de Ingenieros de Montes, Universidad Politécnica de Madrid, Ciudad Universitaria, 28040, Madrid, España. Correo electrónico: maisdile@yahoo.es]

AQUILARIA

Oudh – the sweet smell of tradition

Oudh is considered a supreme fragrance in the Gulf countries. In Bahrain, it is burned as a mark of respect and hospitality and is a traditional gesture of welcoming and honouring guests. In fact, oudh is considered an important feature at most social occasions.

Oudh, which simply means wood in Arabic, has an extraordinary pedigree. Also known as aloes and agarwood, oudh is

found in the forests of Southeast Asia and is an aromatic resin found in certain species of *Aquilaria* and *Gyrinops* trees. The resin is produced by the tree as an immune response to a fungus – *Phialophora parasitica* – that invades the tree and over many years spreads through it. It is believed that it takes as long as 300 years for the fungus to spread through the bark of the tree. Unlike the otherwise pale wood of the tree, infected sections are dark and extremely heavy. In fact, the Chinese and Japanese terms for oudh translate as “the wood that sinks in water”.

The best grade of oudh is hard, nearly black and very heavy. In general, oudh becomes inferior as it becomes lighter in tone, flecked with diminishing amounts of resin. The only reliable way to test for quality is to burn a small bit and evaluate the complexity and richness of the smouldering wood.

Oudh is cut, sliced, polished and burned over coal in traditional incense burners called *mabakhir*. Chips of this fragrant wood are a prized, almost priceless commodity and burning it is one of the region’s most distinctive traditions.

In most Gulf countries it is customary to pass the hand-held charcoal brazier or *mabkharah* of smouldering oudh at social gatherings. Oudh is burned over smouldering bits of coal in the cup that is normally lined with sheet metal. In some homes oudh is burned in an electric *mabkharah* instead of over coal for convenience. The *mabkharah* is always passed counterclockwise and people waft the smoke over themselves to perfume their clothes.

The tradition of burning oudh has not waned even among young Bahrainis who understand and appreciate the cultural significance of this age-old custom. Indian oudh is a favoured choice with most Bahrainis but because of its high price Cambodian oudh burns in most Bahraini homes. On average, a middle-income Bahraini home would spend up to BD50 on oudh per month whereas the well-heeled would spend up to BD150 per month on purchasing oudh for daily use. One kilogram of oudh normally costs between BD2 000 and BD8 000 or more, depending on the variety.

The voracious demand for oudh is outstripping supply, thus making this sweet incense more precious than gold.

The agarwood harvesting countries stretch across Asia: Malaysia, Indonesia,



Cambodia, Myanmar, Thailand, Java, Viet Nam and India. There are more than 2 000 varieties of oudh in the world. Traditionally, India was one of the largest producers; however, Assam, once the source of the most valued oudh, has now exhausted its wild stocks and supplies the market only from plantations. In Viet Nam, agarwood trees are commercially extinct in the wild and in Thailand almost no trees remain outside the national park.

Oudh comes in different forms from wood chips to powder mixed with oil and shaped into round balls. While it is burned in *mabakhir* for fragrance, oudh oil or *dehn-al-oudh* is packaged in a bottle as a personal fragrance. Oudh-based fragrances are just as treasured a commodity as oudh.

Traditionally, brides use oudh fragrances on their wedding day as they have an individuality that is missing in international brands, but they are also more expensive. Oudh gives a powerful scent that lasts for 24 hours.

According to Malik Al Oudh, a company that supplies and distributes oudh in Saudi Arabia, half a tola (approximately 11.7 g) of *dehn-al-oudh* from India can cost anywhere between BD300 and BD600 depending on the richness and maturity of the oil. Eyad Saud, sales manager at Saudi Arabia’s Arabian oudh company in Bahrain’s Seef Mall says, “One tola of Cambodian oudh costs anywhere between BD6 and BD32. This is one of the cheaper and swift-selling varieties here in Bahrain.”

Considering the steep price of a small vial of oudh fragrance, it is no wonder that wearing such fragrances is restricted to special events. All oudh shops, whether they are small kiosks peppered in the major malls in Bahrain or large speciality shops, carry ornately packed oudh fragrances in exquisite bottles that are a testament to the fact that the tradition of using this age-old prestigious fragrance lives on. [Source: *Gulf Weekly* [Bahrain], 19 September 2007.]

DVD ON GAHARU

Gaharu or eaglewood, an important non-timber forest product, is a well-known source of high-quality incense. It is formed when damaged *Aquilaria* trees produce a fragrant protective resin that gradually hardens and turns into black lumps. Because of its high market price (up to US\$2 000/kg), the substance is sought out by many. Systematic hunting for the species starts from Sumatra, Kalimantan and Papua New Guinea. The high market pressure has led to uncontrolled, destructive and unsustainable exploitation of the species, threatening its existence.

A recent film raises the alarm on how these market demands are threatening the very existence of eaglewood. It looks at its unique sustainable harvesting system as practised by the Punan of Malinau, East Kalimantan. Not only do they have traditional regulations for land use and forest protection, but the Punan are also actively engaged in using *Aquilaria* for reforestation.

Rehabilitating this precious resource is making inroads in the national consciousness. The private sector stresses the need to balance *gaharu* exploitation with cultivation. Meanwhile, research on inoculation methods in order to enhance *gaharu* production is well under way.

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BAMBOO

Bamboo as a plant and a resource

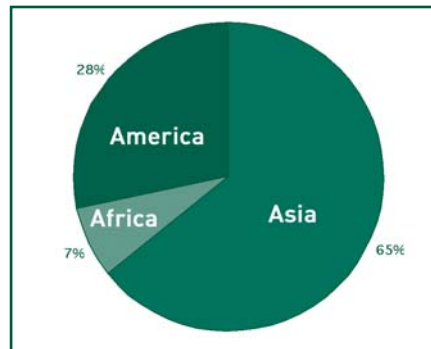
Bamboo belongs to the Gramineae family and has about 90 genera with over 1 200 species. Bamboo flowers rarely and in irregular cycles, which are not yet clearly understood. Thus taxonomists do not always agree on the identification of bamboo species and genera, but modern genetic analysis may shed new light on bamboo taxonomy.

Bamboo is naturally distributed in the tropical and subtropical belt between approximately 46° north and 47° south latitude, and is commonly found in Africa, Asia and Central and South America. Some species may also grow successfully in mild temperate zones in Europe and North America. Bamboo is an extremely diverse plant, which easily adapts to different climatic and soil conditions. Dwarf bamboo species grow to only a few centimetres, while medium-sized bamboo species may reach a few metres and giant bamboo species grow to about 30 m, with a diameter of up to 30 cm. Bamboo stems are generally hard and vigorous and the plant can survive and recover after severe calamities, catastrophes and damage. Young bamboo shoots were the first sign of new plant life after the nuclear bombing of Hiroshima and Nagasaki in Japan.

Bamboo shoots and culms grow from the dense root rhizome system. There are two main categories of rhizomes: monopodial and sympodial. Monopodial rhizomes grow horizontally, often at a surprising rate, and thus their nickname of "runners". The rhizome buds develop either upwards, generating a culm, or horizontally, with a new tract of the rhizomal net. Monopodial bamboos generate an open clump with culms distant from each other and can be invasive. They are usually found in temperate regions and include the genera *Phyllostachys* and *Pleioblastus*. Sympodial rhizomes are short and thick, and the culms above ground are close together in a compact clump, which expands evenly around its circumference. Their natural habitat is tropical regions and they are not invasive. The main genus is *Bambusa*.

Bamboo has received increasing attention over the last two decades for its economic and environmental values. In Africa, Asia and Latin America, it is closely associated with indigenous culture and knowledge and is widely used for housing, forestry, agroforestry, agricultural activities

Contribution of world bamboo resources by continent



and utensils. In countries undergoing economic development, traditional bamboo culture gradually disappears. However, industrial development of bamboo is offering a new opportunity for younger generations to retain and continue developing cultural traditions related to the cultivation, harvesting and use of bamboo.

The physical and environmental properties of bamboo make it an exceptional economic resource for a wide range of uses and for poverty reduction. It grows quickly and can be harvested annually without depletion and deterioration of the soil. Bamboo can grow on marginal land not suitable for agriculture or forestry, or as an agroforestry crop. It has a relatively light weight, because the culms are hollow, and unlike wood can be easily harvested and transported without specialized equipment or vehicles. It splits easily for weaving and is thus easy to handle also for women. Bamboo is often cultivated outside the forest on farms, where it is more easily managed. Processing normally does not require highly skilled labour or special qualifications and can be started by poor rural communities at a minimal cost. For the same reason, it can offer income-earning opportunities for handicapped people.

Bamboo use and trade have been growing rapidly in recent years. Bamboo is becoming popular as an excellent substitute for wood in producing pulp, paper, board and charcoal. It is widely used in construction, either in its natural form or as a reconstituted material (laminated boards and panels). In addition, bamboo shoots have become a popular vegetable, with Asian cuisine spreading quickly around the globe. (Source: *World bamboo resources. A thematic study prepared in the framework of the Global Forest Resources Assessment 2005*. Rome, FAO. 2007.)

Bamboo bicycles in Ghana

Accra, Ghana. The Bamboo and Rattan Development Programme under the President's Special Initiative Programme (PSI) has introduced bamboo in the manufacture of bicycles for rural communities. The programme is aimed at raising awareness about the use and benefits of bamboo and rattan in poverty alleviation and socio-economic development of rural communities.

This initiative was made known during a meeting on Tuesday organized by the Forestry Service Division in collaboration with the Earth Institute (EI) at Columbia University in the United States of America on how to use bamboo in the manufacture of bicycles in Ghana. Three research scientists from the United States – Dr David T. Ho, Dr John Mutter and Dr Craig Calfee – are to spend ten days in the country to demonstrate how to use bamboo in making a bicycle.

Dr Ho said that the bicycle, made to carry a load of 100 kg, was designed for farmers in rural communities for sustainable transportation. He said finance was the main problem facing the project, adding that there should be a fund that would take up two-thirds of the cost of production so that local people could afford the bicycles. (Source: Joy Online [Ghana], 26 June 2007.)

Bamboo for housing construction

A book describing the methods of using bamboo for construction of houses, authored by Lionel Jayanetti and Paull Follat, was released recently at the auditorium of the National Engineering Research and Development Centre (NERD), Ja-ela, Sri Lanka.

A model house built using all-bamboo materials was also formally opened.

The Deputy Minister of Science and Technology said that since bamboo cultivation is not widespread, there will be a new industry in the Sri Lankan market. "Prices of material in the construction industry are soaring, hence bamboo will be an ideal alternative for building materials, especially in the hotel trade. It is high time for us to start cultivation."

The Science and Technology Minister, Prof. Tissa Vitarana said that this would be a good start not only in the building construction industry, but also for making furniture so that forest devastation may be prevented. (Source: TRADA International; international@trada.co.uk)



Bamboo chip-based particleboard developed

Pressed particleboard created from a blend of plastic chips and bamboo has been invented by the Kagawa Prefecture Sangyo Gijutsu Industrial Technology Centre in Japan. Suitable for application in construction, a particleboard that is made of 70 percent bamboo chip material according to weight has the same strength attributes as typical wood-based products. The release date of the product has not been announced and studies are in progress to find out whether the size and shape of the chips have any relevance to strength. [Source: Malaysian Timber Industry Board [in Friday Offcuts, 21 September 2007].]

Animal species associated with bamboo

The association of animal species with bamboo has been explored in a number of studies. The best-known animals dependent on bamboo are the giant panda (*Ailuropoda melanoleuca*) and red panda (*Ailurus fulgens*). Their diet consists almost exclusively of bamboo shoots and leaves. Several other mammals and birds live in a symbiotic relation with bamboo forests. The southern bamboo rat (*Kannabateomys amblyonyx*) lives in groves of *Guadua* and some introduced bamboo species. Bamboo flowering and seeding lead periodically to an explosion of the rodent population, resulting in famine and social cataclysms in various parts of the world. Local populations in northeast India suffer particularly from the rat outbreaks triggered by bamboo flowering. The dynamics of the rat population fluctuations have still not been well explored.

Interestingly, the majority of bamboo-dependent birds and mammals are endemic to the Atlantic Forest of eastern Brazil. At least 27 species of birds are considered to be

associated with bamboo in the forest. Some species live almost entirely in large bamboo stands. Others may migrate to other ecosystems, but may depend on bamboo for feeding and breeding. Most of the bird species feed on bamboo nodes, internodes and the insects on foliage. Some species feed extensively on bamboo seeds and do not reside in bamboo forests during non-seeding periods.

Studies of bird association in the Amazon Basin show that 25 of approximately 440 bird species (about 6 percent) live in *Guadua* bamboo thickets. The degree of dependence on bamboo varies among bamboo-dependent species; they may depend on it for feeding, breeding, shelter and protection from predators. Depletion of bamboo ecosystems threatens species biodiversity: it has been observed that birds and mammals are less abundant than before in the Atlantic Forest. [Source: *World bamboo resources. A thematic study prepared in the framework of the Global Forest Resources Assessment 2005*. Rome, FAO. 2007.]

RODENTS RAVAGE VILLAGES IN MIZORAM, INDIA

Thousands of rats have destroyed rice fields in Mizoram, India, fuelling fears of a famine in the region. According to the Mizoram Agriculture Minister, at least 177 villages have been ravaged by armies of rats in the state this year. About 70 villages that bore the brunt have now nothing left to harvest. At least 65 villages have lost half their harvest while 42 villages have experienced low-intensity destruction. Mizoram, with about 1 million people, is dependent on agriculture. Rice and vegetables are the dominant crops.

Reports of rats destroying farmlands follow vast forests of bamboo bursting into flower in many parts of the state. When bamboo flowering takes place, the rat population shoots up, leading to an invasion of granaries and paddy fields. The Mizoram government has warned that a famine is going to hit the mountainous state.

The phenomenon of bamboo flowering occurs every 48 years. [Source: NEWSPost India, 25 September 2007.]



BUTTERFLIES

East Africa feels the butterfly effect

Beating the air with her homemade net, Aicha Ali chases a swirling black and turquoise butterfly. Far from indulging in a frivolous pastime, this Kenyan mother is earning crucial family income. Arabuko Sokoke on the Kenyan coast is known for its rare species of butterflies, which a development project called *Kipepeo* (butterfly in Swahili) is helping export to exhibits and museums in Europe and North America.

Forest dwellers in the neighbouring United Republic of Tanzania have also benefited from such butterfly-farming initiatives, which not only increase the local community's economic wealth but also help protect the environment.

"I need the forest to feed the butterflies," Aicha explains.

Only a few years ago, she and most of the 100 000 villagers living around Arabuko Sokoke "had a negative perception of the forest", says Kenyan scientist Maria Fungomeli. They saw it as little more than a refuge for the monkeys and elephants attacking their farms and a hostile growth that should be cut down to harvest timber, says Fungomeli, assistant director at the *Kipepeo* project.

Deforestation is threatening what is the largest block of coastal forest remaining in East Africa as well as the rare animal species it shelters.

But what conservationists call "the butterfly effect" has started to pay off, both for Arabuko Sokoke and its inhabitants. About 800 families now live thanks to the sale of butterflies. Flying handkerchiefs, emperor swallowtails and African blue tigers are some of the rare species collected at *Kipepeo*, fetching between US\$1 and \$3 a piece for visiting tourists. One villager now earns between \$15 and \$23 a month from his work with *Kipepeo*, double what he used to make selling timber. Another villager is equally adamant about the changes butterfly farming have brought to her lifestyle. "We did go hungry now and then, but now we can meet the needs of the children: medical care, school fees, uniforms," she says, sorting pupae at the project's collection centre.

Kipepeo, launched in 1993 with funds from the United Nations Development Programme, buys only pupae. The villagers therefore have to breed the butterflies after capturing them. George Jefwa closed his



shop down a few years ago to build his butterfly "farm": a large, netted wooden cage teeming with multicoloured butterflies. He has learned to identify dozens of different types of butterflies and moths and regularly collects their eggs from the cage. He then places them in a plastic box for five days and drops the newly morphed caterpillars on plants, where they feed before the penultimate stage of their transformation into pupae ready for export.

In Tanzania's Usumbura mountains, butterflies are also revolutionizing local traditions. Farmers who had been earning a meagre living producing cash crops such as coffee and bananas are now reaping the rewards of butterfly farming, says the Tanzania Forest Conservation Group. The community will earn \$50 000 in 2007 from the project, the group said in a recent statement. "The forests are better protected now. The community knows that the base populations of butterflies and host plants must be conserved if the enterprise is to continue," the statement said. "A recent survey found much higher conservation awareness among butterfly farmers compared with those not involved in the venture."

Kenya's Kipepeo project has been so successful with the local population that it is struggling to find buyers for the thousands of pupae collected in Arabuko Sokoke. "We get 200 000 pupae a year. But we market only 25 percent of them," says Fungomeli. She explains that gaining new markets is crucial to keep the project alive and bring on board those villagers who are still chopping down the forest's endangered tropical trees. (Source: Mail and Guardian Online [Kenya], 29 July 2007.)



Plastic, not axes, threatens cork forests

Tempio Pausania, Sardinia. If you buy a bottle of wine with a metal screw top or a plastic cork, you may be dooming the world's cork forests. That is the view of environmentalists and cork producers who have joined forces to protect cork oaks – and

the unique habitat they provide – from competition in the wine trade.

Alternative "corks" are ever more common, as synthetic and aluminium wine closures have grabbed a 20 percent share of the market, up from just 2 percent in 2000, according to wine industry consultant Stephane Rein of Rein Consulting. She says that could increase to 35 percent by the end of the decade.

"Silicone corks are not a problem for quality wines that will always use cork," said Battista Giannottu, an agronomist who works with a consortium representing Sardinia's cork producers. "But the mass market, which is 80 percent of the total, might. That's not just an economic problem but an environmental one."

The *Quercus suber*, or cork oak, which grows on both the European and African sides of the Mediterranean, provides the raw material for practically all the 20 billion wine corks used every year. The way cork is harvested – shaved off the sides of trees – means that forests continue to thrive as they give up their valuable bark.

In Sardinia, the only region in Italy that produces cork, the forests are a haven for wild boar, a species of hawk native to the island and Sardinian deer. The highly endangered Iberian lynx roams the cork forests of Spain and Portugal, which is the global leader in cork production; in North Africa the forests provide a habitat for Barbary deer.

A cork oak must be at least 30 years old before the first harvest and, even then, the gnarled, porous "virgin cork" is not good enough to make wine stoppers. It will take another ten years for the bark to grow back and be good enough to make corks. That means a poor rate of return compared with other trees that might be planted in such areas, such as the fast-growing eucalyptus which competes with cork oaks for land. "It isn't a tree which gives a lot of one thing – it gives a little of a lot of things," said Nora Berrahmouni of the World Wide Fund for Nature (WWF), an environmental group working to protect cork forest habitats.

The undergrowth is a patchwork of fragrant shrubs, including ones that produce the myrtle, a berry gathered to make Sardinia's *mirto* liqueur – an extra source of forest income.

More than 80 percent of the world's cork production is used for bottle stoppers. The rest is used for building materials and in items such as fishing tackle and badminton shuttlecocks.

The best-quality cork – which is the least porous and has no cracks or flaws – makes the best grade of stopper sold at a premium for wines made to be matured in the bottle. Lower grades are used for cheaper wines: cork granules are agglomerated with a type of glue to make the dense champagne corks that must withstand the pressure of sparkling wine. Offcuts are glued to plastic discs to make the type of stoppers found in some sherry bottles.

As well as being cheaper alternatives, plastic and metal do not pose the same risk of "corking" the wine – when a chemical called TCA is present in the stopper and gives the wine a "mouldy" odour.

But cork producers and environmentalists are fighting back. Aiming to cash in on the demand for "green" products, they have started to produce corks certified as environmentally friendly under the Forest Stewardship Council (FSC) scheme, an "ecolabel" system already widespread for timber products. Backers of the FSC scheme hope that "green" wine buyers will prefer a bottle with the FSC label. Cork makers hope that it can guarantee their future by differentiating their traditional product from the upstarts. (Source: ENN Daily News, 6 August 2007.)



Guaraná fights cancer and global warming

Scientists from the University of São Paulo (USP), Brazil, have discovered that guaraná from Amazonia, sold on a large scale by the state of Amazonas from production in Maués (268 km from Manaus), is effective in fighting cancer. The study was published in the journal, *Ciência Hoje*, by the Brazilian Society for the Advancement of Science (SBPC).

The researcher responsible is veterinarian Heidge Fukumasu, who has worked on research in tumour regression through ingestion of guaraná since he graduated from university. Now, with a doctorate from USP and a member of a solid research team, the scientist highlighted that the decrease in cancer cells occurs in a type of breast cancer called Ehrlich tumour.

Fukumasu still does not know the substance within guaraná that acts to decrease cancer cell levels. Nevertheless, according to data from the journal, experiments are under way to find out.

Another important study that was recently announced was on the development of cloned guaraná seedlings that are more resistant and offer greater yields, aiding both in exportation of the product to the national and international markets as well as reducing deforestation. The experiment by the Brazilian Agricultural Research Corporation (Embrapa), which also investigates the effects of guaraná, has its lines of research directed more towards cloning seedlings to increase effectiveness of seeds and reduce deforestation in Amazonia. This year, five new clones of guaraná have been launched in Manaus, helping to reduce the total area deforested in the state for planting guaraná by as much as 90 percent.

Among other variables, the research studies the cause and effect relationship of cloning guaraná plants and felling the forest, and is being conducted by agronomist Firmino José do Nascimento Filho. He stresses that reduced deforestation is also one of the major advantages of clones in relation to traditional seed-bred plants. This is so, says Nascimento Filho, because of the low environmental impact that results from the use of guaraná clones. [Source: *Amazonas Em Tempo*, 24 August 2007.]

HONEY

Setting manuka standards

A New Zealand honey health science company and a German university have joined forces in a bid to set industry standards for the use of manuka honey products to heal wounds, overcome stomach and skin problems, and potentially in the fight against cancer. The move comes in the wake of the discovery by the university's researchers of the compound responsible for manuka honey's antibacterial activity.

Te Awamutu-based Manuka Health New Zealand Ltd and the Technical University of Dresden have formed a partnership to establish a process to certify levels of the compound in manuka honey. Announcing the partnership today, Manuka Health chief executive Kerry Paul said that the university's Institute of Food Chemistry was

the first to identify the compound methylglyoxal (MGO) and prove its high levels in some New Zealand manuka honeys.

Mr Paul said that the discovery that honey's antibacterial ability was directly related to MGO levels was highly significant for the industry. "We have known for some time that manuka honey has this property. The term Unique Manuka Factor (UMF) is used to describe this honey's consistently reliable antibacterial effect and UMF has been trademarked by the Active Manuka Honey Association. But we haven't known until the German discovery what the compound is that is responsible. The next step is to put a standards process in place with the industry which independently certifies MGO levels in honey-based health products."

Manuka honey was already well known for its reliable antibacterial activity, making it highly effective for overcoming gastrointestinal and skin health problems and improving healing of wounds. However, with the identification of MGO, further applications for manuka honey are possible, including use as a potential tumorcidal agent to fight cancer.

A research team led by Prof. Thomas Henle, head of the Institute of Food Chemistry at Dresden, tested more than 80 honeys from around the world and found MGO levels as high as 700 mg/kg in some New Zealand manuka honeys, more than 70 times higher than ordinary honey. Previous research had shown the highest concentrations in any food or drink were about 100 mg/kg in cocoa and coffee. During their research, Prof. Henle's team developed assays for measuring MGO in honey.

Mr Paul said that medical researchers had found MGO had the potential to act specifically against malignant cells in the body and has a significant curative effect on a wide range of cancers in animals. Current research on humans shows MGO results in complete remission in about 40 percent of malignancies, with partial remission in a further 40 percent. More studies are under way to improve treatment techniques.

A Japanese cancer researcher at a German university hospital announced last month the results of a study showing Manuka Health's Bio30 propolis extract suppressed NF1 neurofibromatosis, a type of tumour affecting one in 3 000 people. [Source: Manuka Health press release [New Zealand], 2 July 2007.]



Capsicum frutescens

MEDICINAL PLANTS AND HERBS

Poultry farmers in Uganda take on herbs to control diseases

Farmers have embraced medicinal plants in treating poultry diseases. Research carried out by Makerere University in central and eastern Uganda revealed that about 80 percent of poultry farmers know how to use medicinal plants to treat these diseases.

Prof. Bukenya Ziraba from the Makerere University Department of Botany said the research that was carried out in Mbale, Rakai and Mbarara districts shows that many farmers are using medicinal plants to treat coughs, diarrhoea, swollen eyes, mites, worms and lice, as well as Newcastle prophylaxis and coccidiosis. Research found that medicinal plant species such as *Capsicum frutescens* (kamulali) and *Cannabis sativa* (enjaga) were used in all the three districts, while *Nicotiana tobaccum* (taaba), *Aloe* sp. (lukaka), *Vernonia amygdalina* (omubirizi) and *Tagetes mihuta* (kawunyira) species were used in Rakai and Mbarara.

Ziraba says the most common way of preparing the medicine is by crushing the plant material, adding water and administering the concoction orally. Some farmers prefer to give chickens the medicine by hand, while others put it in a container and leave the chickens to drink it when they are thirsty. He says that using medicinal plants saves farmers losses caused by outbreaks of diseases. "Since some of the farmers cannot afford to buy modern poultry drugs, medicinal plants work as a substitute," he says.

Ziraba presented the research during a symposium on drugs discovery from African flora, organized recently by the Natural Research Network for Eastern and Central Africa. [Source: *New Vision* [Kampala], 14 August 2007.]



Artemisia annua

***Artemisia annua*. Artemisinin “promising” as leishmaniasis treatment**

The antimalarial drug artemisinin shows promise as a treatment for leishmaniasis, according to Indian researchers, whose research was published in the September issue of the *Journal of Medical Microbiology*.

Visceral leishmaniasis – also known as *kala-azar* – is caused by the *Leishmania* parasite and transmitted to humans through biting insects such as sand flies. The parasite lowers immunity and causes persistent fever, anaemia, liver and spleen enlargement, and is lethal if left untreated. It infects 500 000 people worldwide, according to WHO. There is no vaccine for the disease and there are signs of increasing resistance to the few effective drug treatments.

Researchers evaluated the efficacy of artemisinin against the *Leishmania donovani* parasite. They found that the drug kills the parasite at both stages of its growth, particularly the disease-causing amastigote form of the parasite. The study also indicated that artemisinin was safer than the existing antileishmanial drug pentamidine, which can cause diabetes, and miltefosine, which has been linked to birth defects.

Lead researcher Mitali Chatterjee, from the India-based Institute of Postgraduate Medical Education and Research, said that the advantage of artemisinin is that it is already a licensed drug, so toxicity studies have already been completed.

Swapan Jana, secretary of the India-based NGO Society for Social Pharmacology, said the prospect of using artemisinin was “very encouraging, given leishmaniasis is endemic in India and existing antileishmanial drugs show side-effects”.

But Neena Valecha, deputy director of the National Institute of Malaria Research in India, warned that any expanded use of artemisinin must not affect malaria

management. “We have to consider that artemisinin is the valuable drug for acute illnesses like malaria,” Valecha said. (Source: SciDev.Net, 1 October 2007.)

Fighting poverty with herbs and medicinal plants

Scientists from all over the world have recently begun deliberations on the role of herbal, medicinal and aromatic plants (HMAPs) in improving the livelihoods of the rural poor. Addressing researchers attending the three-day regional expert workshop held at the International Center for Agricultural Research in the Dry Areas (ICARDA), in Aleppo, Syrian Arab Republic, Dr Mona Bishay, director of the Near East and North Africa (NENA) division of the International Fund for Agricultural Development (IFAD) said that several obstacles hinder the full exploitation of the potential of HMAPs in reducing poverty and improving the livelihoods of rural people in the region: poor local technology; inadequate business and entrepreneurial skills and awareness on quality requirements; limited knowledge on the properties of HMAPs beyond traditional knowledge; and limited access to intellectual property rights.

Underscoring the need to analyse and find means to address the obstacles, Bishay said that the most important handicap was the inability of the collectors and growers of such plants to take advantage of potential markets, because of lack of access to resources; inadequate extension and training services; lack of improved technology and business skills; and insufficient marketing information and local organizational skills that could enable them to take advantage of emerging market opportunities.

Dr Mahmoud Solh, Director-General of ICARDA, said it was regrettable that indigenous knowledge on HMAPs was not backed up with adequate use of modern technology, despite the fact that folk medicine still serves 80 percent of the world’s rural population. “The HMAP sector faces various challenges and constraints, such as overexploitation of naturally occurring species; fragmented approaches and projects that address only limited aspects of selected HMAP value chains; lack of quality control standards of locally produced HMAPs and products; and poor distribution of benefits in value chains,” said Solh. “Our partners in national agricultural research and extension

systems possess rich knowledge on HMAPs and this gives us a great opportunity to add valuable new crops to our joint knowledge of ecogeography and farming systems in the NENA region,” said Solh, elaborating ICARDA’s role in research on HMAPs.

According to Solh, tremendous room for growth and export opportunities exists if quality products are available that can compete with other suppliers. New science and technology can be deployed to understand potential new uses for processing, transforming and adding value to natural products – with the purpose of generating income for poor farmers. (Source: *Yemen Observer*, 17 July 2007.)

Desarrollo y conservación de ipeca (*Psychotria ipecacuanha*) (Brotero) Stokes en Costa Rica

La raicilla, nombre vernáculo en Costa Rica de la ipeca (*Psychotria ipecacuanha*) familia Rubiaceae, es una planta nativa de América usada económicamente por la industria farmacológica mundial. La distribución natural se extiende desde la planicie oriental de Nicaragua pasa por el sur a través de Centroamérica (Costa Rica y Panamá) y el norte de Sudamérica, hasta Brasil (Estado de Rondonia y Matto Grosso).

Constituye desde el siglo 20 el producto forestal no maderero (PFNM) de mayor importancia económica de las exportaciones de cultivos no tradicionales con categoría de planta medicinal de Costa Rica. Su cosecha comenzó a partir de poblaciones silvestres en la Región Huetar Norte, Costa Rica, a partir de la década de 1950 y constituye el primer cultivo comercial implementado para cobertura del bosque.

La ipeca es una planta herbácea, con un tallo semileñoso, delgado y retorcido, entre 20 y 30 cm de largo. El rizoma es tuberoso y posee una envoltura áspera, de 0,5 a 1 cm de grosor y de 15 a 17 cm de longitud.

El producto comercial es la raíz, que después de su deshidratación presenta un color grisáceo, un particular olor a moho y tiene la característica de presentar anillos en su superficie. La importancia económica en la industria farmacológica y homeopática se debe a la presencia de alcaloides isoquinolínicos, como la emetina, cefaelina, psicotrina, éter metílico de psicotrina y emetamina, con usos medicinales como emético para contrarrestar la disentería amebiana, como expectorante. Las poblaciones silvestres

varían ampliamente en el contenido de alcaloides totales, de acuerdo con la época; en Panamá, por ejemplo se registran resultados medios entre 1,657 y 3,536 por ciento.

Las poblaciones cultivadas tienen la ventaja de producir mayor cantidad de alcaloides y una biomasa de raíz seca en promedio de 2,3 toneladas por hectárea.

En un estudio realizado por el CIPRONA (Centro de Investigación de Productos Naturales) de la Universidad de Costa Rica sobre el contenido de alcaloides totales de poblaciones cultivadas mayores a 2 años de cultivo por medio de estolones, se lograron resultados en promedio de 2,65 por ciento de alcaloides totales, con 1,92 por ciento de emetina y 0,72 por ciento de cefaelina.

El tiempo para ejecutar la cosecha de la ipeca varía de 3 a 4 años, aumentando los rendimientos en biomasa y el contenido de alcaloides totales, en Costa Rica comúnmente se cosecha entre 2,6 hasta 3 años.

En estudio realizado por el Centro Internacional de Investigación Forestal (CIFOR) en el año 2000 sobre la situación de desarrollo de la ipeca como estudio de caso de un producto no maderero del bosque (PNMB) en Costa Rica se determinó la existencia de un área de 45 hectáreas de cultivo y una cosecha potencial de 103 toneladas de raíz seca, situación que en esa fecha mantenía precios bajos, 7 dólares EE.UU. por kilo de raíz deshidratada, precio reportado en las estadísticas nacionales, por lo tanto el precio pagado al agricultor fue menor, lo que determinó un desinterés por el cultivo.

Es importante resaltar la producción del año 2000 y compararla con la producción histórica exportable de Costa Rica, un promedio de 20 toneladas por año (1961 a 1985), situación que se vio aumentada por el interés por parte de los agricultores y empresarios en el cultivo gracias a los incentivos gubernamentales para el desarrollo de cultivos no tradicionales, lo que provocó exportaciones entre 115 y 180 toneladas entre 1989 y 1996. Esta situación provocó anomalías y se descubrieron distorsiones por parte de las compañías exportadoras en las cifras sobre exportaciones de la raíz de ipeca, provocando una fiscalización del sector y poniendo en duda la confiabilidad de las estadísticas oficiales.

El hecho de un mercado contraído y de bajos precios internacionales, condujo a la

reducción de las exportaciones del año 2002 a 7 toneladas y el desinterés de los agricultores en el cultivo de la ipeca y finalmente en el año 2006 se presenta una ausencia de materia prima en el mercado internacional provocando un nuevo interés por parte de las empresas importadoras de los países consumidores: Alemania, Francia, Austria, Bélgica, Estados Unidos de América, elevando el precio hasta 50 dólares EE.UU. por kilo seco a nivel de agricultor.

En el 2007 no existen volúmenes suficientes de materia prima para abastecer las necesidades del mercado internacional. Esta situación conduce a que Bougainvillea Extractos Naturales promueva una iniciativa de desarrollo de producción con agricultores de la Región Huetar Norte para incentivar el cultivo a precios razonables, con un contrato de respaldo para producir extractos fluidos para el mercado internacional con el objetivo de contribuir con la estabilidad de un mercado internacional que se ha caracterizado por precios inestables en el tiempo, provocando situaciones adversas para el agricultor y por ende, para la industria farmacológica.

La importancia de esta iniciativa es lograr contribuir a dar valor agregado a nivel local, ya que los PFNM históricamente se han exportado como materia prima, por lo tanto lograr la estabilidad de un precio base para el agricultor contribuirá a la conservación del bosque tropical húmedo, y dará seguridad en el abastecimiento del producto de ipeca para la industria internacional. (Aportación hecha por: Rafael A. Ocampo S., Bougainvillea S.A. Apartado Aéreo 764-3100. Santo Domingo, Heredia; correo electrónico: quassia@racsa.co.cr)



Sunlight reduces the value of moringa leaves

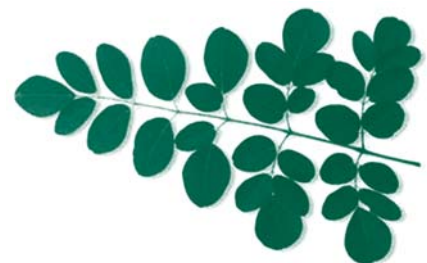
A recent research by Mbarara University of Science and Technology has revealed that the proven potency of *Moringa oleifera* can be lost during preparation. The leaves, which contain vitamins A and C, calcium, potassium and proteins, need proper handling for effective use. Ritah Namutebi, a student at the university, studied the preservation of vitamin A which acts as a shield against eye and skin disease, heart ailments and diarrhoea. She found that

much of the vitamin is lost in the way leaves are preserved.

While presenting a paper during the Biodiversity and Medicinal Plants Joint Conference at Makerere University recently, Namutebi said the study was undertaken to explore an effective method and time of picking the leaves in order to maintain the high vitamin A quantities. During the study, leaves were picked at different times – in the morning, at midday and in the evening. Vitamin A quantities in each freshly harvested sample were analysed to quantify losses based on different picking times and drying methods. The results revealed that the leaves dried in sunshine lost 35–60 percent and those in the shade, 11–15 percent.

Dr Raymond Tweheyo, a lecturer at Mbarara University, said: “25 g daily of *Moringa oleifera* leaf powder would give a child the recommended daily allowances of vitamins A and C, calcium, iron, magnesium, proteins and potassium. We recommend people in developing countries grow it at the household and community level.”

Duncan Sesaaazi, also from Mbarara University, said that *moringa* can be an effective supplement in the treatment of HIV/AIDS. [Source: *New Vision* [Uganda], 5 June 2007.]



Malunggay leaf

Malunggay: a “miracle vegetable” taking centre stage in the Philippines

Malunggay, described as a “miracle vegetable”, is among the many native plants in the Philippines that can contribute greatly to human health, according to the country’s Bureau of Agricultural Research (BAR).

BAR disclosed recently that the Medical College in Kolkota, India has discovered that among the many different medicinal herbs, *malunggay*, a green, leafy vegetable containing phytochemicals, plays an important role in preventing the development of cancer cells as well as in the treatment of female reproductive disorders such as epithelial ovarian cancer. Research studies also indicate that

malunggay is an effective treatment for ovarian cancer because of a combination of antitumour and hormonal properties that can be taken from its root bark extracts.

Malunggay also contains antioxidants and can help prevent other chronic ailments such as arthritis, kidney diseases and heart complications. Moreover, it is rich in vitamins A, C and E and thus helps to maintain good eyesight; facilitates digestion and bowel movement; cleanses wounds and ulcers; and cures stomach aches, scurvy, asthma, earache and headaches.

Also known as the drumstick or horseradish tree, *malunggay* is the most widely cultivated sample of the genus *Moringa* that can be grown almost anywhere using seeds and cuttings. The Department of Agriculture revealed that three months after germination, the young leaves can already be harvested, providing vitamins, niacin, iron, calcium and protein.

Given *malunggay's* many health benefits and the fact that it is helping farmers by becoming their major source of income since it can be developed as an export crop under their biotechnology programme, the Department of Agriculture and BAR have pledged to step up their campaign for production and planting of the vegetable.

Recent studies also indicate that because of its nutritional value, the Department of Health is advocating Filipino families, especially lactating mothers, to increase their intake of *malunggay* leaves in their daily diets since it is an excellent source of nourishment.

In a related move, to promote its development, production and intake further, *malunggay* will be showcased at the launching of BAR's "Indigenous Plants for Health and Wellness Program" which coincides with the proclamation of National Health and Wellness Month. (Source: Philippine Information Agency, 2 October 2007.)

MYRICA GALE

Myrica gale as a beer ingredient

Bog myrtle (*Myrica gale*) is a distinctive shrubby plant that grows on wet, acidic heathland, bogs and moors in the north of western Europe. One of the world's leading brewers is to create a new beer using this obscure Scottish moorland plant that was once used to flavour medieval beverages. In fact, Vikings and native Scots once drank

a brew made from this shrub, long before the Romans brought hops to Britain.

Now the Danish brewing giant Carlsberg is planning to use bog myrtle to flavour a new version of one its range of strong "bock" lagers. The firm has signed a supply deal with Scottish company Highland Natural Products (HNP) in the United Kingdom, which has already been instrumental in bringing several bog myrtle lines to the market. HNP's managing director said it was a "landmark deal" between a small Highland company and a giant in the world of beverage production, and foresees huge benefits for the Highland rural community in Scotland. He added that the contract could lead to repeat orders and possible interest by Carlsberg in some of the other flavours the company is producing.

Some microbreweries in Scotland already use bog myrtle as a chief ingredient in specialist beers. But beer experts said the interest being shown by Carlsberg, which is the United Kingdom's fourth-largest brewer, would give it a major boost.

The use of bog myrtle as a major beer ingredient died out more than 500 years ago. Although used extensively as flavouring in Britain during the Middle Ages, it was gradually replaced by hops, which could be more easily grown on agricultural land closer to population centres.

Beer-making aside, it has had many uses in the past, including as a medicinal product for wounds, stress and coughs, as well as a midge repellent. Earlier this year, the high-street chemist Boots launched a new Botanics Sensitive Skin product incorporating bog myrtle after five years of research and development. It sourced its raw material from bog myrtle plantations in the Highlands. (Source: *The Scotsman*, 22 July 2007.)



NUTS

Managing the southwestern United States of America as a nut grove: the Pinyon-Juniper Ecosystem Management Project

Pinyon-juniper ecosystems cover 36 million acres (approximately 14 568 683 ha) scattered across Colorado, New Mexico, Arizona, Nevada and Utah. Pinyon trees exist in association with more than 1 000 species of plants, insects, birds and mammals, and perform important ecosystem services, such as water and soil retention. For 10 000 years, human inhabitants in the Southwest also relied on pinyon trees, primarily for sustenance, shade, firewood and building materials. To this day, pinyon trees are sacred among the region's indigenous cultures and pine nuts – the seeds of pinyon trees – are highly prized among Native American and Hispanic residents for their flavour and nutritional value. Commerce in pine nuts is an old tradition in the Southwest, dating back at least 1 000 years, and linking peoples of the Great Basin, the Colorado Plateau and the Great Plains. As late as the 1930s, trading posts shipped millions of pounds of pine nuts each year from southwestern forests to markets in New York City and Los Angeles.

Over the past 50 years, however, the flow of pine nuts from the Southwest's forests has dwindled to a trickle. Much of this decline is directly linked to a century of unsustainable public land management policies. For much of the twentieth century, rangeland ecologists treated pinyon trees as weeds and recommended converting wooded savannahs in many parts of the Southwest to grasslands stocked with non-native grasses. By the late 1980s, the combination of wide-scale clearing, fire suppression and intense livestock grazing had created landscapes dominated by abnormally dense thickets of small-diameter pinyon trees across much of the Southwest. Prolonged drought during the 1990s increased the susceptibility of these forests to insects and disease, resulting in massive die-offs of the trees over large parts of Colorado, New Mexico and Arizona, and placing the remaining live pinyon trees at extreme risk to wildfire. Despite the negative ecological impacts of previous pinyon removal efforts, current efforts to restore pinyon-juniper ecosystems continue to rely on management techniques, such as hydromowing and chaining, that indiscriminately remove all pinyon trees, rather than retaining healthy specimens.

Land management approaches that encourage the restoration of healthy pinyon groves instead of eliminating them are badly needed. One promising alternative is to reverse current management priorities and manage pinyon-juniper ecosystems primarily for nut production, and only then for grazing, timber and mining. Such an approach would benefit the land, water and wildlife; it would also decrease the risk of catastrophic wildfire and provide a reliable supply of highly nutritious nuts, thereby increasing the economic viability of the local pine-nut industry.

The notion of managing pinyon-juniper forests as nut groves is neither new nor far-fetched: humans have managed pine forests for nut production for thousands of years in the Mediterranean, and the indigenous peoples of the Southwest practised a variety of management techniques to improve nut production, including selectively thinning unproductive trees, clearing around the base of the trees and removing lower branches.

In 2007, with funding from the Colorado Wood Utilization and Marketing Program (a collaborative effort between the Colorado State Forest Service, Colorado State University, the United States Forest Service and the Bureau of Land Management, Colorado State Office), the Institute for Culture and Ecology initiated a pilot project aimed at building the capacity of Southwestern communities and land management agencies to manage pinyon-juniper ecosystems as nut groves. In this phase an interactive Web site (www.pinonnuts.org) is being established where harvesters, buyers, land managers and scientists can share information about pinyon nut crop locations and yields, permit prices and harvesting restrictions, pinyon nut prices and methods for improving pinyon nut production. Penny Frazier, owner of Goods from the Woods and long-time advocate of sustainable management of pinyon-juniper ecosystems, was the inspiration for the project and is coordinating the development of the Web site.

The Institute for Culture and Ecology has produced several educational tools highlighting the many benefits of pinyon trees, including an overview of the pine nut industry, guidelines for managing pinyon-juniper forests for nut production and a scientific poster on pinyon management. These materials are available at: www.ifcae.org/projects/pinyon/ and

www.pinonnuts.org/ (Contributed by: Rebecca McLain, Institute for Culture and Ecology and Penny Frazier, owner, Goods from the Woods.)

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NORTHERN NUT GROWERS ASSOCIATION, UNITED STATES OF AMERICA

The Northern Nut Growers Association, Inc. (NNGA) is a national non-profit organization with members throughout the United States and 15 other countries, founded in 1911 to share information on growing nut trees. Members include new nut culturists, farmers, amateur and commercial nut growers, experiment station workers, horticultural teachers and scientists, nut tree breeders, nursery people and foresters.

The most popular kinds of nut and fruit trees that NNGA members plant are walnut (*Juglans*), filbert (*Corylus*), pecan and hickory (*Carya*), chestnut (*Castanea*), oak (*Quercus*), pine nut (*Pinus*), paw paw (*Asimina triloba*) and persimmon (*Diospyros kaki* and *D. virginiana*).

NNGA has been publishing articles, research papers, and monographs on nuts, nut-tree growth and culture since 1910. Summaries of some of these articles and a listing of books that can be borrowed can be found on the NNGA Web site.

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For more information, please contact:
Mr Tucker Hill at tuckerh@epix.net or visit
www.northernnutgrowers.org/

Price of Brazil nuts plummets in Acre, Brazil

This year alone, the native Brazil nut groves in the regions of Alto Acre, Baixo Acre and Iaco/Purus, have produced over 10 000 tonnes of Brazil nuts, according to optimistic forecasts in the extractivist sector. Despite increased production, the price per can of Brazil nuts has plummeted on the regional market, where it is currently R\$14, when last year it was as high as R\$17. (Source: *O Rio Branco*, 2 August 2007.)

Maya nut (*Brosimum alicastrum*): an ancient food for a healthy future

Maya nut (*Brosimum alicastrum*) – or Ramon, Ojoche, Masica, Ujuxte, Ojushte, Ojite, Ash, Ox, Capomo, Mojo and Breadnut – is a delicious, nutritious, abundant nut from neotropical rain forest trees that provided a staple food for pre-Columbian hunter gatherers. Maya nuts are exceptionally nutritious, providing high-quality protein, calcium, iron, folate, fibre and vitamins A, E, C and B. They are also one of the best native forage species and show great promise for providing ecological alternatives to pasture for cattle ranches in the neotropics.

In recent history, maya nuts have been critical to rural food security; thousands of villages throughout Central America and Mexico have survived drought and famine by eating them when no other food was available. Unfortunately, knowledge about the nuts has decreased as globalization, export crops and deforestation negatively impact indigenous cultures and the forests that sustain them. As a result of this loss of indigenous knowledge, people cut maya nut trees for firewood and burn forests to plant maize, beans and other crops. The maya nut tree is in danger of extinction throughout its range, a situation that threatens the food security of both human and animal populations.

The Equilibrium Fund's Maya Nut Program is working to rescue lost traditional knowledge about the tree for food, fodder and ecosystem services. Since its inception in 2001, more than 7 000 women have been trained from 312 communities in Honduras, Nicaragua, Guatemala, El Salvador and Mexico about the nutrition, processing, recipes, conservation and propagation of *Brosimum alicastrum* seed. This programme has resulted in the conservation of more than 400 000 ha of maya nut forests and the planting of more than 150 000 new seedlings.

The programme focuses on women as the caretakers of the family and the

environment, and addresses key factors for sustainable livelihoods – sociocultural, environmental and economic – by creating leadership, educational and economic opportunities for women and girls. In this context, we have facilitated the creation of five autonomous women's producer groups who produce *Brosimum* seed for consumption and sale, and who train new communities to provide women with the skills and knowledge they can use to earn income and produce food for their families.

Our anticipated accomplishments include:

- reforesting 50 percent of El Salvador with *Brosimum alicastrum*;
- creating at least three agroforestry demonstration plots in Mexico for cattle ranching using *Brosimum* fodder in conjunction with pasture;
- creating and strengthening a women's producer group network to unify the producer groups and reduce competition, and improve supply, quality, and sustainability;
- expanding the programme to Haiti, Cuba, Jamaica and other parts of the Caribbean; and
- obtaining research funding to explore the *Brosimum* genome.

[Source: Eco-Index Monthly Update, October 2007.]

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Cambodia promotes mulberry tree planting and silkworm feeding for silk production

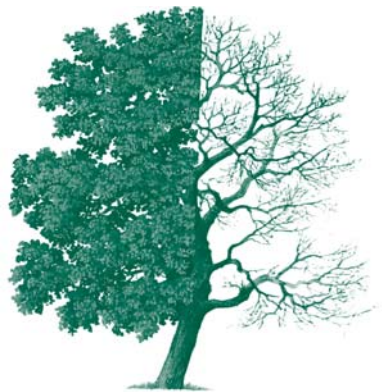
The Cambodian Government is encouraging farmers to expand mulberry tree planting and silkworm feeding under the "one village for one product" policy to produce silk to fulfil the demand in domestic and foreign markets, a senior official said on Monday.

There are up to 20 ha of land to plant mulberry trees in Sre Cheing commune, Chom Kiri district in Kompot Province, Sun Kunthor, an adviser for the Cambodian Government and secretary-general of the committee of "one village for one product" said. "I saw mulberry trees and silkworms

grew well there," he said, adding that the government wants to develop the area with roads and water dams.

Techniques and seeds from China are being used to plant mulberry trees in Chom Kiri district, Sun Kunthor said. Chinese experts told him that the weather in Cambodia is good for silkworm feeding and products can be harvested throughout the year. "In Cambodia, we need to feed the silkworms for 20 to 30 days before they can spin strings of silk, but in China it will need about 45 days", he quoted an expert as saying. "One hundred kg of silkworm cocoons can yield 20 to 22 kg of silk", he added.

"We plan to establish the Association of Mulberry Tree Planters to protect the benefits of our silk products," he said. "When we expand our land for planting mulberry trees to 800–1 000 ha, foreign investors will come here to set up a factory to make silk for exporting." "If we can produce raw materials of silk in the country, local people will have jobs," he said, adding that it will help promote higher living standards, reduce poverty, stop labour migration and increase national revenues. [Source: People's Daily Online [China], 23 July 2007.]



Mulberry tree

India's Central Silk Board and its 10th five-year plan

The Central Silk Board (CSB), apex body of the Indian sericulture industry, has almost met its targets in releasing new sericulture products during the 10th five-year plan. The CSB's inventions were primarily aimed at improving productivity in a bid to reduce silk imports from China.

Of the total 297 research projects targeted during the 10th plan period, the research institutes attached to the CSB have completed 281 projects. The remaining 16 projects will be completed

during the current 11th five-year plan. As research mainly involves biological materials such as mulberry and the silk insects, the results of the products cannot be ascertained in the short term. The benefits of these products will be felt during the 11th plan period.

However, some products have already started yielding results during field trials. To highlight a few, officials said mulberry leaf productivity has doubled to 60 tonnes per ha per year when compared to 30 tonnes during the 9th plan period.

Cocoon productivity has also increased to 60 kg per 100 dfls (disease-free layings) from 40 kg, pushing up the cocoon production to 698 kg per ha from 627.5 kg. Input cost per kg of cocoon produced has been brought down to Rs75 from Rs100.

Primarily, raw silk production per ha has increased to 82.9 kg from 68.3 kg. The CSB has also filed 40 technologies for patenting, of which 16 have been commercialized.

During the 10th plan, production varied but has been steadily increasing, surging to 17 305 tonnes in 2005/2006 and now in the financial year 2006/2007 it has reached 18 760 tonnes. Despite this production increase, India still imports around 8 000 tonnes of silk from China.

With new inventions, the CSB hopes to increase its production to match local demand and thus reduce imports from China as much as possible during the 11th plan period, when the country will witness the benefits of newly invented sericulture products. [Source: *Financial Express* [India], 15 July 2007.]

Rwanda: turning the nation into a land of silk

Samples of Rwanda's silk have been ranked the best in India. With these positive results, planners are positioning the country to produce silk for both local and international markets. Peter Muvara, chairman of the silkworm project, says returns from silk are two times higher than that of coffee and three times that of tea. Having a local silk industry processing cocoons to silk yarn and finished fabrics would develop markets for other rural products and Rwanda could be turned into a land of silk.

The government has allocated about RF154 million for training 30 farmers from the four provinces in the country. They will be trained in mulberry farming, silkworm rearing and weaving to ensure that they produce quality silk products.

Jointly run by farmers' cooperatives and the private sector with the Ministry of Defence playing a leading role, about 600 000 ha of mulberry trees are to be planted in three years, with at least 60 000 families targeted to benefit. Each household will plant 0.1 ha. The Rwanda Investment Group has already opened 20 ha of silkworm production in Rusizi-Western Province. The government has also interested UTEXRWA, a local textile company, in upgrading their factory to start processing silk products.

Some money has been invested in the Institute of Science and Agricultural Research, to build up staff capacity in silkworm egg production. Five ha of mulberry tree plantations have been opened at the Institute to kick-start silkworm egg production. The country has been importing eggs from the Republic of Korea, but the stakeholders in silkworm production complain that they are expensive. To cut costs and losses, eggs will be produced locally in Rwanda. It is estimated that 1 ha of land needs 20 boxes of silkworm eggs.

These worms feed on mulberry trees. Cuttings were imported from Uganda and planted on 10 ha, at four sites in the Northern, Southern, Eastern and Western Provinces. To boost silk production, the government plans to give out free mulberry cuttings; however, when the project takes off, farmers will have to pay back for them. The farmers will also be trained in rearing and reeling silk for production. The government will install weaving facilities to be managed by cooperatives.

If the project takes off fully, planners believe that it will act as an incentive, triggering off economic growth and increasing the balance of payments and foreign currency earnings.

Muvara is optimistic. He believes that the silk industry is well suited for Rwanda because of the excellent agroclimatic conditions that favour silk production throughout the year. He cited some countries that are not competitive in silk production, some of them producing as little as 600 kg, while Rwanda can produce twice as much.

Rwanda has the opportunity to exploit the silk market through the African Growth Opportunity Act because world supply is currently about 45 percent. When the country goes to full production, about 19 000 tonnes of cocoons worth \$64 million will be produced on the 10 000 ha of land planned to be opened for silk production. [Source: *New Times* [Kigali], 9 July 2007.]



"Riches of the forest: fruits, remedies and handicrafts in Latin America"

SPICES

Allspice: the flavour of Mexico

Allspice is similar to Asia's "black pepper" but with a sweeter, more aromatic flavour and smell. Sourced from the pepper tree (*Pimenta dioica*), the flavour comes from the dried, ground fruits, which first appear as small strongly scented green berries. In addition to the ground seasoning, essential oil is also extracted from the dried berries for use in the medicinal, cosmetic and food industries.

The pepper tree grows in several Central American countries and in Mexico, where its history of use dates back long before the arrival of the Spanish. Known in Mexico as *pimienta gorda*, the pepper tree has historically given both the Old and the New World the tremendous gift of flavour. In pre-Hispanic times, indigenous people in Mexico used the berries, which they called *xocoxóchitl*, to season their food, and as an ingredient in traditional medicine. The Spanish colonists quickly adopted the local seasoning and used it in their cooking as well, mixing native condiments, cultivars and fruits with produce from plant varieties from their homeland. They called the local pepper *malagueta* or tabasco pepper, and it went on to become one of the main commercial products in the new Spanish colony.

During the seventeenth century, the small green berries were commercialized around the world by Dutch and English entrepreneurs. Since the nineteenth century, the states of Veracruz, Chiapas and Tabasco have been the main allspice producers, joined in more recent times by the states of Oaxaca, Campeche and Puebla. Demand for the dried berries and essential oil is continuing to grow. Between 1990 and 2000, the total Mexican production of allspice increased from 868 to 4 980 tonnes. Most of the production is exported, with only 2.2 percent being consumed in Mexico. The majority goes to South America, the United States of America, Europe and the Middle East. In 2000 the total export value was US\$12 million.

Pepper trees that grow to a height of 20 m are native to tropical forests in Mexico, Honduras, Guatemala, Belize and Jamaica. They are becoming scarce in the east Mexican forests of the Sierra Norte region as rising human populations have led to forests increasingly being cleared for agriculture and cattle ranching. However, escalating international demand for the seasoning has been a catalyst for the cultivation of pepper trees in and around this region and over the past two decades the number of the trees has increased twofold.

Pepper trees can be found mainly within the shade-grown coffee plantations of the Sierra Norte de Puebla, along with other valuable tropical trees, such as *mamey*, banana, orange, mandarin, cedar, mahogany and *jonote* trees (which are used for making bark paper). In the municipality of Tuzamapan, each hectare of coffee plantation contains about 70 to 100 productive pepper trees, which produce up to 120 kg of green fruit. Each kilogram sells for around US\$2.2. The pepper trees are valued not just for monetary reasons, but because they also help to improve the soil, with the falling leaves forming a protective layer against erosion in mountainous terrain such as that of the Sierra Norte de Puebla.

Within the coffee plantations, a common practice is to prune the branches of nearby trees in order to promote the yield of the pepper trees. In addition to shade-grown coffee plantations, pepper trees are cultivated in orchards, *milpas* (maize plots) and *potreros* on small cattle ranches. Farmers also protect the natural regeneration of pepper trees in areas where they are not actively cultivated. When clearing weeds and grasses with machetes, the farmers try not to cut the small pepper seedlings. Some farmers even protect the seedlings with fences or replant them within their coffee plantations. Others establish small nurseries.

Men harvest the pepper berries from May to August – harvesting up to 25 kg a day. When the harvesters return home, the women and children pick the little green berries off the small branches. They spread the berries out over flat, cement surfaces or on bed rolls to dry in the sun. An important stage in the drying process involves making the berries "sweat" – there needs to be just the right level of moisture content (or *sudado*) in the dried allspice. The first day in the sun ensures that the allspice acquires its characteristic scent and black colour, but it takes four to five days before the fruit is dried properly. Alternatively, the berries can be processed more rapidly in

only nine hours in an electric dryer. Grain sieves are then used to remove damaged fruit and sort the remaining berries by size.

The allspice market. At the beginning of the 1970s, itinerant traders would visit the region to buy allspice and then move on to hawk it in other towns and cities, such as Cuetzalán or Veracruz. More recently, local farmers have organized themselves into associations of allspice producers, taking more responsibility for production as well as sales. With the support of the state, these small cooperatives have begun to export their produce through intermediaries.

The harvesting and processing of allspice represent an important economic activity for many families in the Sierra Norte de Puebla. In recent years this activity has come to the rescue of coffee growers, following the fall in international coffee prices. Indeed, allspice has become a more important source of income than coffee. For example, in Tuzamapan, in the Sierra Norte de Puebla, where about 56 percent of the villagers are engaged in producing allspice, 17 percent of their overall income is derived from allspice, with 11 percent from coffee.

Although the prices of these international products are subject to instability and fluctuations, the two products continue to be important for the livelihoods of many rural households. The diversity of crops offers some protection against economic uncertainty or changes that can affect one particular crop, such as coffee in this instance. Local people benefit greatly from the pepper trees, which provide a direct source of income, as seasoning for domestic use, medicinal leaves and shade for coffee plants. The plantations also provide valuable resources such as fruits, fuelwood, medicinal plants and herbs, highlighting the benefits of multiuse plantings. [Source: Case study on allspice, pepper seasoning by Miguel Angel Martínez Alfaro, Virginia Evangelista Oliva, Myrna Mendoza Cruz, Cristina Mapes and Francisco Basurto Peña [in *Riches of the forest: fruits, remedies and handicrafts in Latin America*, eds C. López, P. Shanley and A.C. Fantini].]

Sri Lanka: spice industry needs duty rebates to encourage exporters

Sri Lanka has exported spices worth US\$30.5 million and these spices, particularly because of their original flavour, are in heavy demand on the global market, said the Director of Seven Seas Commodities, V.P. Rajan.

From time immemorial Sri Lanka has been popular in the spice industry globally

and this cultivation needs to be developed to meet the demand, he said. "We exported \$30 million of pepper and \$0.5 million of cinnamon last year. Our company mainly exports pepper, cinnamon, oil seeds and mace from the nutmeg fruit. "We should improve our productivity of cinnamon gradually. Mostly South and Central American countries consume Sri Lankan cinnamon." "Since the demand for Sri Lankan cinnamon is very high, the produce could be sold at attractive prices," Rajan said. He added that this year cinnamon production was less because of the heavy rains and floods.

Rajan said that the tariff rebate to which exporters are entitled had been reduced and the government should reinstate the earlier rebate rate to encourage them. [Source: *Ceylon Daily News* [Sri Lanka], 8 June 2007.]



Cinnamon helps fight against bird flu

Tel Aviv University technology transfer company Ramot has signed an agreement with Frutarom, a multinational nutraceutical company based in Israel, for applying a technology using a cinnamon extract in a whole host of applications from disinfecting the air as a spray against avian flu in airports, to a daily supplement that protects people against common flu. The discovery was made by Prof. Michael Ovadia, of Tel Aviv University's Department of Zoology.

Ovadia's initial experiments proved to be true – his savoury cinnamon extract was quickly and efficiently able to immunize chicken embryos from the Newcastle disease virus, which costs the poultry industry in the United States of America alone millions of dollars a year. Apparently further studies on avian influenza H9, sendal virus and herpes simplex 1 also achieved positive results. "Not only was the extract able to neutralize the viruses, but it also showed for selected viruses that it has the potential to immunize against them as well."

Besides human applications, Prof. Ovadia sees that cinnamon fills an important niche in the agricultural industry where chicks need to be immunized by hand against the deadly Newcastle disease virus. Applying his research on the global scale could only be

done with the help of a large company, which is where Frutarom comes in. The flavour and food additive company has grown in the last ten to 15 years from US\$10 million a year to a projected \$350 million by the end of 2007. [Source: World Poultry Net, 8 August 2007.]

TRUFFLES

Giant field of rare black truffles in Poland

An enormous field of black truffles has been discovered by mushroom researchers from the University of Łódź. The truffles are growing over a large area in the vicinity of the southern city of Czeszochowa, making this the farthest reach of the mushroom in northeastern Europe and the only point of its appearance in Poland. A kilogram of truffles, considered a delicacy and an aphrodisiac by some, can sell at around €3 600.

According to the researchers from Łódź University, Polish black truffles are just as aromatic as truffles from Burgundy. In Poland truffles are a protected species, so the location of the rare Polish truffle field is being kept a scientific secret. [Source: Polish Radio External Service, 14 August 2007.]

Summer rain boosts United Kingdom truffle harvest

Farmers across the United Kingdom have been counting the cost of the summer's devastating floods but one corner of the industry has received an unexpected boost from the heavy rainfall. Hunters and farmers of truffles have reported a huge increase in the number and quality of the fungi growing on roots of trees and the trend will continue as the main harvest gets under way throughout August.

Although France and Italy are generally regarded to be the world leaders in the truffle market, some species found in the United Kingdom can be eaten and can fetch a high price on the international market.

The heavy rainfall during June and July has particularly benefited the summer truffle (the only variant grown that is eaten), a caramel-coloured species with white veins that has a nutty and sometimes gritty consistency and can fetch up to £300/lb (0.5 kg).

One entrepreneur set to benefit is the biologist Dr Paul Thomas whose business, Plantation Systems, has pioneered a way of cultivating summer truffles in the United Kingdom. Dr Thomas used his expertise as a biologist to find a way of impregnating the roots of trees with truffle fungus in the laboratory and then transferring the

saplings on to one of four plantations across the country.

The expected bumper harvest will be particularly welcome to the small number of truffle farmers who are hoping that chefs and the wider public will be interested in buying local truffles rather than more expensive foreign variants. [Source: *The Independent*, 6 August 2007.]



Global and EU wildlife trade values

The value of legal global international wildlife trade, including non-CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) species and based on declared import values in 2005, is conservatively estimated to be about €249 billion per year, with timber and fisheries accounting for about 90 percent of this value. As a comparison, the United Nations Statistics Division records the declared import value of the global trade in coffee, tea and spices in 2005 at about €14 billion; while domestic sales of medicinal plants in China was valued at around €19 billion in 2002, and has increased by 8 percent a year since 1994.

The Table provides an estimate of the global value of international wildlife trade, and an estimate of these values specifically for the EU. Wildlife traded at the national level

TRADE IN REPTILES



In 2005, the European Union (EU) was the top global importer by value of live reptiles (€7 million) for the pet trade, and reptile skins (€100 million) for products such as handbags and shoes. Imports into the EU have been suspended from countries where there are concerns about the sustainability of the trade. However, import suspensions do not automatically address conservation concerns. For example, ten years after imports from Indonesia were suspended for certain species of Indonesian monitor lizards, original concerns remain unaddressed. A strategic EU action plan for external assistance should be developed, to enable priorities to be identified and addressed in collaboration with states in order to ensure wildlife trade is sustainable.

or within the EU is not included in these estimates, but can represent significant value. Moreover, these estimates include only certain categories of commodities and do not include the value of the illegal trade in wildlife

products. Consequently, the table is far from a complete representation of the value of wildlife trade either globally or in the EU; however it serves as an indication of its scale. [Source: *Opportunity or threat. The role of the European Union in the global wildlife trade*, by Engler, M. and Parry-Jones, R.A. TRAFFIC Europe Report. 2007.]

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Wildlife trade and biodiversity loss

A number of factors including habitat loss and climate change contribute to global biodiversity loss. However, wildlife trade can be an equally significant threat to the survival of certain species, such as the tiger for medicine and skins, and the Tibetan antelope for its wool.

The 2006 International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species records a significant increase in the number of animals and plants in the Critically Endangered, Endangered and Vulnerable categories between 1996 and 2006. The high value of wildlife trade can increase threats to biodiversity by acting as a financial incentive for people to trade in wildlife products even when the trade is not sustainable. For instance, in six United Kingdom wildlife trade prosecutions that occurred between 1996 and 2002, the value of the wildlife products concerned totalled £4 058 000 (over €6 million). These cases involved commodities from highly endangered species, such as rhinoceros horns, shahtoosh shawls and certain parrots and birds of prey.

Because of the environmental, economic and social impacts of wildlife trade, regulation is necessary to ensure sustainable resource use and to avoid the depletion of natural capital and biodiversity loss. [Source: *Opportunity or threat. The role of the European Union in global wildlife trade*. A TRAFFIC Europe Report, 2007, by Engler, M. and Parry-Jones, R.

The price of a wild trade

Proteins obtained from hunting wild animals are crucial for the survival of many forest-dependent people of the Congo Basin. In Gabon, the overall annual bushmeat trade has been valued at US\$25 million (€18.5

Estimate of global and EU wildlife trade values, 2005

Commodity	Estimated global value (€)	Estimated EU value (€)
Live animals		
Primates	75 million	15 million
Cage birds	38 million	7 million
Birds of prey	5 million	0.2 million
Reptiles, including snakes and turtles	31 million	7 million
Ornamental fish	257 million	89 million
Animal products for clothing/ornamental		
Mammal furs and fur products	4 billion	494 million
Reptile skins	255 million	100 million
Ornamental corals and shells	85 million	15 million
Natural pearls	57 million	12 million
Animal products for food (excluding fish)		
Game meat	365 million	126 million
Frogs legs	40 million	16 million
Edible snails	60 million	19 million
Plant products		
Medicinal plants *	1 billion	324 million
Ornamental plants	11 billion	1.2 billion
Subtotal		
(excluding fisheries food products and timber)	17.2 billion	2.5 billion
Fisheries food products (excluding aquaculture)	68.6 billion	26 billion**
Timber	154 billion	64 billion
TOTAL	239.5 billion ***	93 billion

* Estimate from 2004. ** Estimate for all European countries. *** Does not include global estimate for NWFPs of €9.5 billion (FAO estimate, 1995).

ILLEGAL WILDLIFE ITEMS SEIZED IN THE UNITED KINGDOM

The top ten illegal wildlife crime items as seized by customs officials in the United Kingdom between 2006 and 2007 were the following.

1. Traditional Chinese medicine (containing products from endangered species including tiger, rhinoceros, seahorse, deer musk)
 2. Snake and lizard products
 3. Alligator/crocodile products
 4. Plants (including orchids, cycads and cacti)
 5. Live reptiles (including snakes, lizards, chameleons, iguanas, tortoises and terrapins)
 6. Caviar (amounts over 250 g)
 7. Coral
 8. Elephant ivory and skin products
 9. Queen conch shells
 10. Animal skin products or stuffed animals
- (Source: WWF News, 16 October 2007.)



million). In West and Central Africa, estimates of the national value of the bushmeat trade range from US\$42 to \$205 million (€31–151 million) per year. The current harvest in Central Africa alone may well be in excess of 2 million tonnes annually, the equivalent of over 1.3 billion chickens or 2.5 million cows.

If current levels of hunting persist, bushmeat protein supplies will fall dramatically in Central Africa in less than 50 years. However, if bushmeat harvests are reduced to a supposedly sustainable level, all countries will be seriously affected by the immediate loss of wild protein supply. Most Central African countries do not produce sufficient amounts of non-bushmeat protein to feed their populations. There is a clear dilemma here. (Source: extracted from an article by Robert Nasi in *Spore* 130, August 2007.)

Asia's exotic animal black market

Two of the world's most beautiful creatures have been found stuffed into a fridge in Hanoi

– a rare insight into the lucrative trade in endangered animals across Southeast Asia that makes a mockery of international conservation treaties.

Vietnamese police this week found the two frozen tigers in an apartment, along with two soup kettles filled with animal bones in an outdoor kitchen. A 40-year-old woman confessed to police that she had hired three experts to cook tiger bones to make traditional medicines that she sold for about Â£400 per 100 g. "The tigers could have been bought in Myanmar or the Lao People's Democratic Republic and transported back to Viet Nam by ambulances or hidden in coffins," said Vuong Tri Hoa, a forest ranger.

And there is the problem: while more developed countries in Southeast Asia, such as China and Viet Nam, have taken strong steps to stamp out the illegal hunting of endangered animals, impoverished states such as the Lao People's Democratic Republic and Myanmar either will not or cannot.

Demand for exotic animals across Southeast Asia remains high – newly affluent Chinese prove excellent customers. Three of the world's nine tiger subspecies became extinct in the last century, and many scientists believe a fourth, the South China tiger, is already "functionally extinct".

Poached from forests and sold to traders for as little as Â£5, almost every part of Asia's biggest big cat has commercial value. Skins are sold as rugs and cloaks on the black market, where a single skin can fetch as much as Â£10 000. Tiger meat is marketed as giving "strength", and bones are ground into powders or immersed in vats of wine to make curative "tiger-bone wine" tonics for the traditional Chinese medicine market.

If the market of Mong La – a town in Myanmar on the Chinese border – is anything to go by, the remaining wild elephants, tigers and bears in the country's forests are being hunted down slowly and sold to China. The market offers a grisly array of animal parts, as well as many live specimens, to the hundreds of Chinese tourists who flock across the porous border each day. Bear paws and gall bladders, elephant tusks and chunks of hide, tiger and leopard skins, as well as big-cat teeth and deer horn are all openly on display next to crudely welded cages of live macaques, cobras, star tortoises and pangolins. The live creatures, some of them on the IUCN World Conservation Union's "Red List" of critically endangered species, are destined for the cooking pots of exotic animal restaurants in China's neighbouring Yunnan Province, or further

WILDLIFE IN AFRICA

Wildlife is undoubtedly a very important natural resource of Africa, with considerable potential for contributing to rural development through employment and income from tourism, and as a source of food, especially bushmeat. Establishment of protected areas – especially national parks and sanctuaries – has been an important approach to conservation. Game viewing and trophy hunting have proved to be major attractions for tourism in some countries, contributing significantly to increased export earnings. (Source: *Companion Document. Comprehensive Africa Agriculture Development Programme. Integrating livestock, forestry and fisheries subsectors into the CAADP. The new partnership for Africa's development [NEPAD]/ FAO.*)

afield. Food stalls in the market openly advertise dishes of pangolin or black bear.

Most of the specimens come from Myanmar's still vast tracts of virgin forest, wildlife experts believe.

The exotic animal black market is worth billions of pounds a year – exceeded in value only by the illegal trade in arms and drugs, experts believe. The 100 000 yuan (Â£6 500) price tag on a tiger skin stretched across the wall of one shop in Mong La shows what cross-border police efforts such as Southeast Asia's Wildlife Enforcement Network, launched in 2005, are up against.

The Chinese Government has stepped up efforts in recent years to stamp out the domestic wildlife trade and educate people about the environmental perils of stripping forests of their native flora and fauna. However, the appetite for exotica remains and, partly as a result of the crackdown, the trade has intensified beyond China's borders. (Source: Environmental News Network [ENN] News, 7 September 2007.) ♣

The little unremembered acts of kindness and love are the best parts of a person's life.

William Wordsworth