AGARWOOD

Research breakthrough in India

In what may be termed as a path-breaking find, a team of researchers from the Rain Forest Research Institute (RFRI) in India, led by Rajib Kumar Borah, claimed to have pinpointed the fungus that causes the formation of agarwood (*Aquilaria* sp.) and, ultimately, agar oil, used widely in the multimillion dollar global perfume industry.

The Director of the Institute, N.K. Vasu, said that the find would lead to a more scientific and accurate method of tapping the oil and saving millions of agarwood trees from being felled unnecessarily. "It is very difficult to understand which tree has the oil and which has not, and therefore trees are being indiscriminately cut with only a sparse growth now surviving in the wilds of Assam," Vasu said.

R.K. Borah, Head of the Forest Protection Division of the Institute, said he had applied for a patent and did not want to disclose the name of the fungus before the patent was allotted, "as there is competition, and researchers of other institutes, too, have claimed discovery of the fungus".

The agarwood tree, popularly known as the *sasi* tree in Assam, is indigenous to Southeast Asia and some other parts of the world and its products have the biggest market in oil-rich West Asia. One litre of agar fetches as much as US$10 000 to US$14 000.

In Assam, the trade in agarwood oil is said to be the largest informal industry. Almost every household in rural Upper Assam is engaged in extracting the oil, which is then sold to intermediaries and taken to Mumbai for onward transmission to the Gulf. "The oil extracted from the trees of Assam is especially in great demand as it lends a rich and strong fragrance to the *aatar* (perfume)," Borah said. "Nowadays, tea estates have also taken up agar plantations on fallow land and as shade trees," he added.

The wood gains commercial value after it is infected by a fungus, which is carried by the larvae of *Zeuzera conferta* Walker, a stem borer. "The stem borer larvae make vertical tunnels which are the initial sites of infection. From these, the infection gradually spreads up and oleoresins are accumulated in the infected areas. The infection process takes time and the highest concentration of agar (2.5–5 kg) is usually found in trees around 50 years of age. Such agar fetches anything between 50 000 and 70 000 rupees/kg in the wholesale market," Borah said.

Borah further pointed out that commercial cultivation of agarwood suffers from a paradox in that only those plants infected by the particular fungus produce the highly valued agarwood. "So even if agar trees are planted on a massive scale there is no guarantee that a commercial quantity of agarwood can be harvested. This kind of ignorance, or even greed, often results in indiscriminate felling of trees. This problem can be overcome by artificial inoculation of the fungus," the scientist said. (*Source*: The Telegraph [India], 13 January 2011.)

Brunei Darussalam: cultivating *gaharu* (agarwood) trees to prevent their extinction

Importing and cultivating *gaharu* trees (*Aquilaria* sp.) will prevent them from extinction. The demand for agarwood products has resulted in the depletion of wild *gaharu* trees and they are now considered to be endangered, said Acting Director of Malaysia's Oud Agarwood Enterprise, Mohd Ruslan Osman. Developing cultivated species of *gaharu* – which is protected in Brunei – will prevent wild trees from being harmed.

Mohd Ruslan was speaking at the Mukim Tanjong Maya Local Products Festival on Monday, which saw the launch of the *Aquilaria subintegra* species imported from Malaysia. The imported species promises more yield of resin in a shorter time to help increase productivity of the *gaharu* industry in Mukim Tanjong Maya. He explained that resin is what makes the *gaharu* tree valuable because the valuable oil is extracted from the resin. Sometimes people illegally chop down wild trees and find out there is no resin, Mohd Ruslan said. "This is wasteful and it is a loss because wild trees can take decades to grow."

Mohd Ruslan explained that cultivated trees are guaranteed to contain resin because they are injected with a vaccine that stimulates resin production. Therefore, with cultivated trees, there will be no unnecessary wasteful cutting of trees. Furthermore, the harvesting of resin from cultivated trees happens in phases, slowing down the depletion of trees.

Although the cultivated trees will eventually die off as more parts are chopped off to extract resin, the trees will be replaced. Cultivated trees take less time to mature, from about five to seven years, unlike wild trees.

The Government's Forestry Department is aiming to strengthen the non-wood-based industries of the Sultanate this year. In an interview with *The Brunei Times*, Director of Forestry Hj Saidin Salleh said that his department would continue to promote and encourage local entrepreneurs to venture into sustainable activities such as nature tourism, ecotourism and biotechnology, including production of agarwood (*Aquilaria* sp.), or *gaharu*.

The official noted that towards late 2010 the community began to see the potential and the economic importance of forest trees such as the *gaharu* tree. Huge profits are possible from *gaharu*'s fragrant oil extract. For example, *gaharu* extract, which can be made into various products such as lotions, perfume oil and soap, is an industry generating US$1.2 billion in Singapore. Its leaves can also be made into green tea.

Because of their economic significance, the trees are often chopped down and stolen for their valuable resin. The official said his department was "eager in leading the way to promote *gaharu*", adding that emphasis would not only be given to the economic activities for this year but would also focus on enforcement activities, which at the moment was only at 11 percent capability.

Mohd Ruslan said that Oud Agarwood Enterprise is working together with the Mukim Tanjong Maya Consultative Council to educate Tanjong Maya residents interested in the *gaharu* business on proper methods of cultivating the plants through workshops and consultation. (*Source*: *The Brunei Times*, 29 December 2010 and 3 January 2011.)

BAMBOO

Bamboo charcoal

Bamboo is one of the most important sources of energy for cooking and heating in many tropical and subtropical regions. The culms by themselves, however, are not good combustible material: they do not store well, they burn fast and tend to produce dense smoke while burning. Bamboo charcoal offers an alternative to bamboo culms for stored energy. For over 1 000 years, charcoal has been produced and utilized, primarily in China, and exported either in its basic form or as various manufactured products. International organizations should promote the production and use of bamboo charcoal and its by-products. In a recent article, the authors present methods of preparation as well as describing properties and use of bamboo charcoal and its important by-products, including bamboo vinegar, bamboo gas and bamboo ash. (*Source*: W. Liese and S. Silbermann. 2010. Bamboo charcoal: properties and utilization. *Magazine of the American Bamboo Society*, 31(6).)

Bamboo bike factory set to put Africa into motion

The first large-scale production facility of its kind in the world will soon begin producing bikes made from bamboo for the African market. Initially, Ghana-based Bamboo Bikes Limited (BBL) will produce 750 bikes for a test run at its facility in Kumasi, with larger-scale production runs to follow.

Bamboo is grown locally in many regions of Africa and the manufacturing of bicycle frames does not require costly infrastructure or electricity. Bamboo-framed bicycles are lighter and stronger than steel-framed bikes, adaptable to difficult road conditions and can be easily modified for different needs, such as carrying farm loads, passengers, food, water and medicine.

The production of the bamboo bikes at BBL is a direct result of Columbia University's Bamboo Bike Project (BBP) in New York, United States of America, which was established at the university's Earth Institute to enhance access to safe, reliable and multipurpose transportation in rural communities of sub-Saharan Africa.

The effort was supported by the Earth Institute's Millennium Cities Initiative (MCI), which helps under-resourced sub-Saharan African cities to create employment and foster economic growth. MCI was instrumental in establishing the bamboo bike investment in Ghana, attracting donors, as well as facilitating many of the operational aspects of the project.

In Ghana, BBL will be responsible for managing the production facility and supplying the labour, bamboo and bike parts for the production test run and subsequent scale-up. It will be responsible for all operational matters, as well as marketing and outreach efforts in Ghana.

Included within the many groups that could benefit from bamboo bikes are health care workers, students and farmers. (*Source*: www.theengineer.co.uk, 27 January 2011.)

BAOBAB

Madagascar: les baobabs, grands corps fragiles

Madagascar abrite la plus grande variété au monde de ces arbres mythiques, menacés par la déforestation. Une expédition franco-malgache est allée étudier de près le devenir de ces phénomènes du règne végétal.

Selon la croyance malgache, c'est dans un baobab qu'Imbelo, le premier homme, a sculpté sa compagne. Pour toucher et photographier ces créatures mythiques, leurs admirateurs sont prêts à franchir des océans. Au détour de la célèbre «allée des baobabs» de Morondava, dans l'ouest de Madagascar, il n'est pas rare d'apercevoir un Japonais ou un Américain en pleine extase, le visage posé sur l'arbre magique, les bras tendus, comme s'il cherchait à l'enlacer. Comme si c'était possible... La circonférence de ces splendeurs peut dépasser 20 mètres. On murmure même que, quelque part dans le pays, celle de l'un d'eux dépasserait 35 mètres.

Ce ne sont pourtant pas les mensurations de ces géants du règne végétal qui excitent les chercheurs, ce sont leurs singularités biologiques. Voilà deux siècles et demi que les botanistes étudient le genre *Adansonia*, du nom de l'explorateur français Michel Adanson, qui fit la connaissance de son premier baobab un jour d'août 1749, au Sénégal. Mais c'est seulement il y a une quinzaine d'années – autrement dit hier pour les scientifiques – que le taxinomiste américain David Baum a enfin mis (provisoirement?) tout le monde d'accord sur le nombre d'espèces de baobabs: il y en a huit, dont six n'existent qu'à Madagascar.

La région du fleuve Mangoky, dans l'ouest de l'île – loin des baobabs à touristes, loin de tout – figure parmi les moins bien connues des spécialistes, qui sillonnent pourtant le pays à longueur d'année. En mai dernier, six chercheurs malgaches et français du Centre de coopération internationale en recherche agronomique pour le développement (CIRAD) ont décidé de s'y aventurer, s'orientant grâce à la carte réalisée par le biogéographe du groupe, Cyrille Cornu. A partir des images satellitaires à haute résolution que Google Earth propose sur Internet, le scientifique a identifié des zones à forte densité de baobabs: ces arbres sont en effet si imposants que, vus du ciel, ils se distinguent des autres.

Progressant en pirogue, l'équipe de spécialistes observe les baobabs grandidieri, les plus élancés de tous, en pleine floraison à cette époque de l'année. Protégé par son large chapeau et son foulard rouge pare-soleil, armé de ses jumelles, Pascal Danthu, patron de la mission, est aux aguets. A plusieurs reprises, il arrête le cortège: «Il faut absolument que l'on aille prélever un peu d'écorce de ces baobabs-là.» Aussitôt, les piroguiers tâchent de gagner le banc de sable le plus proche. Puis tout le monde descend et des groupes se forment.

Lorsqu'un arbre est particulièrement difficile d'accès, c'est Wilfried Ramahafaly qui s'y colle, sourire aux lèvres, son inséparable hache en équilibre sur l'épaule. Ce phénoménal marcheur des bois parcourt chaque année 4 000 km à pied dans la campagne. A la nuit tombée, sa consœur, l'entomologiste Tantelinirina Rakotoarimihaja, pose ses pièges – drap blanc et projecteur – à proximité des baobabs. Un sphinx (papillon de nuit), pollinisateur éventuel, l'intéresse? Elle l'attrape dans son filet, le pique à l'ammoniac puis le classe dans ses petites boîtes pour identification ultérieure.

Les rares villageois installés sur les rives fabriquent de la corde avec l'écorce des baobabs. Ils vouent aussi une vénération absolue à certains spécimens

remarquables, placés sous la garde vigilante d'un sage. Ils savent aussi que la culture sur brûlis qu'ils pratiquent a des effets redoutables. Au moins 10 000 ha de forêts partiraient chaque année en fumée. Déjà, les jeunes plants se font rares, et certaines espèces seraient menacées. «Il est grand temps de mettre en place sur l'île un plan de préservation acceptable sociologiquement», souligne Pascal Danthu. «Il faut accompagner les villageois pour qu'ils profitent davantage des ressources forestières et prennent conscience de leur valeur.»

Les chercheurs du CIRAD associés à leurs homologues de l'université d'Antananarivo ont constaté que certaines espèces malgaches présentaient un étonnant mode d'évolution. Pour s'adapter à un nouvel environnement, elles n'attendent pas que la sélection naturelle «classique» suive son cours, génération après génération. Elles «volent» du matériel génétique à d'autres espèces de baobabs bien établies, un phénomène appelé «introgression». Leur stratagème est au point: elles titillent le pollinisateur de leur cible, un sphinx par exemple (le papillon) et lui soutirent un fécond baiser. Un peu comme si, souhaitant quitter l'hémisphère Sud pour le Nord, des manchots venaient frayer avec des pingouins afin de favoriser leur descendance! Efficace. Mais aussi très déstabilisant pour Jean-Michel Leong Pock Tsy, le généticien du groupe, qui tombe parfois sur d'improbables hybrides. De quoi compliquer encore la carte de répartition des espèces sur l'île, qu'il peaufine depuis des années.

Aujourd'hui de retour à Antananarivo, l'équipe a commencé le travail d'analyse. Dans les années qui viennent, les spécimens de baobabs aux profils ADN les plus étranges auront droit à une nouvelle visite. Les chercheurs, qui ont noté les coordonnées GPS de tous les arbres observés, tenteront alors de saisir ce qui, dans l'environnement, pourrait expliquer ces anomalies. «Il reste encore tant de choses à comprendre sur la génétique, l'histoire biologique et les liens que les hommes entretiennent avec ces arbres fabuleux», s'enthousiasme Pascal Danthu. (*Source*: *L'Express*, 18 août 2010. France.)

L'ARBRE AUX MERVEILLES

Il vit longtemps: Les plus vieux pourraient dépasser 1 000 ans. Une aubaine: grâce aux tissus d'anciens spécimens, les chercheurs du CIRAD et leurs partenaires comptent retracer l'histoire climatique de Madagascar.
Ses fruits sont à tomber: La pulpe du pain de singe, le fruit du baobab, est dix fois plus riche en vitamine C que l'orange. En la mélangeant avec de l'eau, on obtient un délicieux breuvage acidulé. Depuis deux ans, la commercialisation du fruit et de son jus est autorisée dans l'Union européenne.
Il se remet de tout: Coupez un arbre: à l'intérieur, le bois est mort. Coupez un baobab: le coeur est vivant. Un atout qui lui permet de cicatriser des pires blessures en quelques mois. Quitte à repousser parfois bizarrement, sous la forme d'une théière, par exemple.
Il intéresse l'industrie cosmétique: Sur les rives du Mangoky, l'équipe du CIRAD a prélevé des échantillons pour les laboratoires de la marque Yves Rocher, qui a participé aux frais de la mission. L'entreprise n'est pas la seule à s'intéresser aux fruits, aux feuilles et aux graines du géant des forêts, qui pourrait bien devenir une vedette des rayons beauté.

BUSHMEAT

Bushmeat hunting alters forest structure in Africa

According to the first study of its kind in Africa, bushmeat hunting impacts African rain forests by wiping out large mammals and birds, such as forest elephants, primates and hornbills, which are critical for dispersing certain tree species. The study, published in *Biotropica*, found that heavy bushmeat hunting in the Central African Republic changes the structure of forest species by favouring small-seeded trees over large-seeded ones, leading to lower tree diversity of trees that have large seeds.

"When hunters remove big animals, they remove at the same time the ecological functions of the animals," lead author Hadrien Vanthomme, from the Muséum national d'histoire naturelle in France, explained to mongabay.com. "To keep it simple, animals can have two opposite impacts on forest regeneration: they can favour it (mostly by carrying seeds away from the parent plants, a phenomenon called dispersal), or they can oppose regeneration (by destroying seeds or young seedlings). So basically, we expect that if a guild of animals implied in seed dispersal of a plant is removed, the regeneration of this plant species will be compromised."

Because of a dearth in data, Vanthomme and his colleagues did not know which animals spread which plants, but instead had to hypothesize likely ecological interactions.

According to co-author, Pierre-Michel Forget, given the diversity of such, it is almost impossible "to know all the actors involved – we are simply not enough and an army of scientists would be needed for that, just as to describe the diversity on Earth – and what are the ecological services these animals offer to plants".

However, by analysing two plots in the Ngotto Forest, one with little hunting and the other with high hunting, they were able to paint a broad picture of the impact of bushmeat hunting on forests in the region, a "net effect" as Vanthomme puts it.

The study found that a number of key trees – the African star apple *Chrysophyllum africanum*, a species of kola nut tree *Cola acuminat*a, and the *Carapa procera*, a species of mahogany – were all depleted in the high hunting site, most likely because of the lack of necessary seed dispersers. Each of these trees produces large seeds that probably require big mammals and birds to disperse successfully.

Dr Forget said that the study's findings are buoyed by similar studies in South America, showing that trees which hold similar ecological niches also vanish when hunting is high. However, since the study broke new ground, more research is needed to confirm the results and build a more complete picture of how hunting is changing forests, according to the authors. Yet if these findings stand the test of time, it means that forest structure is being changed in ways hardly imagined a few decades ago.

While seed dispersal studies have become almost common in South America and Southeast Asia, Vanthomme and Forget say that studies in Africa have taken time to get off the ground in part because of a lack of field stations and infrastructure in tropical Africa for researchers.

In addition, if researchers are to move forward in their understanding of the complex interactions between animals and plants in rain forests – knowledge that

could prevent species and ecosystems from vanishing – Forget says that local education must be paramount. "[We] need more researchers from tropical countries to describe the diversity and the essential relationships that exist, linking plants to animals. And for that, we need both to educate a young generation of scientists and offer them the most favourable conditions for adequate learning and training to study rain forest ecology. That is the next challenge for educators, politicians and stakeholders if they don't want the rain forest to disappear." (*Source*: www.mongabay.com, 4 November 2010.)

Chimpanzee meat found on sale in the United Kingdom

Chimpanzee meat is for sale in restaurants and market stalls in the United Kingdom in a lucrative black market, authorities said. Officials uncovered the illegal bushmeat from the endangered species while testing samples seized from vendors in the Midlands, the *Daily Mail* reported on Monday.

Bushmeat, which can sell for more than US$15/pound (0.45 kg), is part of a lucrative black market trade that experts say is "rife" in Europe. At least five tonnes of bushmeat arrive in Europe every week to be distributed across the continent, said Marcus Rowcliffe, a research fellow at the Zoological Society of London. "I am not at all surprised that bushmeat is on sale in the Midlands because we know the trade is going on in the United Kingdom and that there is a regular flow of smuggled meat into the country," he said. (*Source*: United Press International, 28 February 2011.)

Bushmeat in Ecuador: market in the rain forest thrives

At an open-air market on the bank of the Napo River in eastern Ecuador, a group of men bid for smoked wild animal parts offered for sale by four native Huaorani women. The women have just arrived here in the village of Pompeya by motorized canoe from their territory across the Napo. Within a day or two, the meat from their rain forest home will be served in restaurants across Ecuador's Amazonia region.

The Pompeya market is the only regular bushmeat bazaar in Ecuador, and business is brisk. A recent report estimated that about 12 tonnes is sold here every year. Quito-based biologist Esteban Suárez says that nearly 50 species are traded at the market, including the agouti – a large local rodent – wild pigs, birds, reptiles and fish. Suárez says the numbers are growing, and the hunting is starting to take its toll.

He is worried about the impact on animal local populations, but is more concerned about the overall health of the forest. Large mammals such as the *agouti* perform critical jobs in a rain forest, dispersing seeds and controlling seed-eating rodents. A forest without its large mammals could be an ecosystem in trouble.

The problem is especially acute because of where the Huaorani live. Their forest territory is in what is now the Yasuni National Park, which harbours among the greatest variety of animal and plant life on Earth. The Huaorani have hunted in this forest for centuries but until recently only to feed themselves.

What is happening now is different. "It is totally illegal," says Ecuadorean wildlife official Javier Vargas. Vargas says the Huaorani have the right to hunt, but only for subsistence. Commercial hunting is not permitted, which may be why it is difficult to find any Huaorani willing to talk about the bushmeat trade.

The Huaorani have been selling bushmeat to outsiders since the 1960s, when Ecuador began to open its Amazonian lowlands to oil drilling. It was a new road, however, built by an oil company in the 1990s, which turned the new commercial hunting from a small problem into a big one. However, it seems no-one foresaw that the road would become a bushmeat superhighway. It created an easy route out of the forest for Huaorani hunters, including free transportation. Biologist Suárez says this means that hunters can bring out a lot more meat.

Vargas says the government has tried seizing all the animals in similar markets elsewhere, and that does not work. Instead, he says the Environment Ministry plans to join forces with other institutions to help fight the issue in a more strategic way. Among other things, they are trying to develop ecotourism and other sources of income for the Huaorani,

Wildlife scientist Esteban Suárez is cautiously optimistic about such plans. But he says the Ecuadorean Government will need to work creatively to protect the forest and its wildlife while also respecting the rights of the people who live there. (*Source*: The World, 15 March 2011.)

CAT'S CLAW

Medical benefits of *uña de gato*, or cat's claw

The Amazon rain forest has been targeted by pharmaceutical companies for over a century as a land of exploration for source materials of new drugs. It is also a treasure trove of botanicals for the herbal supplement industry. Among the many Amazon botanicals that have come to light in recent years, *uña de gato* (*Uncaria tomentosa*), which means "cat's claw" in Spanish, is one of the most promising of all. A woody vine, the plant earns its name because of its preponderance of sharp, claw-like thorns. Dispersed throughout Central and South America, *uña de gato* has been used for centuries by numerous native tribes.

Uña de gato is described by Dr James Duke in his *Amazonian Ethnobotanical Dictionary* as a plant widely used in Peru for anti-inflammatory, contraceptive and cytostatic purposes. In popular literature, it is additionally touted as an immune stimulant, and a large number of studies do in fact show that it offers significant anti-inflammatory and immune-enhancing benefits, and that constituents in the vine may help to inhibit tumour cell formation.

The vine has been known for a long time through the Victorian era explorers. But the plant gained the attention of the European scientific community in the early 1970s when Austrian Klaus Keplinger heard of a remarkable cancer cure attributed to use of the plant. Keplinger spent time in the Peruvian Chanchamayo region of the Amazon, and familiarized himself so well with the plant to become one of the most important scientific authors on its uses. Since that time, researchers have plumbed *uña de gato*'s chemical secrets in search of what might account for its purported healing benefits. Analysis shows that it contains at least five alkaloids, and two other important groups of compounds – quinovic acid

glycosides and triterpenoid saponins. In addition, the plant contains antioxidant polyphenols.

Well-conducted scientific studies appear to validate several of the traditional uses of *uña de gato*. It appears to be safe and non-toxic, and is useful in cases of inflammation, compromised immunity and viral infection. It is a significant aid to relief in cases of both osteo- and rheumatoid arthritis. With further research, the plant may eventually play a broader role in a complementary approach to the prevention and treatment of certain types of cancer. (*Source*: Fox News Latino, 13 January 2011.)

EDIBLE INSECTS

Rebranding edible insects

Edible insect advocate and anthropologist Daniella Martin first tasted insects in Oaxaca, Mexico, when she purchased a small bag of *chapulines*, a tasty treat typical of the region that combines dry-roasted grasshoppers with lime and chilli.

In America, however, "insects need rebranding!" she says. Martin is hoping to do just that by becoming "an edible insect advocate". One of her projects is "Girl meets bug," a Web site where she offers cooking tips on the proper way to prepare larva tacos. She is also part of a loose-knit cricket-eating collective of women who are trying to show that bug eating is not exclusive to eight-year-old boys daring each other in the playground.

Designer Rosanna Yau is another woman who has plans on getting Americans – especially American women – to eat more bugs and did a thesis on whether elements such as branding or packaging would make the concept more palatable. Yau is studying ways that design might help influence Americans to be more open to eating insects such as mealworms.

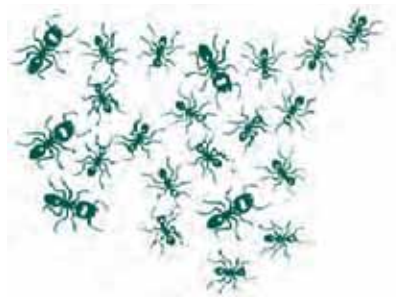
"The biggest challenge is identifying a cultural identity with a product," she said. "Do people identify with insects? How do the people likely to eat insects see themselves? As foodies? As adventurous?"

Yau has theorized about creating brands for foods, such as Opoda, which is an offshoot of the word "arthropod", the word for creatures with crunchy exoskeletons, and experimenting with transparent packaging that would let people see the product, but admits that we may be a few decades from converting the populace into insectivores.

"The question is now, how do you sell something that people are not sure they want?"

Dianne Guilfoyle may have the answer: by having it provide a solution for problems presented by other products on the market. Guilfoyle is working on Bug Muscle, a nutritional supplement for bodybuilders made from the phylum of various bugs. "The exact amount of bugs can differ, but it is 80 percent crickets and grasshoppers," she said. The product's patent is still pending, but Guilfoyle is confident that Bug Muscle will make its way on to the market by the end of the year, mainly because her target market – bodybuilders and cage fighters – is looking for something different from what is on the market.

She adds: "Look at the impact farms have on ecosystems. Insects have much less. As the population increases, we will have to rely on insects for our diet". (*Source*: America Online News, 22 February 2011.)



Los insectos se convierten en una alternativa real contra el hambre

Para muchas personas, los insectos son animales que hay que exterminar, para otras son alimento diario y exquisito. Se evalúa que en el año 2050 la población mundial llegará a superar los 9 000 millones de personas, un número que colapsará las fuentes de alimentos.

Ante esa situación, de la que ya infinidad de científicos vienen alertando desde hace tiempo, expertos de la FAO han decidido promocionar estos animales, tan denostados por algunas civilizaciones y tan requeridos desde hace siglos por otras, como fundamento de nutrición.

Los responsables del Programa de Insectos Comestibles del Departamento de Bosques de la FAO, en Roma, insisten en que no se puede ignorar la eficiencia de los insectos como productores de proteínas, en detrimento de otros animales que se incluyen en la dieta tradicional, pero de los que no todos pueden participar y que, además, provocan graves problemas medioambientales.

Desde hace siglos muchas culturas han mantenido a los insectos como base de su alimentación. En la actualidad, 36 países de África, 29 de Asia y 23 en América consumen alrededor de 527 tipos de insectos diferentes. Entre los más comunes se engloban estos cuatro grupos: escarabajos; hormigas, abejas y avispas; saltamontes y grillos; y por último, polillas y mariposas.

Julieta Ramos Elorduy Blázquez, profesora e investigadora del Instituto de Biología de la Universidad de México, ha dedicado más de tres décadas al estudio de los insectos y sus virtudes alimenticias. Para ello, ha convivido con distintas tribus de México y asimilado los conocimientos de estos pueblos para los cuales los insectos son una tradición gastronómica legendaria.

México es uno de los países con mayor consumo de insectos en su dieta común. Desde hace 500 años se conoce su uso culinario. Los primeros españoles que se establecieron allí enviaban a los reyes de España ilustraciones de esos pequeños animales que eran consumidos, entre los que se encontraban chapulines (saltamontes), abejas, avispas y escarabajos, todos ellos con el nombre en la lengua que cada pueblo hablaba.

Julieta Ramos nos explica que "en la actualidad, se sigue consumiendo en todo el país, en particular en áreas rurales. Incluso, hay algunos insectos que han alcanzado precios muy elevados, como es el caso del gusano blanco del maguey, que cuesta $USD 500/kg, que corresponden a 1.666 gusanos, aunque es una cantidad difícil de obtener dada su escasez".

El valor nutritivo de los insectos es mayor que el del resto de las proteínas animales, sostiene la bióloga, "porque los insectos tienen ciclos de vida mucho más cortos que los que tiene una res". Su contenido en proteínas es comparable al de la carne y su cantidad de fibra es aún mayor. Son ricos en ácidos grasos poliinsaturados de cadena corta, hierro, calcio, vitaminas del grupo B y minerales, por lo que su desarrollo de forma industrial podría ser una importante fuente de alimentación para aquellos países cuyos habitantes sufren de desnutrición.

Para Ramos "es una alimentación que sirve para cualquier país porque los insectos se reproducen geométricamente, es decir que siempre habrá más generaciones de insectos que de vacas, aunque el tamaño sea diferente. Pero a la vaca se le tiene que dar de comer ocho gramos de comida para

ganar uno de peso, y los grillos, por ejemplo, necesitan menos de dos gramos para un engorde similar.

Además, las reses apisonan las tierras y no las dejan ser productivas, y el vaho de su respiración genera gran cantidad de CO_2 lo que provoca un cambio de la atmósfera, porque nunca ha habido pastos tan grandes como los que hay ahora para obtener carne".

A pesar de la idea generalizada que se tiene de los insectos en algunos países desarrollados, donde están asociados a la suciedad, en Estados Unidos hay empresas dedicadas exclusivamente a su comercialización; en Montreal, Canadá se realizan cada año festivales de degustación y en otros países europeos, como España, han abierto sus puertas restaurantes en los que los insectos son los únicos protagonistas de sus platos. Aunque su comercialización masiva parece todavía lejana, llegado el momento esta será, sin duda, será mucho más amplia.

- 925 millones de personas sufren de hambre en el mundo, según cifras actuales de la FAO;
- 578 millones de personas en Asia y el Pacífico padecen hambre; es la región que más presenta este fenómeno.

(*Fuente*: El Tiempo [Colombia], 17 de noviembre de 2010.)

Edible insects produce smaller quantities of greenhouse gases than cattle and pigs

Insects produce much smaller quantities of greenhouse gases per kg of meat than cattle and pigs. This is the conclusion of scientists at Wageningen University in the Netherlands, who have joined forces with government and industry to investigate whether the rearing of insects could contribute to more sustainable protein production. Insect meat could therefore form an alternative to more conventional types of meat.

Cattle farming worldwide is a major producer of greenhouse gases. For the assessment of the sustainability of insect meat, the researchers at Wageningen University quantified the production of greenhouse gases of several edible insect species.

The results of the study were published in the online journal PLoS ONE on 29 December 2010. The research team has for the first time quantified the greenhouse gases produced per kg of insect product. The gases concerned were methane (CH_4) and nitrous oxide ($N2_0$). The results demonstrate that insects produce much smaller quantities of greenhouse gases than conventional livestock such as cattle and pigs. For example, a pig produces between ten and 100 times as much greenhouse gas per kg compared with mealworms. Emissions of ammonia (which causes the acidification and eutrophication of groundwater) also appear to be significantly lower. A pig produces between eight and 12 times as much ammonia per kg of growth compared with crickets, and up to 50 times more than locusts. An additional advantage of insects over mammals is that they convert their food into meat more quickly.

The study indicates that proteins originating from insects in principle form an environmentally friendly alternative to proteins from meat originating from conventional livestock. Further research is required to ascertain whether the production of 1 kg of insect protein is also more environmentally friendly than conventional animal protein when the entire production chain is taken into account. (*Source*: Science Daily, 9 January 2011.)

FODDER

Fodder and browse for livestock

Many species of trees found on farms, as well as forest trees and associated understorey shrubs and grasses, are used for animal feed, either as browse or collected and fed to livestock in stalls. It has been estimated that 75 percent of the tree species (7 000 to 10 000) of tropical Africa are used as browse. Fodder trees contribute in several ways to the overall food and nutritional security of households. First, they make a significant contribution to domestic livestock production, which in turn influences milk and meat supply. Second, fodder contributes to maintaining draught animals and producing manure and organic fertilizer, thereby boosting agricultural production. Tree fodder and browse may consist of leaves, small branches, seeds, pods and fruits, all of which supplement other feeds and which can be a crucial component of livestock diets during the dry season, providing proteins, minerals and vitamins. (*Source*: FAO, 2011. *Forests for improved nutrition and food security*. Rome.)

Livestock feed – a forest provisioning service in the lower Himalayas

India is primarily an agrarian country, with the largest livestock population in the world. In rural India, livestock rearing mechanisms and food production systems are closely integrated in the forest ecosystem in general and the hilly regions in particular. Most of the households in the hilly regions rear livestock of varying numbers and composition, depending on the availability of resources. Uttarakhand represents 1.8 percent of the country's geographic area with a total population of 8.48 million recorded in 2001. The rural population is 74.4 percent and the urban population is 25.6 percent; population density is 159 persons/km². Uttarakhand has 1.18 percent of cattle, 1.25 percent of buffaloes, 0.48 percent of sheep, 0.93 percent of goats and 0.24 percent of the pig population in the country.

Policy development vis-à-vis fodder in India is crucial to curtail the deficit of livestock feed and to conserve the country's forests. To address the issue, data were collected from rural households selected at random from the Nainital district of Uttarakhand. Based on the data collected from 67 selected households, it was clear that the quality of life of the people in the region is poor. The extraction of livestock feed from forests totalled 4 362 kg for 326.45 adult cattle with the per capita consumption of an adult animal at 13.38 kg/day. The fodder extraction from the forest by each household is 65 kg/day on average. This amount of feed from the forest is extracted for the livestock of the region as a forest provisioning service by households. In total, 4 550 919.99 kg/day are required for the livestock of the region. This is a testament to the contribution of forests to the livestock sector, as well as to family welfare. It is important for policy-makers to consider sustainably managing forests, which are under huge pressure

from the livestock sector, as well as opportunities for provisioning proper livestock feed to fulfil the requirements of the poor. Moreover, the palatability of the forest feed in combination and on an individual species basis should be explored locally, keeping in mind the poor quality of livestock in the region.

FODDER COLLECTION, AVAILABILITY AND PREFERENCES

Fodder collection is carried out by women and in some cases children accompany them. In general, fodder and fuelwood collection are practised together. The collection of fodder involves assembling small bundles called *phula*; the total collection comprises seven to eight *phula*/day/person. Fodder collection depends on the size of the herds being reared and available labour; however, the maximum collection of fodder for livestock is nearly 65 kg/day from the forest. Nevertheless, a few households, with only one or two animals and scarce labour, prefer to collect fodder from their own resources. During the summer and rainy season, the villagers collect grass and tree fodder twice a day, while during the winter season only once a day because fodder is scarce.

The most common fodder species collected is oak (*Quercus* spp.) e.g. *Quercus leucotrichophora* and *Q. semicarpifolia*, which are abundantly distributed in the surveyed area and used extensively for fodder. Other tree species preferred include *banj, putli, kaphal, rianj, buransh* and *bhimal*. In the hills, bedding materials (crop residues, leaf litter, leftover forage and feed) are spread in the animal shed and are mixed with dung and urine. The use of raw materials for bedding varies from place to place, depending on forest species, forest condition and socio-economic circumstances. Compost, moreover, is used in crop production at the moderate to well decomposed stage; it is common in the hilly regions.

(*Source*: A. Mishra and R. Pandet. 2010. Livestock feed – a forest provisioning service in the lower Himalayas. Centre of Minor Forest Products for Rural Development and Environmental Conservation. *International J. Forest Usufructs Management*, 11(2). Indirapuram, Dehradun, India.)

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FORAGING

Urban foraging – a look at the deep connections between people and ecosystems

Do you forage for wild fennel? Pluck juicy berries from nearby shrubs? Gather fallen figs, apples, plums, walnuts and chestnuts? Harvest stinging nettles, dandelions, chickweed, watercress or other edible greens? Use Oregon grape or woodland fungi to dye textile fibres? If so, then you just might be an "urban forager".

Foraging is a deeply interactive nature practice that links urban residents to the intricate web of urban ecology while improving overall health and well-being. Urban ecosystems yield a bounty of edible, medicinal and useful plants and organisms important to the diverse communities. Forested woodlands, parks, alleys, parking strips, vacant lots and other areas outside the garden provide habitat for well over 250 native and introduced species of plants and mushrooms in Seattle, Washington (United States of America), some of which are foraged throughout the year. Gathering vegetative material serves many purposes, including: providing food, medicine and raw materials; strengthening social ties; and maintaining cultural identity.

The Institute for Culture and Ecology (a non-profit applied research organization) is currently taking an in-depth look at the diversity of plants and fungi important to people in Seattle. As part of the Green Cities Research Alliance, we are examining the social, economic and cultural importance of foraging and gathering in urban ecosystems and the extent to which foraging practices foster stewardship of plants and habitats. The Seattle Urban Foraging Project has the potential to link planners, land managers and gatherers in ways that build new bridges for urban green-space management that not only supports a diversity of environmental stewardship activities, but also supports broader initiatives of environmental justice.

If you are a forager or interested in participating in this project, please consider getting in touch with the project leader, Dr Melissa Poe (mpoe@ifcae.org). (***Contributed by***: Eric T. Jones, Ph.D., Environmental Anthropologist, Institute for Culture and Ecology, PO Box 6688, Portland, Oregon 97228-6688, United States of America. E-mail: etjones@ifcae.org; www.ifcae.org)

FOOD FORAGERS FIND FUN AND CASH IN THE UNITED STATES OF AMERICA

Hunting may get more attention as a primal human endeavour but, for Connie Green, there is something even deeper and older: gathering. "I think it triggers something in people's brains that we are hard-wired for," she says. It "involves the joy of finding food, and it is really quite beyond our control in some way".

Green is a professional forager. She makes her living gathering wild foods in the woods and selling them to chefs, stores and the occasional very lucky person. Her tramps through northern California yield delicacies such as mushrooms, ferns, elderflowers, salad greens, juniper berries and rosehips. Some of these, especially the mushrooms, can go for hundreds of dollars a pound (0.45 kg).

To share the thrill of that hunt, and a taste of the thrill, Green and chef Sarah Scott have written *The wild table: seasonal foraged food and recipes*. (*Source*: USA Today, 12 January 2011.)

United Kingdom: top foods to forage

Thanks to modern agricultural methods, foraging – once a part of the majority's daily life – has faded away, replaced by regular trips to the supermarket instead. Recently, however, there has been a revival of interest in raiding nature's larder, thanks to increased awareness of the health benefits of wild food.

But for the beginner, foraging should come with a health warning as it is easy to mistake a deadly fungus for an innocent field mushroom. While wild food is generally good for you, taking precautions and getting some tips and advice from experienced foragers are essential.

In addition to mushrooms, berries, nuts, garlic and other wild foods, the following are among the most common foods foraged.

- **Elder.** Also called elderberry, elder is a genus of between five and 30 species of shrubs or small trees constituting the genus *Sambucus* of the moschatel family, Adoxaceae. There are more uses for elderflowers than for any other type of blossom. The aromatic blooms can be eaten raw, cooked, dried or powdered, and added to cordials, wine, salads, fritters, ice-cream, cakes, biscuits, jellies, jams, sweets, tea and meat dishes, as well as to beauty products such as skin lotion and eye cream. Elder bushes are usually covered in sweet-smelling flowers by the end of June, followed by berries between August and October. Elderberries can be put to many of the same uses as the flowers but the leaves and stems are poisonous. Elder is widespread and abundant in hedgerows, woods and at roadsides.
- **Dandelion** or *Taraxacum* is a large genus of flowering plants in the family Asteraceae. They are native to Eurasia and North America, and two species, *T. officinale* and *T. erythrospermum*, are found as weeds worldwide. Both species are edible in their entirety. They might have a reputation for being obstinate garden weeds, but dandelions are versatile, healthy and are freely available throughout the country for most of the year. The whole plant can be eaten: leaves in salads, sandwiches or pies, while flowers (in bloom between February and November) can be used in anything from a risotto to omelettes. The roots can also be thrown into stir-fries or added to vegetable dishes.
- **Nettles** also known as common nettle or *Urtica dioica*, is a herbaceous perennial flowering plant, native to Europe, Asia, northern Africa, and North America, and is the best-known member of the nettle genus *Urtica*. Another plant pariah, nettles tend to be avoided thanks to their well-known propensity for leaving painful welts on the hands of the picker. Among other things, they can be used to make tea, soup, beer and even haggis. Boiling will get rid of the sting. Packed with vitamins and minerals, nettles contain more vitamin C than oranges. Nettles should be harvested before the flowers appear in early spring and only the youngest leaves should be chosen; mature leaves can damage the kidneys. Find them in gardens, woodlands, pastures and orchards.
- **Hawthorn.** *Crataegus monogyna*, known as common hawthorn, is a species of hawthorn native to Europe, northwest Africa and western Asia. Hawthorn used to be referred to as "bread and cheese", as the leaves sandwiched between slices of bread were once a staple food in the spring. The leaves can also be added to salads, made into a tea or munched straight off the branch, while the roasted seeds make a good coffee substitute. Hawthorn berries, bountiful in autumn, make a tasty jam or fruit bread. Hawthorn also has medicinal benefits and can help treat heart and circulation disorders. Powerful bioflavonoids present in the fruit stimulate blood flow to the heart and regulate the heartbeat.
- **Mallow** refers to any of several flowering plants in the hibiscus, or mallow, family (Malvaceae), especially those of the genera *Hibiscus* and *Malva*. Mallow leaves have a mild flavour and a distinctive gummy, glutinous texture, making them good for bulking up salads. By the same virtue, they can be used to treat constipation and diarrhoea, soothing the digestive tract, as well as helping a dry throat or chesty cough. The mauve flowers have a similar flavour and texture to the leaves and are also a good addition to the salad bowl. Mallow is widespread from spring to midsummer in open and sunny habitats such as at roadsides and on pastures.

(*Source*: The Ecologist, 18 March 2011; Wikipedia.)

MUSHROOM FORAGING IS DAMAGING UNITED KINGDOM FORESTS, WARN NATURE GROUPS

The fashion for collecting wild mushrooms began with celebrity chefs and has been encouraged by those with a revived interest in local food. This year's wet summer and mild autumn has produced bumper crops of colourful wax caps, common ceps and luscious chanterelles.

But this new generation of foodies and foragers are beginning to trample the forests and fields that feed them, as well as many animals and insects, warn those who look after the United Kingdom's woodlands and nature reserves. Concern is particularly high at some of the country's best-known beauty spots, including the New Forest, Epping Forest and around the North Downs and the Chilterns. So serious is the problem in some areas that some big collectors, found with bagfuls of mushrooms from one trip, are being prosecuted. In just one weekend earlier this month, forest managers reportedly confiscated 45 kg of fungi at a site near London. (*Source*: www.guardian.co.uk, 24 October 2010.)

Hibiscus

FRUITS

Monkey cola/kola: underutilized fruits of Nigeria

The west and central subregions of sub-Saharan Africa have been known to hold a great array of kola species, among which are the commercial varieties of kola nuts (*Cola acuminata* and *C. nitida*). Monkey kola is a common name given to certain wild *Cola* spp. relatives in the subregions. They include *C. pachycarpa* K. Schum (white monkey kola), *C. lateritia* K. Schum

(red monkey kola) and *C. lepidota* K. Schum (yellow monkey kola). All these yield edible fruits of varying characteristics and sweetness. The species are known in southern Nigeria, where they are common sights in local markets during the peak fruiting season from June to November.

All of the species are identified by various local names in southeastern Nigeria: *achicha* or *ochiricha* in Igbo and *ndiyah* in Efik as well as Ibibio. As underutilized indigenous fruit trees, there is scanty research and information on the monkey kola species. However, the nutritional value of the fruits has been evaluated and quantified by the authors.

Monkey kola fruits have long been among the primary NTFPs of the humid forest belt of southeastern Nigeria. The produce is consumed by men, women and children alike because of the natural tasty pulp, especially that of the species *C. lepidota* and *C. pachycarpa*. The value of these underutilized indigenous fruit trees in meeting the micronutrient needs of local people, in alleviating food insecurity and as a source of income for resource-poor farmers cannot be overstressed. The World Agroforestry Centre states that African indigenous fruit trees constitute one of the best tools readily available for preventing diseases caused by a lack or insufficient supply of vitamins in the diet.

Domestication efforts focusing on finding the most productive species/varieties of these indigenous fruit trees with high nutritive value and good market potential should be further researched. (*Source: Platform for Agrobiodiversity Research Newsletter*, 16 March 2011.)

Cola acuminata

WILD FRUITS OF AFRICA

Most of Africa's edible native fruits are wild. One compilation lists over 1 000 different species from 85 botanical families and even that assessment is probably incomplete. Among all these fruit-bearing plants, few have been selected to bring out their best qualities, let alone deliberately cultivated or maintained through generations.

For all the lack of research and attention in development activities, wild fruits still play a crucial role in Africa's rural areas, especially for young children who are malnutrition's greatest victims. This is because, unlike most grains and vegetables, fruits generally do not need cooking, they require no adult intervention and they are tasty to boot. In this sense, wild fruits are Africa's most nutritionally important resource. Even a few small fruits that are nutritionally dense can deliver large benefits when the rest of the diet is deficient in vitamins and minerals, which is especially the case when it is overly dependent on starchy staples.

A surprising number of wild fruits contribute to countryside nutrition, and also to commerce, as seen in local markets. In Cameroon, for example, surveys identified over 300 trees whose fruits or seeds were eaten, including 200 forest species. In Uganda, 105 wild fruits are recorded as still being used. Similar inventories are documented in enough places to make this a fair reflection of the norm.

Today, however, these wild resources are becoming harder to find. Nearly all activities in African agriculture emphasize the top international crops. Technical interest and professional support for wild fruits are crucial, especially because times are rapidly changing. Fruits contribute most to the quality of eating and their nutrients act catalytically in tiny amounts to help the body employ bulky staple foods most efficiently and effectively. Underexploited fruits can contribute much more to Africa than they do today. (*Source*: Development, Security and Cooperation, 2008. *Lost crops of Africa*. Vol. III. *Fruits*.)

African plum (*Dacryodes edulis*) and its use

The contribution of African plum to improving food security and health as well as alleviating poverty in the local population in the Democratic Republic of the Congo (DRC) is unquestionable. Considering the vastness of the production area in Central Africa, the African plum offers interesting prospects for mobilizing and building capacities for small- and medium-sized enterprises involved in the NWFP value chains.

The African plum can be found growing naturally in forests; it is also artificially planted and managed by humans. It can be planted in orchards or through mixed farming, as in cocoa agroforests. The fruits are either harvested by climbing the trees or mechanically using a hook-like object. Natural harvesting occurs when the fruits drop as they mature. The natural method is especially used for very tall trees and for personal consumption.

Generally speaking, 58 percent of the African plum produced is for commercial purposes, 28 percent for personal consumption, 10 percent for gifts and 4 percent represent losses.

Even though the African plum exists in other provinces of the DRC, the greatest production is in the Bas Congo province; 42.2 percent of the stems in the surveyed area in the DRC are found in domestic gardens, 22.4 percent in secondary forests, and 35.4 percent in fallow land and farms. During the 2007/2008 season, 116 persons interviewed by the Center for International Forestry Research (CIFOR) in 23 villages valued their production at 197 500 kg. Some villages such as Luanza, Konde Divungu and Boko Kinfulama distinguished themselves with production highs estimated at 9 975 kg, 5 750 kg and 3 717 kg, respectively. Kibangu and Boko Disu, the villages with the lowest production, averaged 217 kg and 344 kg, respectively. In the capital Kinshasa, the African plum accounts for more than half the income generated from the sale of NWFPs in households. Among those interviewed, 92 percent generate significant income from the fruit.

The income derived from the fruit in the areas surveyed by CIFOR around Bas Congo and Kinshasa accounts for 31.4 percent of all NWFPs, followed by mushrooms (18.2 percent), caterpillars (13 percent) and *fumbwa* (11.4 percent).

The African plum is principally used for food (95.53 percent) and health (4.47 percent). Used as food, the fruit is consumed after it has been cooked in

warm water, in a frying pan or roasted. It is also consumed separately as a dessert or as an accompaniment to other foodstuffs. The fruits of *Dacryodes edulis*, moreover, have a high nutritive value, with each fruit containing an average of 50 percent lipids, 10 percent protein, 27 percent fibre and 10 percent of sugar on dry matter. Some varieties can have as much as 70 percent in oil content. For health reasons, the leaves, bark and roots of the African plum tree are used to treat toothache, diarrhoea, burns, chronic weight loss, shingles, hiccups, dysentery and the regulation of excess milk in breastfeeding women. Moreover, the African plum is potentially useful in the production of cosmetic and pharmaceutical goods.

The development of the African plum value chain has many opportunities, the most important of which seems to be the existence of big markets that include even people in places far away from the place of production. Handling may be another important strategy to complement the supply. (*Source*: S. Grouwels and O. Ndoye. Policy Brief No. 6, April 2010. *Mobilization and capacity-building for small and medium-sized enterprises involved in the non-wood forest products value chains in Central Africa*. Rome, FAO and CIFOR.) (*This study took place within the framework of FAO project GCP/RAF/408/EC. Please see page 64 for more information.*)

HONEY AND HONEY BEES

Honey is behind new technique to help ulcers heal

A new type of medical bandage using chemicals derived from honey is on trial in Staffordshire, United Kingdom. Early results show that the dressing produces better and quicker effects on long-term wounds than traditional methods.

Julie Stanton, a tissue specialist with the South Staffordshire Primary Care Trust (PCT), said its use could be "life-changing". She said it had had success with seven out of ten patients.

The bandage was developed by Professor Paul Davis, the man who invented the pregnancy test. Speaking to BBC Television, he explained that the honey derivative put both iodine and oxygen into a wound, using two layers of gel that slowly interact. The iodine kills the bacteria in the wound, as does the oxygen, since it empowers white blood cells to kill the bacteria.

Speaking to BBC Radio Stoke, Stanton said she was pleased that the PCT was experimenting with the bandage. She explained that the chemical produced by bees, which is used in the dressing, was integral to the success of the treatment. She said that it was mainly being used in Staffordshire on leg ulcers and surgical wounds that are not healing. "For people with these long-term wounds, life can be appalling and painful. To use something that has this positive effect can be life-changing."

Asked if she was concerned that this treatment costs twice as much as the usual methods, she pointed out that the National Health Service spends 4 percent of its budget treating people with wounds that will not heal. She said the results will be analysed later in the year by the PCT, which would then reassess its use for cost effectiveness.

Honey has been much touted for its medicinal qualities. Scientists hope that its ingredients may also be used to combat MRSA, the "superbug" present in hospitals in the United Kingdom. (*Source*: BBC News, 7January 2011.)

Study produces sweet result for medicine

Honey from an Australian native myrtle (from the genus *Lagerstroemia*) has been found to contain the most powerful antibacterial properties of any medicinal honey in the world.

Medicinal honeys contain an antibacterial agent that can be used to treat wounds and viruses. A team including researchers from the University of Queensland (Australia) and the state government found native myrtle honey has very high levels of the ingredient known as MGO (methylglyoxal).

The chief executive of a company involved in the research, Carolyn MacGill, says the honey could prove useful in treating infections resistant to antibiotics. It will also be beneficial in wound care. "It will have a huge impact, particularly in the wound-care market as these patients become more resilient to the penicillin products," she said. "They need to look for alternatives and fortunately this is a natural alternative that has been available for some time, but unknown." (*Source*: www.abc.net.au [Australia], 1 March 2011.)

United Nations alarmed at huge decline in bee numbers

The UN on Thursday expressed alarm at a huge decline in bee colonies under a multiple onslaught of pests and pollution, urging an international effort to save the pollinators that are vital for food crops.

Much of the decline, ranging up to 85 percent in some areas, is taking place in the industrialized northern hemisphere, resulting from more than a dozen factors, according to a report by the United Nations Environment Programme (UNEP). These include pesticides, air pollution, a lethal pinhead-sized parasite that only affects bee species in the northern hemisphere, mismanagement of the countryside, the loss of flowering plants and a decline in beekeepers in Europe.

"The way humanity manages or mismanages its nature-based assets, including pollinators, will in part define our collective future in the twenty-first century," said UNEP Executive Director Achim Steiner. "The fact is that of the 100 crop species that provide 90 percent of the world's food, over 70 species are pollinated by bees," he added. Wild bees and especially honey bee colonies from hives are regarded as the most prolific pollinators of large fields or crops.

Overall, pollinators are estimated to contribute US$212 billion worldwide or 9.5 percent of the total value of food production, especially fruit and vegetables, according to the report.

Honey bee colony declines in recent years have reached 10 to 30 percent in Europe, 30 percent in the United States of America, and up to 85 percent in the Middle East, said scientist Peter Neumann, one of the authors of the first-ever UN report on the issue. But in South America, Africa and Australia there have been no reports of high losses.

Some of the mechanisms behind the four-decades-old trend, which appears to have intensified in the late 1990s, are not understood. UNEP warned that the broad issue of countryside management and conservation was involved.

Citing research in the United Kingdom, the report estimated that pollination by managed honey bees is worth €22.8 billion to €57 billion in terms of crop yields, and

that some fruit, seed and nut crops would decrease by more than 90 percent without them. (*Source*: AFP in *The Independent* [United Kingdom], 10 March 2011.)

MEDICINAL PLANTS AND HERBS

***Artemisia annua*: largest clinical trial confirms new drug for worldwide malaria treatment**

The largest clinical trial ever conducted has concluded that the drug artesunate should now be the preferred treatment for malaria in both children and adults everywhere in the world. Professor Nick White of the Wellcome Trust-Mahidol University-Oxford Tropical Medicine Research Programme in Bangkok, Thailand, and his colleagues conducted the trial called African Quinine versus Artesunate Malaria Trial (AQUAMAT). Artesunate is derived from a Chinese herb called *qinghao* (*Artemisia annua*).

AQUAMAT found that treatment with artesunate reduced the number of deaths from severe malaria by 22.5 percent compared with quinine. With artesunate treatment, 8.5 percent of the patients died, compared with 10.9 percent with quinine. Children treated with artesunate were also less likely to slip into a deeper coma or have seizures after the treatment was started. Severe hypoglycaemia – dangerously low blood sugar – was also less common in children treated with artesunate. In addition, the drug was easy to administer, well tolerated, and proved very safe.

Thanks to the development of the artemisinin compounds, we now have a safer and much more effective treatment. "We recommend that artesunate should now replace quinine for the treatment of severe malaria in both children and adults everywhere in the world," the *Lancet* journal quoted White as saying. "For those of us who treat malaria in Africa, this trial is a turning point. Finally, we have a better treatment to offer to our malaria patients," agreed Dr Olugbenga Mokuolu from the University of Ilorin in Nigeria. (*Source*: www.thaindian.com, 7 November 2010.)

***Passiflora incarnata* named Medicinal Plant of the Year**

The passionflower (*Passiflora incarnata*) has been named Medicinal Plant of the Year 2011 by a University of Wuerzburg study group on the historical development of medicinal plants.

Passiflora incarnata

The German-based group noted that extracts from the plant helped to relieve nervous restlessness, mild insomnia and gastrointestinal complaints related to nervousness, adding that trials had also shown it to be effective in easing anxiety. Unlike many psychotropic drugs, passionflower has no muscle-relaxing effects, which makes it a good general sedative that can be taken during the day. The group said that the most potent extracts from the plant were from its leaves. Although scientists are not sure what substances are responsible, the main effect is thought to come from chains of molecules called flavonoids that calm and lower anxiety by inhibiting certain neurotransmitters.

Passionflower is native to the tropical rain forests of Central and South America. More than 400 species are known, many of which have edible fruits. However, only the *maracuya* of the *P. edulis* has commercial significance, the study group said.

Every year since 1999, the group has selected a Medicinal Plant of the Year on the basis of an "interesting cultural and medical history" and scientifically demonstrated medicinal effects. (*Source*: Manila Bulletin [Philippines], 24 December 2010.)

MUSHROOMS

Mushrooms in forests and woodlands

Many mushrooms, or the "fruits of fungi", are extremely valuable, wild-gathered products that are utilized for both their medicinal properties and as food. In many of the world's tropical and temperate forests, they are the primary source of income for the people who live there.

These forests range from temperate woodlands and small forests to high altitude forests in the Himalaya and tropical *miombo* woodlands in South-Central Africa. In southwest China, over 200 species of wild fungi in 64 genera are commercially traded, while in Europe and North America, woodlands and small forests are the source of many highly prized mushrooms and an essential resource for small enterprises and collectors. Yet the increased demand for timber has resulted in the rapid expansion of forestry, which in turn has destroyed the natural habitat of many fungi, unbalancing both forest economics and ecology.

Despite the economic, social and cultural values of fungi, there is a general lack of understanding of their importance to local livelihoods and forest ecology. A recent book aims to fill this gap and demonstrates the crucial roles that fungi play in maintaining forest ecosystems and the livelihoods of rural people throughout the world, while providing good practice guidelines for the sustainable management of this resource and an assessment of economic value. The book brings together the perspectives of biologists, anthropologists and forest and woodland managers to provide a unique interdisciplinary and international overview of the key issues. (*Source*: A.B. Cunningham and X. Yang (eds). 2010. *Mushrooms in Forests and Woodlands: Resource Management, Values and Local Livelihoods*. United Kingdom, Earthscan.)

***Enoki*, the winter mushroom**

Enoki (*Flammulina velutipes*), also known as winter mushroom, *enokitake*, velvet stem or velvet foot, is a dark orangey-brown gilled mushroom with an elongated velvety stem, and a cap that can grow up to two inches (5 cm) wide. Like oyster mushrooms, *enoki* grows on dead wood and has a long season, even showing up throughout the winter.

In its wild form, *enoki* looks nothing like the ghostly white supermarket version – those long, thin crunchy fungi that are cultivated in the dark. From above, *Flammulina velutipes* are dark amber-brown to tawny coloured, and slimy-tacky to the touch. But underneath, their caps are light, whitish-gold, and clustered very close together.

Prized in Chinese, Japanese and Korean cuisine, where it is used in soups and stir-fries, *enoki* has been cultivated for hundreds of years.

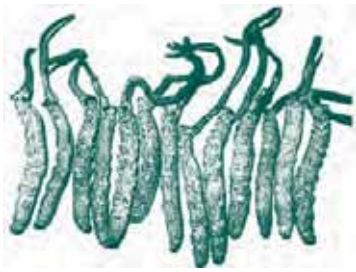
Wild *enoki* can easily be mistaken for poisonous mushrooms such as the deadly *galerina* (*Galerina autumnalis* or autumn *galerina*), a very common little brown

mushroom that grows throughout North America. It also has tacky, brown caps and grows on wood. Unlike *enoki*, which has a white spore print, *G. autumnalis* has a ringed stalk and a telltale brown spore print. (*Source*: *New York Times*, 13 November 2010.)

Collection of the caterpillar mushroom *Ophiocordyceps sinensis* in southwest China

The caterpillar mushroom *Ophiocordyceps sinensis* (syn. *Cordyceps sinensis*) is among the most valuable mushrooms in the world and plays a major role for local economies in its distribution area on the Tibetan plateau and adjacent regions. The mushroom is a valuable income source for the rural poor. Large proportions of its habitat fall into protected areas, and best practices of sustainable harvest are being reviewed to ensure availability for future generations.

A recent study analysed the *O. sinensis* collection in a nature reserve in southwest China. The authors found that harvesting is unevenly distributed among households and villages, with households that have access to the resource but lack adequate alternatives for income generation (such as rewarding wage labour, fertile agricultural fields or harvest of other high-value products) being most involved. Although collection is de jure forbidden, authorities of the nature reserve apply adaptive management strategies for sustainable resource use. This includes the allocation of collection areas to communities, based on their traditional land-use strategies and the control of harvesters from outside, triggering self-policing of the resource by the local people. The strategies applied also provide a promising model for other protected areas where the caterpillar mushroom is collected. (*Source*: C.S. Weckerle, Y. Yang, F.K. Huber and Q. Li. 2010. People, money, and protected areas: the collection of the caterpillar mushroom *Ophiocordyceps sinensis* in the Baima Xueshan Nature Reserve, Southwest China. *Biodiversity and Conservation*, 19(9).)



Cordyceps sinensis

NATURAL DYES

Bloodroot (*Sanguinaria canadensis*)

Few of the wildflowers that appear in Missouri (United States of America) have a stronger connection with past and present human routines than this early spring bloomer. In presettlement North America, bloodroot was immensely popular with many American Indian tribes because of the red sap extracted from its roots, which was used as a clothing dye and for face paint. Bloodroot was also used for a variety of medicinal purposes by American Indians and the early pioneers.

Bloodroot is a perennial, herbaceous, flowering plant native not only to Missouri, but to eastern and North America, from Nova Scotia in Canada to Florida in the United States of America. Bloodroot is also known as bloodwort, red puccoon root, and sometimes pauson and tetterwort (although that name is used in the United Kingdom to refer to greater celandine). The plant is found in rich soils in open broad-leaved woodland and on shaded slopes. Following its flowering period, it produces pods that eventually wither and release seeds on to the ground. Besides its most noticeable characteristic – a white flower with a yellow centre – bloodroot can also be distinguished by its single, lighter-green leaf, which has three to nine lobes. Bloodroot's large, fleshy roots emit the red sappy juice that gives the plant its name.

As mentioned, this juice was used as a face/body paint and as a dye by Native Americans. Warriors painted their faces with it and young girls their bodies. The root juice has been used as a dye for fabrics, producing a yellow-orange colour. Nonetheless, applying the root or juice to the skin is a questionable activity as the plant is known to be an escharotic, a substance that kills tissue.

Native Americans, early settlers and herbal practitioners have prescribed bloodroot for a myriad of medical conditions from skin cancers to sore throats. Its most persistent and possibly valid use takes advantage of the flesh-destroying properties of the root juice or powdered root for treating conditions of the skin such as ringworm, warts, polyps, fungal growths and the like. Today, the plant has an even wider – and much less known – use: it is a key ingredient in many brands of toothpaste and mouthwash because several alkaloids found in the plant (notably sanguinarine) are highly effective at inhibiting the growth of oral bacteria and the build-up of plaque. (*Sources*: various, including Missouri Department of Conservation.)

NATURAL COLORANTS AND DYESTUFFS

Natural colorants and dyestuffs are an important group of NWFPs that find use in industries producing confectionery, other food products, textiles, cosmetics, medicines, leather, fur, paper, paint, ink, etc. One of the publications in FAO's NWFP series (No. 4) reviews the production, markets and development potential of these products and provides information that will help resource managers appraise the future opportunities and constraints for their development.

If you would like to receive a complimentary copy of this publication, please contact *Non-Wood News*. An electronic version is available from FAO's NWFP home page: www.fao.org/forestry/site/6367/en

Caesalpinia echinata

Caesalpinia echinata, also known as *pau brasil* or brazil wood, is a tree species native to Brazil. It is found in littoral forest and woodland, generally on sandy or sand-clay soils that are well drained, preferring less dense forest, frequently in dry high areas.

The species is famous for the dye extracted from the heartwood. *Pau brasil* was in fact an important source of fiery red colorant during the Middle Ages. Enormous quantities of dye wood were exported between 1501 and 1850, causing the loss of large areas of forest and enslavement of Indians. Exports of brazil wood, including the heartwood of a number of related species from Central and South America to the United States of America and western Europe, declined after the 1950s, in part resulting from the manufacture of synthetic dyes. The extent of the current trade is not known and it is unlikely that brazil wood will be exploited as a source of dye other than on a small scale.

The remaining stands of the species exist in a few areas on coastal plains, where deforestation rates are rampant. Illegal extraction of *C. echinata* by farmers and foresters is still thought to occur. The species was included on the official list of threatened species in Brazil in 1992.

Two protected areas in Bahia and Pernambuco were set up specifically to

protect populations of *C. echinata*. The species is also recorded in other public and private reserves. It is in cultivation in Bahia, Pernambuco, Alagos and Rio de Janeiro and there is also a reintroduction programme at Linares Reserve. Various federal and state laws exist, restricting the export and cutting of *C. echinata* or its habitat type. However, there appear to be considerable loopholes and a lack of specific measures to protect the species.

In addition to its use as a dye, the heavy timber has considerable value for use in construction work, carpentry and handicrafts, but its most commercial application is in the manufacture of bows for musical instruments. The bark is of local importance for its medicinal properties. (*Source*: Tree Conservation Information Service, UNEP Web site.)

NUTS

Shea nuts appear safe in allergy study

Shea butter is in everything from nappy cream to tissue paper, but the US Food and Drug Administration considers shea nuts – from which the butter derives – to be tree nuts and therefore potential allergens. A new study suggests, however, that shea butter poses little, if any, allergy risk to people who use products containing the substance.

The allergy triggers in other tree nuts and in peanuts are proteins. For nearly 2 million Americans, the immune system recognizes these proteins as harmful and launches an attack to rid the body of the molecules. If the assault is severe enough, the result can be an anaphylactic reaction marked by potentially deadly failure of the airways, although the number of deaths in the United States of America linked to nut allergies is small – about a dozen annually.

Dr Kanwaljit K. Chawla, a paediatrician in training at the Mount Sinai School of Medicine in New York City, said she became curious about the potential for shea butter to trigger nut allergies, while researching the safety of baby products.

Shea nuts are mostly fat, but Chawla and her colleagues decided to see if they could extract any proteins from the nuts and whether these shea proteins would provoke an immune response. Even trace amounts of nut proteins can still pose problems for people susceptible to the substances, so Chawla's group tested the ability of shea protein to trigger an immune reaction. Using blood taken from several volunteers with known allergies to nuts, the researchers found that the principal immune molecule that would usually invoke an allergic response, immunoglobulin E, barely bound to the shea protein. In other words, Chawla said, although shea nuts in theory could be an allergy trigger, the evidence from her study suggests they are not. At least the immune system does not appear to recognize them as a nut protein. What is more, since Americans typically do not eat shea butter – it can be an ingredient in European chocolates – the risk is likely to be even smaller, Chawla added.

The researchers reported their findings as a letter to the editor in the latest issue of the *Journal of Allergy and Clinical Immunology*. (*Source*: Reuters [UK], 22 December 2010.)

***Dika* nut: the taming of the *dika*, West Africa's most eligible wild tree**

When forests are cleared in West Africa for firewood or for farmland, the *dika* trees (*Irvingia barteri*) are, more often than not, left untouched. Farmers have too much to gain from harvesting the tree's fruits and seeds to burn or discard a tree found in the wild.

Indigenous to West Africa, the *dika* tree can grow to be as tall as 40 m and produces a small green and yellow fruit that looks, at first glance, like a small mango.

Its fruit ranges in taste from sweet to bitter and can be enjoyed, especially the sweeter varieties, fresh off the tree, or made into jelly, jam or "African mango juice".

But while the fruit is a delicious treat, the seeds are where the real value is to be found. Resembling smooth walnuts, *dika* seeds are cracked open by harvesters to collect the edible kernel contained inside. These kernels can be eaten raw or roasted, but most are processed and pounded into butter, compacted into bars or pressed to produce a cooking oil.

The seeds also produce a unique flavour when crushed and are combined with spices to make "ogbono soup", a common dish. The wide popularity of ogbono soup has created a large market for *dika* seeds and harvesters can trade the kernels on both the local and regional scale. Out of season, the seeds bring in an especially high price – it has been estimated that a farmer can make up to US$300 from the seeds produced by just one tree.

Each year, thousands of tonnes of *dika* nuts are harvested throughout western Africa and the popularity of this wild tree has led to many attempts at commercial cultivation. It is a slow maturing plant – it takes ten to 15 years for a tree to begin bearing fruit. Breeders, motivated by the value of its fruit, are working on developing faster growing varieties as well as varieties with shells that are easier to crack open. But whether or not the *dika* is successfully tamed by breeders and made more commercially viable as a domestic crop, the tree in the wild is already providing a critical income for millions of farmers and harvesters throughout West Africa. (*Source*: World Watch Institute, 18 October 2010.)

OLEORESIN

***Copaifera* trees**

Developing sustainable extractive industries in otherwise intact tropical forest regions requires a sound understanding of the production potential of key resource populations. The oleoresin extracted from *Copaifera* trees is an economically important NTFP harvested throughout the lowland Amazon basin.

The authors of a recent paper studied oleoresin extraction from four species of *Copaifera* trees with known harvest histories within two contiguous extractive reserves in western Brazilian Amazonia. They conducted a large-scale experimental harvest of 179 previously unharvested *Copaifera* trees, in both seasonally flooded (*várzea*) and adjacent unflooded (*terra firme*) forests.

The likelihood of trees yielding any oleoresin was principally determined by their species identity: *Copaifera multijuga* was the only species regularly to yield oleoresin (70 percent of trees). Yield volumes varied both among species and forest types: *C. multijuga* (restricted to *terra firme* forest) had the highest mean yield of 505 ml, while *C. guyanensis* produced higher volumes of oleoresin in *várzea* (139 ml) than *terra firme* (15 ml) forest. Intraspecific differences were driven mainly by tree size. To assess

extraction sustainability, the authors reharvested a sample of *C. multijuga* trees and compared the oleoresin production of 24 conspecific trees that had been initially harvested one year previously, with that of 17 trees initially harvested three years previously. Reharvested trees produced just 35 percent of the oleoresin volume compared with that when originally drilled, but this response was not affected by the time interval between consecutive harvests. The research demonstrated that, within a population of *Copaifera*, both morphological and environmental factors restrict total productivity; consideration of these factors should inform sustainable management practices. (*Source*: P. Newton, A.R. Watkinson and C.A. Peres. 2011. Determinants of yield in a non-timber forest product: *Copaifera* oleoresin in Amazonian extractive reserves. *Forest Ecology and Management*, 2: 255–264.)

PALMS

La palma *Brahea dulcis* (Kunth) Mart. en México

Hoy en día las especies proveedoras de productos no maderables, constituyen una parte importante en la economía de muchos países, debido a que proporcionan ingresos directos a muchas familias que habitan en zonas rurales. Tal es el caso de la palma *Brahea dulcis* (Kunth) Mart. en México, conocida comúnmente como palma soyate, la cual es un producto forestal no maderable (PFNM) que actualmente se cosecha en forma silvestre en algunas partes de México, y se distribuye hasta Guatemala. Estas plantas alcanzan una altura de 9 metros, puede crecer de dos maneras, como una palma de tronco único o en grupos arbustivos que alcanzan hasta 10 metros de diámetro y cada planta producen en promedio 12 ± 2.5 hojas al año.

Esta palma tiene gran importancia para las poblaciones indígenas y mestizas del país, debido a que durante mucho tiempo les ha provisto de alimento, vestido y vivienda, además de servirles para fines artesanales y mágico-religiosos.

En la zona central de México las hojas nuevas de *B. dulcis* son extraídas de ecosistemas naturales, principalmente selvas bajas y encinares. En Hidalgo, la planta ha sido ampliamente utilizada por la comunidad otomí para procesarlas y transformarlas en diversos artículos, presentando, al menos en esta zona, 26 usos.

Sin embargo, a pesar de que estudios en esta zona han demostrado que potencialmente este recurso puede aprovecharse de manera sostenible existen normas que limitan su aprovechamiento, principalmente por la ausencia de información básica (biológica, ecológica y cultural) y por el mal diseño de los reglamentos de aprovechamiento de ésta. La reglamentación actual señala que debe tenerse un permiso de aprovechamiento para cortar hojas de esta palma dentro del área de la Reserva, y ante la imposibilidad operativa de obtenerlo hay desconformidad por parte de los pobladores locales quienes han realizado esta actividad durante décadas.

La gran facilidad que esta especie tiene de adaptarse a zonas perturbadas y con poca precipitación, la variedad de usos y la omnipresencia de productos hechos con esta palma en muchos mercados en México, la convierte en una de las especies de palmas más útiles de ambientes semiáridos de México. (***Aportación hecha por***: Mayte Coronel Ortega y María Teresa Pulido Silva, Universidad Autónoma del Estado de Hidalgo, Mexico.)

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Aprovechamiento del mbokaja (*Acrocomia aculeata*) (Jacq.)

El mbokaja (*Acrocomia aculeata*) (Jacq.) es una palmera perteneciente a la familia Arecaceae, nativa de la vegetación de Paraguay y Brasil, es una planta de amplia distribución. Posee un estípite que puede oscilar entre 10 a 15 m de altura y 20 a 30 cm de diámetro, región donde presenta una cobertura de espinas cerca de 10 cm de largo de color oscuro. Las hojas verdes, ordenadas en diferentes planos dando un aspecto plumoso a la copa, son pinadas con una longitud de 4 a 5 metros, presentando aproximadamente 130 foliolos de cada lado y espinas en la región central. La inflorescencia es un espádice, con 50 a 80 cm de longitud, protegidas por una espata de color castaño. Las flores son amarillas y unisexuales, el fruto es una drupa globosa que en época de maduración se torna de color amarilla a naranjo.

La fructificación ocurre todo el año, y los frutos maduran en los meses de septiembre a junio. Los principales polinizadores son Coleópteros, como la familia Curculionidae, Nitidulidae y Escarabaeidae.

El fruto es una drupa globosa de diámetro variado entre 2,5 a 5 cm, constituida por un pericarpio quebradizo cuando maduro; mesocarpio fibroso, mucilaginoso, azucarado y rico en glicéridos de coloración amarillo-naranja; el endocarpio está fuertemente adherida el mesocarpio, posee una estructura ósea de coloración oscura y un espesor de aproximadamente 3 mm, dentro de la cual está contenida la almendra oleaginosa comestible, cada fruto generalmente contiene una almendra, pero rara vez presenta bipartición.

La planta prefiere suelos arenosos, profundos y bien drenados, derivados de areniscas, aunque también puede crecer en suelos derivados de basaltos. La topografía donde crece tiende a ser plana o levemente ondulada. No crece en suelos bajos y de naturaleza hidromórfica que sean pesados y mal drenados. El rango de pH óptimo para el buen desarrollo del mbokaja está entre 5,5 a 6,5, y un contenido de arena de 60 a 75%.

La producción de aceite, de genotipos naturales de mbokaja, puede llegar a 4 toneladas por hectárea año, esto es, sin ningún manejo y sin ninguna planificación. Dando mayor observancia a su capacidad de adaptación en condiciones donde otros cultivos tendrían problemas para su establecimiento, como ser, entre otros, acidez elevada y bajo nivel de fertilidad, el mbokaja se desenvuelve y prospera. Esto le da un valor significativo como una opción, tanto para la diversificación del cultivo, aprovechamiento de superficies degradadas como alternativa para forestación. (***Aportación hecha por***: Maura Diaz (maisdile@gmail.com), Ariel Antonio González Duarte (noeledsoid@hotmail.com) y Prof. Dra. Maura Isabel Díaz Lezcano (maisdile@yahoo.es), Facultad de Ciencias Agrarias, Universidad Nacional de Asunción, Campus de la UNA, San Lorenzo, Paraguay.)

PINES

Chilgoza trees dwindling fast in Himachal, India

The *chilgoza* pine trees (*Pinus gerardiana*) – a source of livelihoods for many people in the tribal areas of Himachal and an integral part of the local economy – are dwindling fast because of the reckless overextraction of pine seed, said Rinki Sarkar, an economist and livelihood expert in New Delhi, India.

Based upon extensive research involving ethnographic and household surveys from 2009 to 2010 in the *chilgoza* belt in Himachal (including 13 villages of Kinnaur, Bharmour and Pangi), Sarkar submitted a report to the Forest Department on the tree's status. Sarkar said: "I stumbled upon the *chilgoza* tree in 2009 on a visit to Kinnaur while doing research on common property resources and was fascinated by the well-organized mechanism of collection of the pine seeds and cones, and the equitable sharing of the profits from the seeds by the natives".

The seeds, collected tediously, were once largely used solely for self-consumption, but with the rising commercial value, people started auctioning the extraction process to contractors, who in turn engaged inexperienced migrant workers or labourers to extract the seeds from the cones. Excessive extraction and careless chopping of branches and twigs have led to a reduction in the forest stock and prevented the natural regeneration of the trees, which take almost ten years to grow 1 foot (30.5 cm). Besides uncontrolled cutting, the extensive grazing on land was also causing a reduction in the regeneration of the pines.

Seeking intervention of the community as well as the State Forest Department in the regeneration of the species, Sarkar said innovative plantation strategies were needed to conserve the species and generate awareness at the grassroots level of sustainable practices where the community could be involved to protect the species from dwindling.

Development activities have seriously affected the species in the areas of Kinnaur and Bharmour, in addition to adverse climatic conditions. Pangi, which is still relatively untouched by developmental activities, still has a larger portion of *chilgoza* trees compared with Kinnaur and Bharmour. (*Source*: *The Times of India*, 25 January 2011.)

White-bark pine in the United States of America and the grizzlies

Doug Peacock has been a tireless defender of the Yellowstone grizzly for decades, but he believes the bear may now be facing its toughest threat yet.

A close encounter with a grizzly many years ago led to what was to become Peacock's life's work: documenting the grizzly on film and in books (including *Grizzly Years* and *The Essential Grizzly*) and fiercely advocating its protection. Now Peacock is warning against what he sees as the greatest threat yet to the grizzly's future: the loss of white-bark pine (*Pinus albicaulis*), a major food source for the bear. Warming temperatures in the Rocky Mountains have led to a proliferation of the pine beetle, an insect that destroys the trees, wiping out vast swaths of white-bark pine. In an interview with Yale Environment 360, Peacock talks about why the demise of white-bark pine will lead to more contacts between grizzlies and people, and why the grizzly needs to be protected under the Endangered Species Act.

"In the last five years, steady warming temperatures have allowed the mountain pine beetle to move up a life zone to where the white-bark pines live. The mountain pine beetle has been around a long time. Until now, it has mainly affected lodgepole pine up here, and lodgepole pine has evolved some defence to it. That same genetic material is present in white-bark pine, but it has not evolved a defence. And that is because it had not been invaded before [by the pine beetle], because we had winter temperatures that dropped to -30 to -35 for four or five days in a row up in that high country and the larvae of the pine beetle cannot winter over. But, since 2002, those temperatures have warmed to the point where the pine beetle can winter over. The last studies concluded that in the greater Yellowstone ecosystem, which is a much bigger area than the national park, 82–83 percent of the white-bark pine trees were either dead or dying. And a lot have died since," says Peacock.

"So what we are talking about is probably the total loss of white-bark pine in this ecosystem. We do not know if we are going to have any trees left in three or four years. And as far as the grizzly bear is concerned, that means the nut of the white-bark pine cone is lost forever as a food source," he added.

While some wildlife management officials are saying that the grizzlies will adapt and find other food sources to eat to replace the pine nuts, Peacock says it is a very contentious area. "White-bark pine is incredibly nutritious. With the loss of the white-bark pine as a food source, the carrying capacity – which is how rich the habitat is for bears – is going to be greatly diminished. And for bears to survive, basically they are going to need a much larger area to forage in," explains Peacock. (*Source*: Yale Environment 360, 19 January 2011.)

RATTAN

World Wide Fund for Nature (WWF) showcases sustainable rattan use amid design revival

Natural rattan belongs to the design classics and it is making a comeback in design circles. Unfortunately, conventional forestry practices may damage tropical forests when the rattan is harvested. To avoid this forest destruction, WWF has set up a European Union (EU)-funded programme for the sustainable production and processing of rattan in the Mekong region. An innovative collection of rattan home accessories is being showcased this week at the international design fair *Ambiente* in Frankfurt/Main.

WWF is working with Swedish designers, graduates from Lund University, in cooperation with local companies, to develop rattan products that are suitable for the international market. These products range from doormats made of rattan waste to foldable baskets, and a unique rattan lounge chair.

In addition, WWF has analysed the worldwide trade flows of rattan. The key

points of a scientific study launched today include the following: between 2006 and 2008, global trade declined by 26 percent as a result of dwindling rattan resources and forest loss. Indonesia is the most important exporting country in the world, with a market share of 80 percent.

The major buyers are the EU and China. Viet Nam plays an essential role for the EU market, exporting mainly to Germany and France. Viet Nam is also a major importing country – suppliers are the Lao People's Democratic Republic, India, Cambodia and the Philippines.

Rattan species are members of the palm family and grow climbing and winding themselves around other vegetation; some varieties can grow to lengths of more than 100 m.

"Forests with such a wide variety of flora and fauna, which have disappeared in other regions of the world, still exist in the Mekong region," said Thibault Ledecq, WWF Sustainable Rattan Regional Programme Manager. "More than 1 000 new animal and plant species have been discovered in the Mekong region in the last ten years alone." But many of these rattan resources are being overexploited, leading to a decline of many rattan species, prompting WWF to create the Sustainable Rattan Programme in Cambodia, Lao People's Democratic Republic and Viet Nam five years ago.

The objectives of the programme are to manage the tropical forests containing rattan in accordance with the Principles and Criteria of the FSC (Forest Stewardship Council), and to promote and implement the United Nations' principles of "Cleaner Production". These include the optimization of material and energy flows, minimizing waste and water contamination, and reducing emissions. "Sustainable rattan only has a chance if there is a market for it and if the forests where the rattan grows are still standing," explained Ledecq. He is convinced that "with credible forest management, responsible trade and consumer awareness we can ensure that this fascinating natural raw material has a future".

The WWF Sustainable Rattan Programme receives 80 percent of the programme's total budget of €2.4 million from the EU SWITCH-Asia Programme of EuropeAid Development and Cooperation. SWITCH-Asia aims at scaling up environmentally friendly production and consumption practices. The Sustainable Rattan Programme is successfully serving this purpose by reaching out to all actors along the rattan value chain and encouraging certification. IKEA cofinances the Programme. (*Source*: WWF, 12 February 2011. http://wwf.panda.org/wwf_news/?199309/WWF-Showcases-Sustainable-Rattan-Use-Amid-Design-Revival)

"SUSTAINABLE RATTAN IN THE GREATER MEKONG REGION": BRIEF PROJECT PROGRESS REPORT

During the last six months, the WWF team and its partners, with support from the three governments, have made a significant impact on forest inventory and management in the region (Lao People's Democratic Republic, Cambodia and Viet Nam), with today more than 31 992 ha of forest inventories and management and 120 ha of rattan plantation and enrichment forest planting.

The first 1 200 ha of forest has been granted by the Department of Forestry (DOF) of the Lao PDR under the FSC Group certificate. The DOF would like to promote and scale up a sustainable rattan management approach in the country.

One hundred villages from the three countries have set up groups and half of them have received training on rattan resource management, business and market links as well as cleaner production management. More than 50 rattan processing and trading companies from the Lao PDR, Cambodia and Viet Nam are engaged in the project to adapt cleaner production techniques, as well as sourcing from more sustainable rattan management areas. The project and partner (Vietnam Cleaner Production Centre [VNCPC]) are now developing new cleaner rattan production techniques that are expected to be used by rattan companies from the region but also from other countries such as Indonesia. Regional market and business links between Vietnamese and Laotian companies have been established, but are not as secure yet as with Cambodia.

In terms of policy, a gap analysis has been carried out in the three countries with the stakeholders and with the support of governments.

During this period, the project has assisted the Government of Viet Nam to set up the Bamboo and Rattan Master Plan. The project will also pilot the rattan supply chain amendment in 2011. (***Contributed by***: Mr Thibault Ledecq, WWF Sustainable Rattan Regional Programme Manager, WWF Lao Country Office, BP 7871 Vientiane, Lao PDR. E-mail: thibault.ledecq@wwfgreatermekong.org)

SPICES

What is forcing the prices to rocket in spice world?

After a series of natural calamities and poor harvests, the prices of spices from ginger to nutmeg have rocketed in one of the hidden stories of global food inflation. Traders and brokers reported that prices of some spice staples have increased more than tenfold over the past five years and in turn hit food manufacturers and consumers. Speculators have joined the fray, encouraged by high prices and poor returns on the financial markets, leading to hoarding and pushing up prices.

Several years of hurricanes and devastation in major spice-growing areas have led to a perfect storm of circumstances that have contributed to the price rises. Cyclones that hit Madagascar destroyed vanilla crops, hurricanes in the West Indies affected nutmeg and unpredictable monsoons in India cut chilli harvests.

In the United Kingdom, prices have followed the upward trend in the £250 million a year herb and spice market where demand is fuelled by a growth in ethnic cooking and health concerns. Reducing the salt level in diets has resulted in an increased use of spices, said Anthony Palmer, General Manager of Schwartz (a United Kingdom spice supplier).

The spice trade represents a small subsection of the food supply chain where prices have been volatile recently because of extreme weather. The last food price crisis, in 2008, quickly dissipated as the world entered recession, demand fell and farmers shifted into production of higher-priced crops.

Cardamom

Cardamom. Highly popular in the Middle East, cardamom was originally grown in southern India but is now grown elsewhere, including Sri Lanka and Guatemala. Yields in Sri Lanka were down sharply this year because of heavy rains that caused flooding and landslides. However, demand for the crop has remained buoyant in the Middle East. It is used heavily in sweets and the early Ramadan holiday meant that supplies were snapped up. The crop was also disrupted in Guatemala.

Coriander. Although the price for coriander (one of the first spices ever used by primitive cooks), has been largely flat over the year, there has been a sharp spike in recent weeks. The relatively stable price, compared with some of the other most popular spices, has been attributed to its diversity of supply. It is grown in eastern and southern Europe and in North Africa and the variety of growing conditions and locations has levelled out short-term spikes in price and production. The price has spiked in India over the last couple of weeks in part owing to the late monsoons that affected growing conditions and cut production.

Paprika. While the price has been driven up by increasing producer prices in Peru, brokers in Europe blame the rise in domestic prices on stricter pesticide and toxin rules that have restricted supply. Originally grown in Central America, the supply of paprika to European consumers is dominated by a small group of family businesses in Murcia, Spain, who buy up a large proportion of the world's crop for processing. Brokers say rules have tightened over the last five years, preventing much of the crop being sold in Europe and hence driving up the price.

Cinnamon. An earthquake in 2009 in Indonesia damaged a number of plantations, causing major disruption to the cinnamon crop, which contributed to supply problems and drove up prices. The damage to the trees has a long-term significance: the spice is obtained from the inner bark of trees that take some 15 years to mature. Analysts also reported that competing crops, such as coffee and cocoa, were being planted instead, to increase returns for farmers.

Cumin. Cumin has been relatively expensive for the last couple of years, with too little of the crop grown to satisfy demand, particularly in India, where it is a staple of Indian cooking. Spice brokers say the trade in cumin has been highly influenced by speculation, notably in India, the source of a majority of the world's spices and the centre of their trade. The nature of farming, with thousands of backyard growers each supplying a few sacks to cooperatives, has also contributed to the volatility of supply and pricing.

Ginger. The price of ginger has been hit by both strong demand in China and a smaller than expected crop in India. While it is native to these two countries, and they are two of the key producers of the crop, it is now also produced elsewhere in Asia, West Africa and the Caribbean. As a root spice, it is susceptible to damage from flooding. In November last year, China's Commerce Ministry blamed hoarding and speculation for driving up prices. The food industry said that Nigeria was only slowly releasing supplies to achieve top prices.

Turmeric. Turmeric, another root spice, had a smaller annual crop last year. It is an integral part of Indian cuisine, used in most meals, with few alternatives to its use (when used to colour foods, it is much cheaper than one alternative, saffron). As well as being used for colouring, it is used in India as an aid to digestion, for skin conditions and for other medicinal purposes. Much of the smaller supply is taken for domestic use in India, thus driving up the prices for export.

Nutmeg/mace. Historically both highly prized and expensive, the prices of nutmeg and mace, from the same tree, have increased sharply. Supply is dominated by Indonesia and Grenada. After nearly 50 years without suffering from a hurricane, Grenada was hit by two in 2004 and 2005. Trees were destroyed and the long growing period until they can be harvested has meant that its nutmeg industry, the world's second largest, has not yet fully recovered. Indonesia, the world's largest producer, has been unable to pick up the slack. (*Source*: *The Independent* [United Kingdom], 18 February 2011.)

NUTMEG

Nutmeg is a spice from the nutmeg tree, of the genus *Myristica*. The most important commercial species is *M. fragrans*. Nutmeg is native to several Indonesian islands, particularly the Banda islands in the Moluccas, also known as the Spice Islands. *M. fragrans* is also grown on the island of Penang in Malaysia, in Grenada (the Caribbean) and in Kerala, a state in southern India.

The nutmeg tree bears a fruit from which two spices are derived: nutmeg and mace. Nutmeg is the "seed" of the tree, measuring some 20 to 30 mm long and 15 to 18 mm wide; it can weigh anything from 5 to 10 g when dried. Mace is the surrounding lacy aril or reddish covering of the seed. This is the only tropical fruit that is the source of two different spices.

The first harvest of nutmeg trees takes place some seven to nine years after planting; the trees reach full production after roughly 20 years. Nutmeg is generally consumed in powdered form, even though several other commercial products are derived from the tree, including essential oils, extracted oleoresins and nutmeg butter.

Nutmeg also boasts several health benefits. It contains the antioxidant eugenol, as well as vitamin A and potassium; it has been used since ancient Roman times to enhance memory function. It relieves stress and stimulates concentration. Used to relieve stomach pain and arthritis in Chinese medicine, nutmeg oil increases circulation, relieves pain and stimulates the liver. The spice is also known to boost kidney function, as well as for its antibacterial and anti-inflammatory properties. (*Sources*: various.)

Spice up your health, cancer researcher advises

Bharat Aggarwal, a professor of experimental therapeutics at the University of Texas MD Anderson Cancer Center (United States of America), began studying the cancer-fighting properties of curcumin – the active ingredient in turmeric – in the 1990s. Back then, he says, it was hard to get his colleagues to take him seriously; he recalls

one oncologist politely shooing him out of his office when he tried to share his findings.

These days, however, his is an expanding field of research. The scientific community is discovering the medicinal powers of not just turmeric, but all kinds of spices.

In his new book, *Healing Spices. How to Use 50 Everyday and Exotic Spices to Boost Health and Beat Disease*, Dr Aggarwal draws upon scores of studies to show how various spices can help prevent or treat specific ailments. Researchers from the Harvard School of Public Health, for example, discovered that people living in India had a 51 percent lower risk of heart disease if they cooked with mustard seed oil compared with those who cooked with sunflower seed oil. Japanese researchers found that mint extracts can prevent the release of histamine, the chemical that causes allergic symptoms such as watery eyes and stuffy noses. Scientists in Denmark found that eugenol, or oil of clove, is more effective as a blood thinner than aspirin. Cinnamon has also been shown to improve one's memory and ability to focus.

"When there is any kind of disease, people think drugs are the only solution. Spices are the last thing they ever think about because, especially in the Western world, it is not a part of their lifestyle," says Dr Aggarwal. "But spices have been used quite extensively in history. Now, we are actually providing scientific evidence that their medicinal value is indeed real and they can be used for a wide variety of diseases." (*Source*: The Globe and Mail [Canada], 23 January 2011.)

VEGETABLE IVORY

Assisting small farmers in Ecuador

Tagua nuts (harvested from a tree species called *Hyphaene phytelephas*) come from the ivory palm tree (often called vegetable ivory for its similar properties), which grows only in the Amazon rain forests. Once it reaches maturity, a tree will bear fruit for up to a century.

The 20–50 cm fruit from the ivory palm is called a *mococha*. It is collected from the forest floor after it falls from the tree and animals take care of removing the tough outer husk. The individual nuts are then removed from the fruit and dried in the sun for six to eight weeks before they can be worked. They can then be sliced, cut and dyed as required.

Individual nuts are removed from the fruit by hand. Before the invention of plastics, *tagua* nut was used for buttons, dice, chess pieces, etc. Now it makes great fashion jewellery, handmade by fairtrade cooperatives such as Camari in Ecuador (www.camari.org/).

Camari is a Quechua word meaning "please" or "gift". Camari was formed in 1981 to assist small farmers and the urban poor to market their agricultural and craft products. Working with Camari benefits approximately 15 000 families around the country; they are particularly focused on the development of products that have no negative impacts on the environment. In addition to product marketing, they also provide credit and technical assistance and training to individual artisans and farmers. (*Source*: Oxfam Ireland, 23 September 2010.)

New business creates products from rain forest *tagua* trees

Ken and Mako Friedenberg have been in the Naples area of Florida (United States of America) for only a few months, but already the husband and wife team have found a following. Their company is called La Tagua (www.latagua.com) and it comes to southwest Florida by way of the Amazon rain forest. While many products from the Amazon previously have come under fire for being destructive, La Tagua has the opposite effect, they say.

"Our product falls off the *tagua* trees (in the Amazon) naturally, so there is no damage to the natural resources in harvesting the nuts of the seeds, which are the size of hen eggs," said Ken Friedenberg. "The raw materials we use are from the rain forest and we wanted to be closer to our natural resources, which made southwest Florida a desirable place for us to live."

A full-grown *tagua* tree can grow to 65 feet (19.8 m) and yield enormous, knobby wooden fruits. When cracked open, the fruit reveals several hen-egg sized *tagua* nuts, which are seeds of the tree. *Tagua* seeds can grow into seedlings or be carved into vegetable ivory products. In the small South American communities where it grows, *tagua* provides a valuable economic and cultural service for indigenous people, allowing them to exist in their traditional lifestyles.

La Tagua products closely resemble ivory, but are far less expensive than ivory and do not affect the environment negatively. (*Source*: www.naplesnews.com [United States of America], 6 January 2011.)

WILDLIFE

World Bank President announces Wildlife Premium Market Initiative

World Bank President Robert Zoellick announced a Wildlife Premium Market Initiative, which will provide additional incentives to protect endangered animals as part of financing for REDD+.

Speaking at an event entitled "New Pathways and Partnerships to Advance REDD+" sponsored by "Avoided Deforestation Partners" during the Cancun (Mexico) Climate Change Conference, Zoellick explained that the Wildlife Premium Market Initiative will focus on species such as tigers, lemurs, elephants, great apes and others that require large forest areas. The Initiative aims to complement REDD+ programmes by giving value to forest wildlife and make payments to local communities for wildlife protection.

Other speakers at the event, including UN Secretary-General Ban Ki-moon, Conservation International CEO Peter Seligmann and UNEP Executive Director, Achim Steiner, stressed the need to act now to protect the world's forests. Zoellick also stressed that a formal decision on REDD+ in Cancun would help scale up efforts in forest conservation and wildlife protection, but that interested parties should proceed with actions in any event. (*Source*: International Institute for Sustainable Development [IISD], 8 December 2010.)

DVD – *The Wild Meat Trail*

Wild meat hunting and consumption are an integral part of the life of communities in northeast India. Wild meat markets exist in different towns and cities across the states. A hoopoe bird for 400 rupees (US$8), a giant

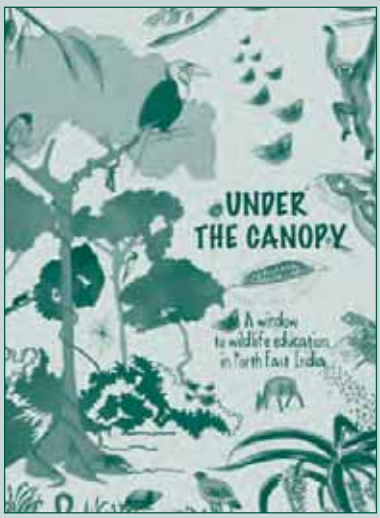
squirrel for 500 rupees (US$11), a barking deer for 6 000 rupees ($135) ... while the forest seems devoid of wildlife, what you see in the markets is an indicator of what still remains. Whereas cash is a driving force in the wild meat trail, there are clearly other aspects to the use of animal parts in local rituals and culture that is deeply ingrained in the psyche of the people here.

Filmed over seven years, *The Wild Meat Trail* is a quest to get some insight into the extent of hunting practices and their place in the current cultural context. It is a journey through northeast India – travelling from small towns to remote villages, trekking though wild terrains, participating in village rituals, talking to sellers and consumers – in an attempt to develop some understanding of the state of the wildlife in the region. The film also looks at attempts made by some village communities to ban hunting and conserve their natural wealth.

Directed by Rita Banerji and Shilpi Sharma and produced by Dusty Foot Productions of New Delhi, the DVD is in English and has a duration of 28 minutes.

UNDER THE CANOPY

"Under the canopy" is the education component of the film *The Wild Meat Trail.* This education programme was developed as a step to influence positively people's knowledge, attitudes, emotions and behaviour regarding wildlife.



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Gorillas on the line

Each and every time your mobile phone rings, a mineral ore called coltan enables the call to be made. Coltan, which coats the tiny capacitor inside most mobile phones, is mined in Central Africa with devastating flow-on effects: the deforestation of primate habitat and butchering of animals to the point of endangering species.

Eighty percent of the world's reserves of coltan are found in the Republic of the Congo. This same region is home to the mountain gorilla (*Gorilla beringei beringei*) and Grauer's gorilla (*G. beringei grauer*, formerly known as the eastern lowland gorilla). As mining operations expand to meet escalating global demand for coltan, clearing the country's lush forest, the habitat of these gorillas and at least ten other primate species is being destroyed, and with it their food sources. In addition to these threats to their survival, the increased human population in mining areas has led to these primates being hunted for bushmeat.

The United Nations Environment Programme (UNEP) reported a 90 percent decline in the number of Grauer's gorillas in eight national parks in the Democratic Republic of the Congo (DRC) between 1996 and 2001. The International Union for Conservation of Nature (IUCN) classifies mountain and Grauer's gorillas as endangered and estimates their respective populations as being 680 and 16 900 individuals, respectively.

And it is not only the animals that are suffering; communities are being plundered. United Nations Security Council reports have implicated illegal mining and smuggling of coltan in funding the military occupation of the DRC. Much of the ore is being smuggled over the eastern borders of the country by militias to Rwanda, Uganda and Burundi, fuelling conflict in the DRC, while prisoners-of-war and children are often forced to work in the illegal mines. The Democratic Republic of the Congo Permanent Mission to the United Nations (DRCPMUN) reported that the Rwandan army had made an estimated US$250 million over a period of 18 months from the sale of coltan, even though no coltan is mined in Rwanda.

Recycling coltan is a proven way to reduce demand for the ore and reduce the destructive consequences of illegal mining. Melbourne Zoo, in conjunction with the Jane Goodall Institute, has launched the "They're Calling You" campaign, encouraging Australians to donate their old phones. So far, the campaign has raised US$50 000, with 50 percent going to the Jane Goodall Institute and the Dian Fossey Gorilla Fund.

Mobile phones, however, are only one of many electronic devices containing coltan. According to the Australian Mobile Telecommunications Association (AMTA), tantalum capacitors are critical components in computer motherboards, computer disc drives, video camcorders and engine control units and are used right across the electronics, chemical and defence industries. (*Source*: G Magazine [Australia], 10 January 2011.) ♣

Isihlahla saziwa ngezithelo zaso.
A tree is known by its fruit.

Zulu proverb