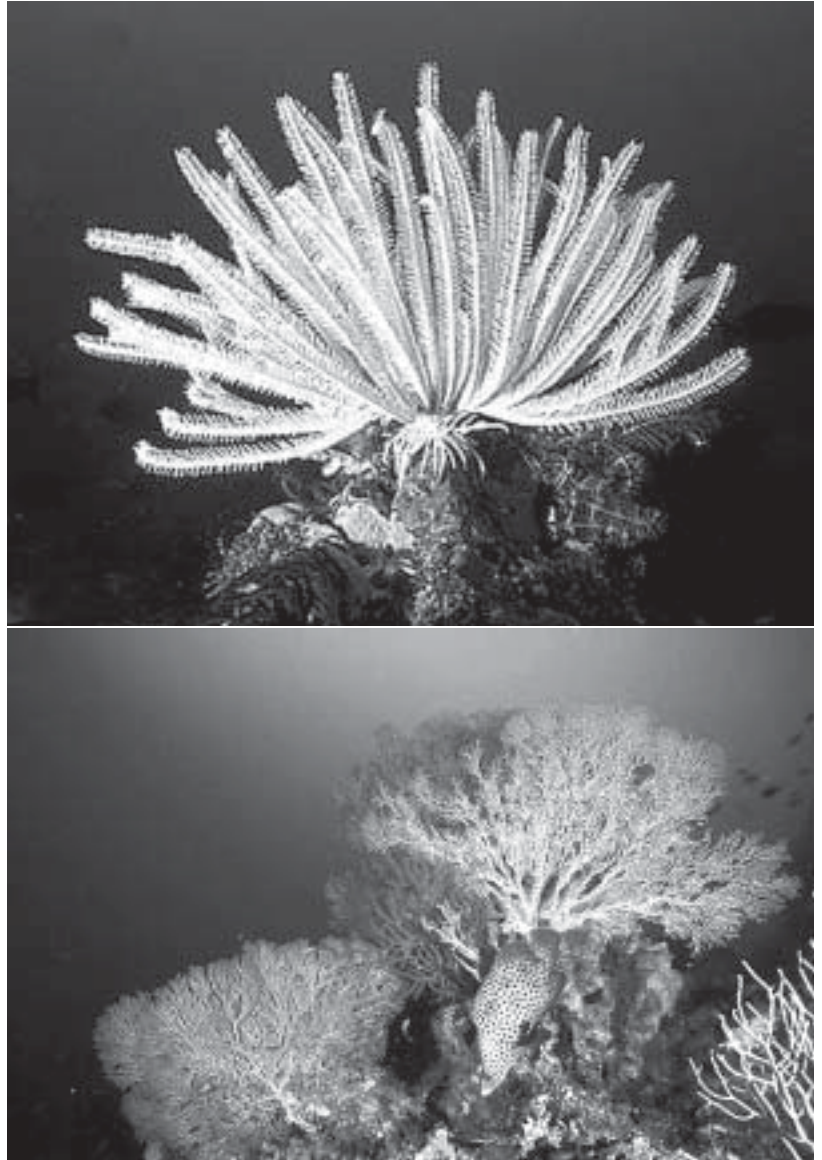


The Great Reciprocal Web that is Life on Earth: Our grammar might teach us to divide the world into active subjects and passive objects, but in a co-evolutionary relationship every subject is also an object, every object a subject. That's why it makes just as much sense to think of agriculture as something the grasses did to people as a way to conquer the trees...we're prone to overestimate our own agency in nature. - Michael Pollan from "The Botany of Desire- A plant's-eye view of the world"

SOUTH ASIA A CORAL DIVERSITY STUDY OF THE SOLOMON ISLANDS.

The maps of where corals live in the world will have to be changed to include the discoveries by a research team led by The Nature Conservancy in the South Pacific Solomon Islands. This first survey of marine biodiversity ever conducted in this area recorded the second-highest level of coral and fish diversity in the world. Only the Raja Ampat islands located in Indonesia have a higher level of coral diversity. The survey recorded 485 species of corals including several species which are possibly new to science and more than 100 species found thousands of kilometers beyond their previously known range. Also recorded were 931 species of fish with 35 species that have only been recorded previously from other regions such as Indonesia or New Guinea. An exceptionally high level of fish diversity, up to 279 species near Gizo in the Western Province, was recorded.

The data collected shows that the coral reefs of the Solomon Islands are in very good overall condition compared with other areas in the Indo-Pacific region. However, there are some concerns about the impacts of land use, overfishing and coral bleaching due to warm temperatures. On many of the reefs, scientists found few or no commercially-important marine species such as Sea Cucumbers, Crayfish or Bumphead Parrotfish, indicating that overfishing is widespread. During the survey, the team did not see a single Green Snail (*Turbo marmoratus*) which in the past supported a large export industry, indicating that this species may be locally extinct and requires immediate protection.



Solomon Island corals. Courtesy of the Nature Conservancy - photos by David Wachenfeld/Triggerfish Images)

"The next challenge will be to ensure that the reefs in the Solomon Islands which we now know to be very special, not only in the region but in the world, are protected for the future," said Dr Alison Green, Marine Science Coordinator for The Nature Conservancy. Look to the next issue of *Biodiversity* for more details on this fascinating study (Information from The Nature Conservancy - Press Release, July 12, 2004).

NEW MOUSE SPECIES DISCOVERED IN THE PHILIPPINES.

American and Filipino biologists captured a bright orange mouse on Mount Banahaw, a national park in the south-central portion of Luzon Island, about 50 miles from Manila. The large headed animal has heavily muscled jaws and powerful teeth that can open hard nuts. It weighs about 15 grams, and has a body length of 3 inches and a tail of four inches. The mammal's whiskers are about



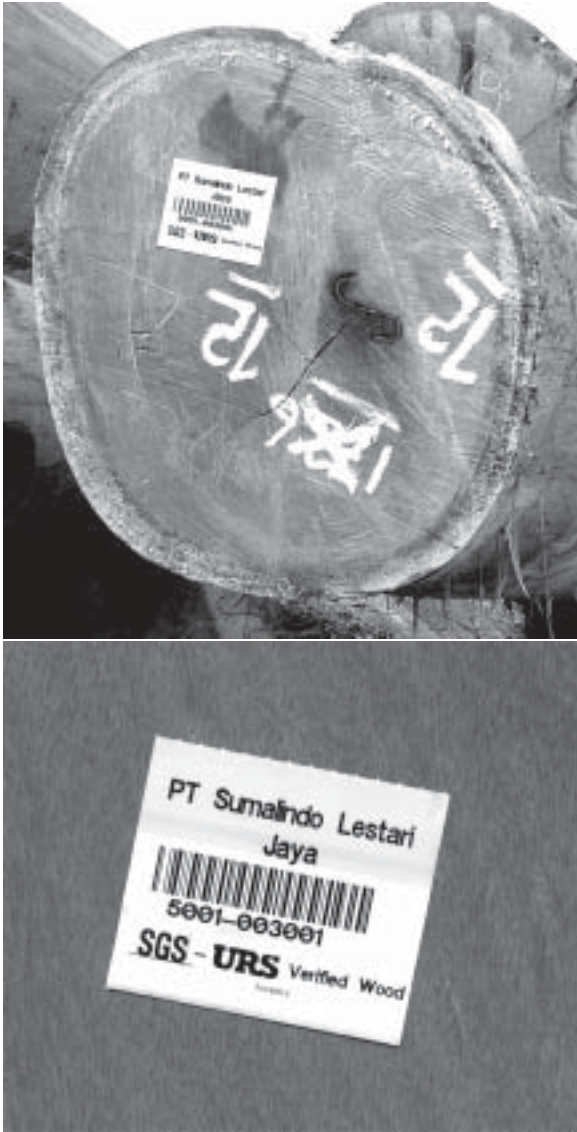
eight times as wide as its head, and there is a second set of “whiskers” that arise from a patch at the back edge of each eye. Scientists are convinced that this is a new species and perhaps even a new genus.

The Philippines have been described as having one of the highest concentrations of unique mammals of any place in the world, a biological diversity even greater than the Galapagos Islands. The newly discovered mouse was not related to any of the other rodents found in the northern Philippines. Only about 3% of the original mature lowland rainforest in the Philippines remains today, and it is feared that many species have been lost even before they were discovered. The Philippines is often listed as one of the highest global priorities for conservation (Information from a Press Release - Field Museum of Natural History, Philippines. May 28, 2004).

Log tag.
Courtesy of the
Nature
Conservancy)

FROM THE INDONESIAN FOREST TO THE GROCERY STORE - BAR CODES

Up to 75% of the lumber that is produced in Indonesia is considered to be illegally logged. The forests are being decimated, threatening endangered animals such as orangutans and rhinos, and harming local communities that depend upon healthy forests for their livelihoods. The Nature Conservancy has initiated a project that uses bar codes to track legally logged wood from the stump to the consumer. This will allow the end users to choose products that they know are legal and hopefully put market pressure on other companies to stop their illegal logging practices. Two Indonesian companies are cooperating with the program, PT Sumalindo Lestari Jaya and PT Daisy. The Nature Conservancy is talking with other Indonesian logging companies and is



hopeful that five to 10 more will join the project in the next year.

The bar codes will act as digital fingerprints, each tag carrying a unique number which corresponds to database information about a log’s size, species and origin, making it almost impossible to swap tags. The tags follow the timber through processing and manufacture and allow external auditors to scan thousands of logs quickly, to compare whole barges or stockyards with a readily updated database.

The three-month pilot project will cost \$400,000 USD and is being funded by the British Department for International Development, the US Agency for International Development, and The Home Depot – the world’s largest retailer of wood (Information from The Nature Conservancy - Press Release July 12, 2004).

OXYGEN SENSING IN WORMS

Over 200 years ago Lavoisier and Priestley discovered oxygen. Since that time, one simple rule can be applied to all life on earth: Attain the critical level of oxygen or die! Above ground there is a rich and stable supply of the life-giving gas but for soil or water-based organisms the job of maintaining correct levels of oxygen is much more challenging. Until now, scientists have understood little about the complicated mechanisms involved. A multi-institutional collaboration of researchers that includes a scientist with the US Department of Energy’s Lawrence Berkeley National Laboratory (Berkeley Lab) has learned how one soil dweller, the nematode *Caenorhabditis elegans*, is able to sense oxygen levels in its environment and then feed in those areas where the concentration of oxygen is just right. The results were reported in a paper on the oxygen-sensing system, which appears in the July 15 issue of the journal *Nature*.

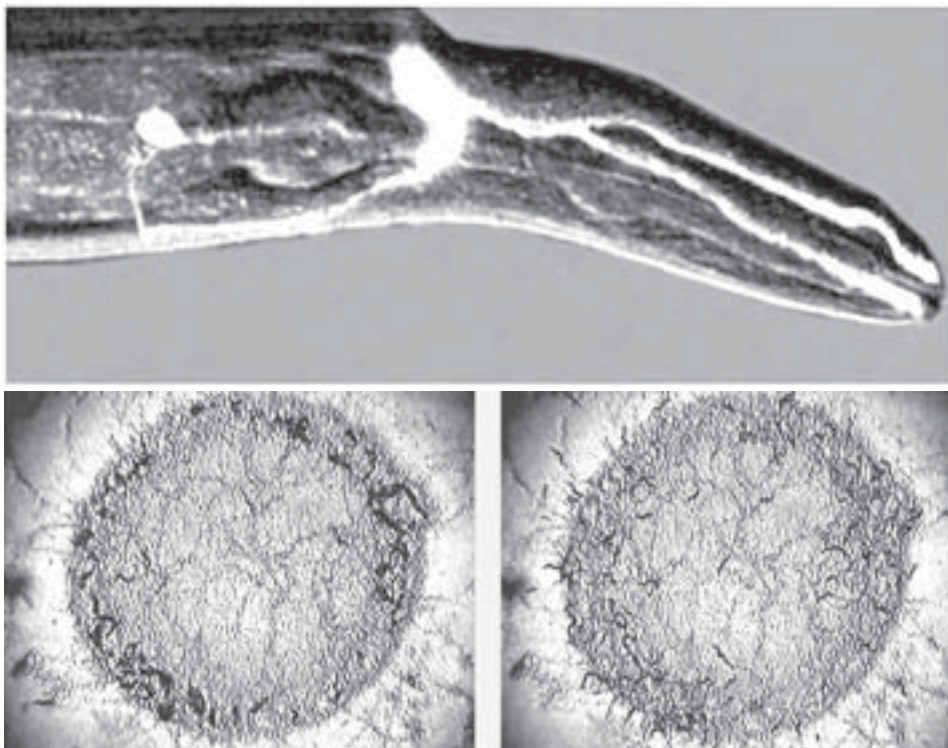
This discovery began as an investigation into a human enzyme, guanylate cyclase, which performs signaling interactions with nitric oxide molecules critical to regulating blood pressure. When nitric oxide enters a human cell it activates guanylate cyclase, which catalyzes the formation of cyclic GMP, a protein that relaxes and dilates blood vessels. The ability of guanylate cyclase to sense and interact with nitric oxide also plays a prominent role in the central nervous system, in particular in the brain. Nitric oxide is also important in the immune system, where it is used as a cell-killing agent. Nature engineered a way for the guanylate cyclase to screen out oxygen, which is usually present in much higher concentrations than nitric oxide, as the heme molecule in guanylate cyclase only binds with nitric oxide. On the other hand the heme molecule in hemoglobin cannot discriminate between oxygen or nitric oxide.

The researchers speculate that the preference of the nematodes for lower oxygen concentrations gives them a selective advantage; perhaps it is a protective response

against levels of oxygen that would be damaging to the worms or would shorten their lifespan. This same mechanism should also be present in fish and other animals that live in environments where the oxygen levels fluctuate. It may also be similar to the mechanism by which the human body deals with hypoxia (oxygen deficiency). Humans monitor oxygen levels in the bloodstream, using a rice-sized organ called the carotid body that sits at the fork of the carotid artery. When there's even a small drop in oxygen concentrations, as might happen in vigorous exercise, these neuron-like cells evoke a hyperventilation or rapid-breathing response. It might well be that we use a similar oxygen-sensing mechanism as the nematode (Information from a news release *Science Beat* Berkeley Labs, July 14, 2004).

THE MANGANESE COMPLEX: THE SECRET OF LIFE?

For a billion years the first single-celled organisms protected themselves from searing solar radiation by hiding in or under rocks or by secreting tough films, some forming mats of bacteria formed stony pillars called stromatolites still seen today. Able to fix carbon through reactions powered by UV light and catalyzed by iron and sulfur, they lived on a diet of methane, hydrogen, and bicarbonates. By 2 1/2 billion years ago, something remarkable had happened: oxygen had begun to accumulate in the atmosphere. Bacteria similar to modern cyanobacteria had stumbled upon a way to break water into molecules of oxygen and hydrogen ions, freeing electrons and releasing energy to power their growth. At the heart of the process was the manganese complex, a tiny molecular structure incorporating four manganese ions, one calcium ion, and



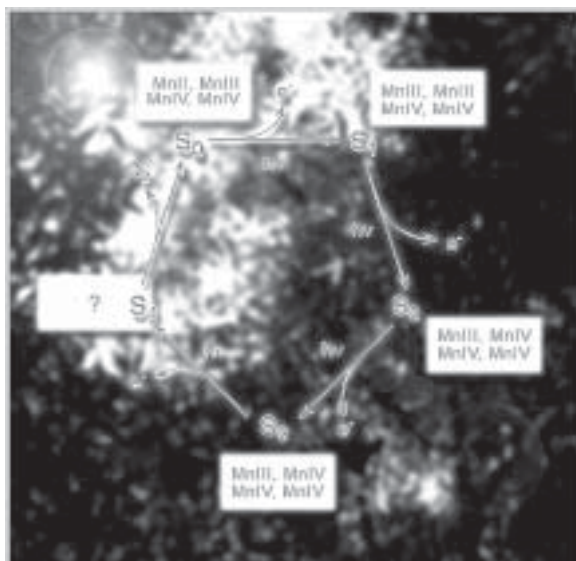
a number of oxygen atoms. This complex produced all the oxygen that today's life forms depend on.

Berkeley Labs has an ongoing research program into the unique biological mechanism called the oxygen-evolving complex (OEC). The oxygen-evolving complex employed by primitive cyanobacteria was so efficient it is still used by plants today, including that long-time favorite of the photosynthesis researcher, spinach.

These engines of photosynthesis are located side by side in some bacteria and in higher plants, in special membranes called thylakoids (from the Greek word for sack). In higher plants, thylakoid membranes are contained inside organelles called chloroplasts; once these were free-swimming bacteria, but at some point in the distant past they formed symbiotic relationships with plants (Information from *Science Beat* a news release from Berkeley Labs).

Top: The oxygen-sensing system (white glow) in the nematode *Caenorhabditis elegans*.

Bottom: In the Petri dish on the left the oxygen concentration is 21 percent; here nematodes display bordering and clumping behavior. In the dish on the right the oxygen level is 6 percent, and the nematodes are dispersed (Courtesy of Berkeley Lab)



KRILL DECLINE MEANS FEWER WHALES AND FISHES

The word krill is of Norwegian origin and means "food of whale." New research by scientists with the Maurice Lamontagne Institute, a marine science center associated with Fisheries and Oceans Canada, shows that the Krill in the Estuary and Gulf of St. Lawrence has dropped 70 percent in 10 years, from 32 metric tons/km² in 1994 to 10 tons/km² in 2003. The scientists speculate that the probable cause is global warming, and the risk is a reduction in the number of whales and fishes in these waters. Since 2000 it has been noted that half the usual number of Humpback, Fin, Sei and Blue whales come to feed on krill each summer. The vast quantities of water carried seaward by the St. Lawrence River are subjected

Energized by light, positive charge builds as ions and atoms in the manganese cluster lose electrons in a repeating process called the Kok cycle; eventually water is split into oxygen and hydrogen. Not all steps in the process are well understood (Courtesy of Paul Preuss, Communications Department, Lawrence Berkeley National Laboratory).



Krill (Photo courtesy of US Fish & Wildlife Service)

to daily tides of more than 15 feet and to strong upwellings of glacial nutrient rich water. This system has historically supported high concentrations of krill that are the basis of a food web that includes Baleen Whales, Fodder Fish species, Beluga Whales, seals and sea birds.

A Blue Whale, the largest whale species, eats from two to four tons of Krill per day. The Krill is a tiny shellfish, resembling a small shrimp, which feeds on vegetable plankton. It lives in cold water, but water that is too cold can harm its food supply or interfere with its reproduction. Changes in the circulation of the water masses moving through the Estuary and the Gulf are thicker and colder than any since the middle of the 1980s and could have played a part in the change in the quantity and composition of Krill.

The fall in Krill levels was also measured along the coast of Nova Scotia and the east coast of Newfoundland after examination of the stomach contents of Capelin, a species of fish. That suggests that the decline in Krill is not a phenomenon unique to the St. Lawrence. More importantly, when the proportion of Krill decreases, one finds an invasion of another order of crustaceans known as Amphipods. While Krill eat phytoplankton, Amphipods are carnivorous. They eat fish larvae, as well as Copepoda, another group of small crustaceans, which are an important source of protein for fish larvae and other marine life. The invasion of the Amphipods, to the detriment of the Krill, may risk accelerating the decline of fish stocks (Condensed from an Environmental News Service (ENS) story by Andre Noel, June 8 2004).

SEA TURTLE ECONOMICS

The worldwide decline in sea turtle populations is bad not only for sea turtles but an economic study by the conservation organization WWF finds that the decline threatens jobs, tourism and coastal economies -

particularly in developing countries, two thirds of which have sea turtles (see "Conservation of marine turtles in Viet Nam", *Biodiversity* 5(2):12-18).

Marine turtle tourism brings in almost 3 times as much money as the sale of turtle products such as meat, leather and eggs, according to the new report "Money Talks: Economic Aspects of Marine Turtle Use and Conservation." Turtles are in steep decline in many areas, as nesting beaches are converted to holiday resorts, turtles and their eggs are over-harvested for food, and turtles are accidentally caught and killed by commercial fishers.

All marine turtle species are currently listed on Appendix I of the Convention on International Trade in Endangered Species, which prohibits any international commercial trade by more than the 160 signatory countries. Even so, trade between non-signatory countries and illegal trade persist. The WWF researchers found that sea turtle populations are declining in areas where they are exploited and rising or stable where they are not. Investment in Sea Turtle conservation is also an investment in Indigenous People and their livelihoods.

WWF compared the revenue generated from killing turtles or collecting their eggs with that generated from tourism at a total of 18 sites in Africa, Asia, Latin America and the Caribbean. At nine sites, where turtles are used for their meat, eggs, and shells, the average annual income from these products was \$582,000. By contrast, at nine locations where turtles are a tourist attraction, the average annual income was some \$1.65 million. The study finds that at the biggest and most established site in Costa Rica's Tortuguero National Park, marine turtle tourism brought in \$6.7 million a year. This type of tourism which began to flourish in the late 1980s is critical to the future of sea turtles as some 175,000 people take sea turtle tours annually to more than 90 sites in some 43 countries (Information from a WWF Press Release, May 25th 2004).



Endangered sea turtle cruises a coral reef in the Florida Keys. (Photo credit: G. McFall, OAR/National Undersea Research Program (NURP); University of North Carolina at Wilmington).

BIOLOGICAL CONTROL OF ASIAN LONG-HORNED BEETLE - CANADA

The introduction of non-native insects such as Asian Long-horned Beetle (ALB) has been identified as so serious a threat that the spread of the insect could lead to the destruction of much of the deciduous Canadian forest. The insect bores into a wide range of trees such as Maple, Birch, Poplar, Willow, Horsechestnut and Elm. It lives 90% of its life cycle inside the tree and only 10% as an adult so it is difficult both to detect and control. Thousands of infested trees have been cut down since cutting is the only known control measure for infected trees. Thousands of healthy trees have also been destroyed to serve as a buffer zone around infected areas. Canadian rules have also been established to ensure wood packaging is heat treated to kill the insects before importing.

There are natural predators in North America of other types of longhorned beetles which use the same tree hosts as the ALB and these include other beetles, wasps, flies, carpenter ants, thrips, birds, lizards, spiders, scorpions, toads, and small mammals as well as several types of parasites. Because ALB is a relatively new exotic, natural predators have not had enough time to make associations with it. Habitats such as wind-breaks, hedge-rows, plantations and natural forests provide a fauna-rich setting to support sources of natural enemies and therefore these should be encouraged. In China, which also has a problem with the ALB, there has been some control success with a natural predator, the woodpecker.

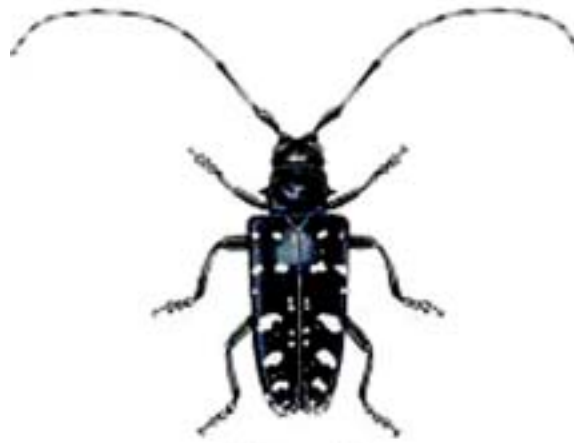
Maple trees, especially Norway, Sugar and Silver Maple, represent 80% of trees removed due to infection. Species richness is important because it means that the beetle is less likely to overcome natural tree defenses. However a challenge is that the northeastern forests have a decreased diversity of maple species.

An integrated approach to the problem would include:

- Conservation of native natural enemies as well as the introduction of exotic natural enemies. Selection of tree species more adapted to stressful conditions in the urban setting such as drought, soil compaction, and air pollution.
 - Selection of tree species adapted to the site, soil conditions and environmental conditions.
 - Silviculture practices which lead to improved tree health such as improved irrigation and fertilization.
 - Use of bait trees to monitor and assess infestation.
 - Identifying the weak links in the lifecycle of ALB.
- (Information from Natural Resources Canada, Canadian Forest Service).

BAMBOOS UNDER THREAT: A UN BIODIVERSITY REPORT

As many as half the world's 1,200 woody bamboo species, may become extinct due to forest loss according



Female



Male

Asian Long-horned Beetle (courtesy of Natural Resources Canada, Canadian Forest Service).

to a Bamboo Biodiversity report by the International Network for Bamboo and Rattan (INBAR) and UNEP's World Conservation Monitoring Centre (WCMC). This would threaten habitats and a key food source for humans and wildlife, heavily impacting an export trade in bamboo products, estimated to be worth \$2.7 bn USD. The predictions are derived from a novel analysis which combines data on bamboo distribution and existing forest cover. The report says the forest destruction threatening woody bamboo (species with a hollow stem supporting the crown) is caused by human pressure. About 250 of these species have less than 2,000 sq kms of forest still within their ranges and many others, including relatives of commercially-grown bamboos, have only tiny amounts of forest left. The woody bamboos are of more economic and social importance than the grass-like herbaceous species, which were not included in the study.

Lesser Bamboo Bat (*Tylongchleris pachypus*) - The world's second smallest bat roosts exclusively in the hollow stems of bamboo.





Although some bamboo species are very fast-growing - one in Japan grows 1.2 metres (almost four feet) a day - their odd life-cycle does not help them. In many species all the individuals flower simultaneously, at intervals of a few years to decades, and then die. Millions of people eat bamboo shoots, and altogether 2.5 billion people trade or use bamboo. The value of its use for subsistence and in global domestic trade is put at \$4.5bn USD annually. Bamboo is also used for making paper, furniture and instruments, from flutes and drums to the pan pipes of the Andes. It is sometimes used in combination with modern materials like reinforced concrete or steel for building houses and bridges. The commercial potential of many wild species remains unknown.

Bamboo is an essential part of the diet of many wild creatures, notably the Giant Panda, which eats nothing else. There are about 600 pandas left in the wild: more than half the bamboo forests where they live have disappeared in the last 30 years. Other Asian species which depend on bamboo for food or for shelter include the

Red Panda and the world's second smallest bat, the Lesser Bamboo Bat (*Tylonycteris pachypus*), which is 3.5 cm (1.4 inches) long. It roosts between the nodes of mature bamboo and enters the stems through holes made by beetles. In Africa the endangered Eastern Mountain Gorillas often need bamboo, which in some months forms up to 90% of their diet: fewer than 700 wild gorillas are thought to survive. Another endangered species, the Mountain Bongo (*Tragelaphus euryceros ssp. isaaci*, a large forest antelope) spends the dry season in the dense bamboo thickets of Kenya's Aberdare mountains. Several lemurs and frogs depend on Madagascar's bamboo forests, which also shelter the Ploughshare Tortoise (*Geochelone yniphora*). Spectacled Bears and Mountain Tapirs are among the Latin American creatures which eat large amounts of bamboo (Information from a WCMC press release).

WISENT REPRODUCTION PROGRAM - CENTRAL RUSSIA

Russian scientists are investigating the opportunity to bring wisents, *Bison bonasus*, back to the forests of Central Russia. Their effort has been funded by the Russian Foundation for Basic Research and the Federal Target Scientific and Technical Program called "Conservation of Rare Species". The specialists from the Severtsov Institute of Ecology and Evolution Problems (Russian Academy of Sciences) believe that this is feasible, but requires a competent wisent reproduction policy. Specialists of the International wisent group recommend a larger population of at least 1,000 animals.

In Russia, it is possible to create such herds living at large in the territory of the Kaluga and the Bryansk Regions and in the North-West of the Orel Region. In the National Park called "Orel Marshy Woodlands" and in adjacent territories, the first phase of this project has been implemented supported by the World Wildlife Fund (WWF) and the Global Ecological Fund. So far, the park territory of 36 thousand hectares is inhabited by only 68 wisents, out of which only 26 animals breed actively. The wisents are divided into 4 isolated groups, containing from three to twenty head. Forecasting the fate of the future population, the specialists carried out field observations in the park, studied archival materials, and even applied computer simulation of demographic and genetic processes.

Researchers estimate that the largest group of the Orel Region wisents has a good chance to reproduce themselves up to 100 head in 12 to 15 years which will render them invulnerable to extinction from casual fertility fluctuations. Along with that, the group will preserve initial genetic diversity and will be able to avoid degeneration. The rest of the groups will remain in the demographic and genetic instability zone for the next 20 years, unless urgent measures are undertaken. The Orel

From top to bottom: In East Africa the 'Endangered' mountain bongo (*Tragelaphus euryceros ssp. isaaci*) relies on montane bamboo thickets for food and shelter during the dry season. - *Bison bonasus*. - A number of bamboo species are potentially threatened by the destruction of natural forest cover. - Endangered Mountain Gorilla (*Gorilla beringei beringei*) inhabits the montane and bamboo forests of the Democratic Republic of Congo, Rwanda and southwestern Uganda.

Region population possesses a sufficient level of genetic diversity for further stable development. For successful inhabiting of the National Park, it is very important to preserve each group of the Orel population, to promote stable and quick reproduction of the animals and continuous exchange of animals between the groups. Six to eight similar populations are to be established to ensure the successful reintroduction of wisents back to the forests of Central Russia (Information from Informnauka (Informscience) Agency May 18, 2004) .

NEW CITES TRADE RULES FOR DOZENS OF WILDLIFE SPECIES

The Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has received over 50 proposals from its member Governments to adjust the rules governing the international trade in various wildlife species. The proposals offer detailed arguments on how to improve the conservation and sustainable use of the African Elephant, the Minke Whale, the Great White Shark, various tropical birds, trees and orchids, numerous turtle species, the Southern White Rhinoceros, two species of crocodile, the bald eagle, several medicinal plants and many other species. Governments will accept, reject or adjust these proposals for amending the CITES Appendices at a conference in Bangkok from 2 to 14 October 2004. These Appendices list species that are at risk and whose import and export is controlled through a permit system (Appendix II) and species that are already endangered and that may not be commercially traded (Appendix I).

Thousands of species around the world are endangered as a result of human activities such as habitat destruction, poaching, over-harvesting and pollution. CITES was adopted in 1973 to address the threat posed by just one of these activities: unsustainable international trade. To date, some 166 countries have become Parties to the treaty, making it one of the world's most important agreements on species conservation and non-detrimental use of wildlife.

Even after commercial fishing and the timber industry are set aside, the international trade in wildlife is big business, estimated to be worth billions of dollars annually and to involve more than 350 million plant and animal specimens every year. Unregulated international trade can push threatened and endangered species over the brink, especially when combined with habitat loss and other pressures. CITES accords varying degrees of protection to some 30,000 plant and animal species depending on their biological status and the impact that international trade may have upon them (From a Press Release *CITES proposals on wildlife trade address over-fishing, illegal logging and recovery of large charismatic animals*).

AFRICA

HOW COULD WE LIVE WITHOUT THE CHIMPS?

Humanity's closest relative, the chimpanzee, could be extinct in around 50 years because it is hunted for meat and threatened by deforestation and disease, researchers said yesterday.

A study, presented at a conference of The Pan African Sanctuaries Alliance (PASA) in Johannesburg, noted that only 8,000 remain of the most vulnerable chimpanzee subspecies, *Pan troglodytes vellerosus*, which is found predominantly in Nigeria, and that it could be extinct in two decades. PASA sanctuaries care for orphaned or injured great apes. The study used the rate of orphans brought by people to sanctuaries to calculate the loss of chimpanzees in the wild and showed a dramatic increase in the number of baby chimps losing their parents.

The other three chimpanzee subspecies face slightly better odds, but all are expected to disappear in 41-53 years, at current rates of decline. Chimpanzees are found in western, central and eastern Africa. The 19 PASA sanctuaries currently care for approximately 670 chimpanzees, a

Two White Rhinos making a point (*top*). (Photo courtesy of www.rhinoceroses.com).

Mother chimpanzee and her young chimps (*bottom*).



number that has risen by more than 50 percent in the last three years. The study is the latest to sound the alarm about the fate of the great apes, which consist of Chimps, Gorillas, Bonobos and the Orangutans of Asia. One recent UN study said less than 10 percent of the forest home of Africa's Great Apes will be left relatively undisturbed by 2030 if road building, construction of mining camps and other infrastructure developments continue at current levels (Information from a June 9, 2004 story by Ed Stoddard, Reuters).

WHITE RHINOS ON THE CRITICAL LIST

The northern white rhino, one of the world's most endangered animals, could be extinct in the wild within months unless poaching by Sudanese rebels stops, say conservationists. The world's 25 or so remaining wild white rhinos all live in the Garamba National Park, a United Nations World Heritage Site on the northern border of the Democratic Republic of Congo with Sudan.

The rhino numbers have dwindled from almost 500 in the late 1970s. Last week, two park rangers were killed by a group of poachers. Once out of the park, the poachers are thought to head to the southern Sudanese town of Yambio, where traders buy ivory and rhino horn from the Congo and Central African Republic. The Garamba National Park has long been a magnet for poachers who prey on its rich wildlife, which also includes elephants, hippos, buffaloes and chimpanzees (Information from a May 21, 2004 Reuter's story by Astrid Zweynert).

SOUTH AFRICA'S NEW BIODIVERSITY ACT

President Thabo Mbeki has signed into law South Africa's new Biodiversity Act, which is hailed by some as the most significant environmental legislation adopted in 10 years of democratic government. Because of its incredibly rich biological diversity South Africa is ranked the third most biologically important nation in the world, after Brazil and Indonesia. The new act now gives the highest possible political protection to this biodiversity. Among other things, it requires full environmental impact assessments before the introduction of any genetically modified organisms (GMOs). The act also makes provision for communities to share the profits of any exploitation of natural materials involving their indigenous knowledge.

Also for the first time, the act gives a legal framework for agreements such as the contract between the National Botanical Institute (NBI) and US horticultural company Ball to develop commercially valuable hybrids from some indigenous South African plant species. The act creates a basic legal framework in terms of which the Environment Minister can promulgate a national biodiversity strategy and action plan. It also provides for the identification of biodiversity "hotspots" and "bio-regions", which will then be given legal recognition.

The act also covers alien invasive species, which are a major threat to biodiversity, and puts obligations on private landowners and the government to clear alien invasive vegetation from their properties. It also establishes the SA National Biodiversity Institute (Sanbi), which is the legal successor of the current NBI (Information from The Cape Argus).

EMBRYO OF FLYING REPTILE FOSSIL DISCOVERY - CHINA

Scientists in China have discovered a 121 million-year-old fossil containing an embryo of a flying reptile that lived alongside the dinosaurs. It is the only known fossil of an embryo of a pterosaur, a winged lizard that evolved powered flight, said researchers



from the Chinese Academy of Sciences in Beijing in a report in the science journal *Nature*. The embryo is preserved in an almost complete egg and was found in the sediment of a lake in Liaoning in northeastern China that is known for its fossil riches. Parts of its skull and skeleton are preserved and the lower jaw shows two slender and slightly curved teeth, according to the scientists. It is bigger than fossils of hatched pterosaurs, which suggests it probably would have hatched soon. The earliest pterosaurs, the first known flying vertebrates, lived about 230 million years ago. They died out about 65 million years ago (Information from a Reuters story, June 10, 2004).

LIGHTS OUT POLICY SAVES MIGRATING BIRDS

Some environmental problems are difficult to solve. This is a simple one: turn off the lights and the problem disappears! This solution is helping to save the lives of thousands of birds migrating across North American cities to their spring breeding grounds. Tall buildings with office spaces brightly lit at night, and electric signage, have long been recognized as a danger to migrating birds, with estimates ranging in the tens of thousands in the US per year from collisions and exhaustion, after the birds circle the light source incessantly.

Dr. Daniel Klem, a biology professor at Muhlenberg College in Allentown, Pa., estimates the number of birds killed in the US could be as high as one billion. His reasoning is that birds just don't see glass and the observable casualty rate is just a small fraction of the

Flying reptiles of the Mesozoic Era, 248-65 million years ago.

Biodiversity on the Net

<http://www.wetlands.org> - Wetlands International is a leading global non-profit organisation dedicated solely to the crucial work of wetland conservation and sustainable management carried out in over 120 countries.

<http://bushmeat.net> - The Bushmeat Project has been urging conservation donors to support programs aimed at helping the African people protect the Great Apes — Gorillas, Chimpanzees, and Bonobos — which are being hunted to extinction for commercial bushmeat in the equatorial forests of west and central Africa.

<http://www.orangutan.org> - The Orangutan Foundation International supports the conservation and understanding of the Orangutan and its rain forest habitat while caring for ex-captive individuals as they make their way back to the forest.

<http://www.gorilla.org> - The Gorilla Foundation, and Koko in particular, bring the subject of interspecies communication to the public in order to save gorillas from extinction and inspire our children to create a sustainable future for all Great Apes.

<http://www.redlist.org> - The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose is to catalogue and highlight those taxa that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable).

<http://www.doaj.org> - Directory of Open Access Journals covers free, full text, quality controlled scientific and scholarly journals with the aim of covering all subjects and languages. There are now 1119 journals in the directory. Currently 282 journals are searchable on the article level. As of today 48908 articles are included in the DOAJ service.

<http://www.earthshare.org> - Earth Share, a nationwide network of America's leading non-profit environmental and conservation organizations, works to promote environmental education and charitable giving through workplace giving campaigns.

<http://www.zoo.cam.ac.uk/ioz> - The Institute of Zoology is the research division of Zoological Society of London and conducts basic biological research which benefits the conservation of animal species and their habitats.

total because the number of volunteers who patrol city sidewalks in the early morning during migration is dwarfed by the volume of birds. Dazed and disoriented birds not killed on impact may be snapped up later by predators such as crows and sea gulls that have learned to regard such sites as rich hunting grounds. Particularly distressing for bird lovers is the danger posed to rare or declining species. Among the known casualties is the Kirtland's warbler, one of America's rarest birds, whose US breeding population numbers just a few hundred in northern Michigan. More common dead specimens found in New York during May included a Veery, a variety of thrush, and an Ovenbird, a kind of warbler.

Chicago is leading the way in the lights out campaign. About 30 major city-center buildings turn out their lights. At McCormick Place, a large lakefront convention center, ornithologists from the city's Field Museum found that bird mortality declined by about 80 percent over a two-year period. Before the lights-out policy at McCormick Place, researchers recorded some 29,000 dead birds of 140 different species over a 25-year period. Efforts of the Audubon Society and the Chicago Bird Collision Monitors were boosted by the city, which promoted a lights-out program starting about four years ago and played a key role in persuading buildings to cooperate. In Toronto, Canada about 100 buildings signed up in 1996 for a lights-out program led by the Fatal Light Awareness Program (FLAP) and

the WWF. The result, after monitoring 16 of the tallest buildings over a five-year period, was a noted reduction in bird mortality (Information from a story by Jon Hurdle June 11, 2004 Reuters) (See also "Wireless telecommunications and night flying birds" *Biodiversity* 4(1): 10-17, 2003).

Night-flying birds
(Photo by Stephen Aitken).

