

biomass and act as ecosystem engineers. Ants are ideal bio-indicators because they are diverse and abundantly found in almost every habitat in the world. Ant biodiversity is extremely high, particularly in the tropical rainforest. Many ant species are highly sensitive to microclimate and habitat structure and respond rapidly to environmental changes. These organisms are highly responsive to human impacts, which reduces their richness.

In Vietnam, there are few foreign scientists who have interests in collecting ants. This project, which promotes taxonomy and systematics, provides a reference collection of ants and basis for inventory and monitoring of this diverse group in the country.

After a year of project implementation, the research team collected 2,500 ant specimens from six sites: Ba Vi National Park, Cuc Phuong National Park, Sa Pa, Nha Trang and Ho Chi Minh City, Huong Son Forest, Bai Tu Long National Park, and identified 170 ant species belonging to 60 genera and 8 subfamilies. The collection is still in the initial stage but it is virtually the first ant fauna collection in Vietnam.

Most of the specimens were identified up to the genera level, and others up to the species level. The ant specimens were sorted into genus using the key book of Bolton



Pheidole

(Identification Guide to the Ant Genera of the World). The identification of ants into species was done in Kagoshima University, Japan. Most of the genera of ants were checked into species by Prof. Seiki Yamane; the genus *Pheidole* by Dr. Katsyuki Eguchi; the genus *Myrmecina* by Mr. Okido Hirofumi (Kyushu University); the genus *Polyschachis* by Rudolf J. Kohout; the genus *Dorylus* by Mr. Stefanie M. Berghoff, Department of Animal Ecology and Tropical Biology, Biozentrum, Am Hubland, University of Wuerzburg. From this project, two new *Myrmica* species (*M. titanica* and *M. yamaneii*) and one species new to Vietnam were found.

The project successfully conducted the 3rd International Workshop on Ants at the Institute of Ecology and Biological Resources, Hanoi, Vietnam, and was attended by 26 foreign delegates (from Australia, Germany, Korea, Japan, Malaysia, Sri Lanka and Thailand) and 24 Vietnamese scientists. ■

INDONESIA

Project Title: Research and conservation of the hawksbill turtle (*Eretmochelys imbricata*) in Indonesia

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Introduction. The hawksbill (*Eretmochelys imbricata*) is one of six species of marine turtles occurring in Indonesia. The others are leatherback (*Dermochelys coracea*), olive ridley (*Lepidochelys olivacea*), green (*Chelonia mydas*), loggerhead (*Caretta caretta*), and flatback (*Natator depressus*). All of these species are highly migratory, often passing through territorial and international waters, from feeding to nesting grounds and back. The turtles are likely to come from an area within a radius of 2,500 kilometers around the nesting area (Limpus 1993). Stark (1992) reported that a tagged leatherback from Irian Jaya, Indonesia was discovered in Cebu, Philippines; this shows that the sites of tagging and recovery were separated by some 1,900 km.

The post nesting migration of five female green turtles monitored by satellite tracking from Redang Island, Malaysia showed movement into Indonesian territory in Belitung, Tambelan and Natuna, after being released 28 days (1,153 km), 16 days (714 km) and 13 days (669 km), respectively. Information on the migration of green and leatherback turtles mentioned above indicates that the hawksbill turtle in Indonesia has the possibility of migrating to neighbouring countries, but so far there has been no information on the migration of the hawksbill population from this region. There has yet been no intensive study that would determine the migration patterns of this marine turtle in Indonesia.

The hawksbills occur widely with low nesting densities throughout the Indonesian archipelago. For instance, in the Segamat rookeries (ca. six hectares and two hectares), only 150 nests were found per year. Salm and Halim (1982) recorded 143 nesting sites throughout Indonesia. Some 80 nesting sites were used by hawksbills for laying their eggs and most of these rookeries are located in very remote areas with very poor accessibility. Hawksbill and green turtles have the most depleted turtle species populations in Indonesia due to over harvesting for a long time, including egg harvesting and the utilization of their flesh, carapace, bones, etc. Although the Indonesian government issued Government

Regulation No. 7/1999 totally prohibiting the utilisation of all six species occurring in Indonesian waters, the implementation of the regulation is ineffective and illegal harvest is still going on in areas such as Bali, Belitung and Riau. It is also unknown whether this hawksbill population is shared with other neighbouring countries (as in the case of the green turtle) or is a local population. Therefore, detailed research is needed in order to obtain their migration pattern data by satellite tracking method and to identify the original gene of the species by Mitochondria DNA (mtDNA) analysis.

Indonesia has been trying to down-list the hawksbill turtle species since the CITES meeting in 1992, but has always failed due to data deficiency in terms of population status. Currently, the Government's development strategy prioritises exploitation of marine resources. The establishment of the Marine Resources Ministry shows the importance of these resources as a primary product in the future. Therefore, now is the critical time to establish the status of vulnerable species such as the hawksbill turtle so that sufficient data will be available in the future especially with the predicted exploitation crises.

The ASEAN region is considered a critical habitat for the dwindling sea turtle population. The mtDNA has been widely used for molecular phylogenetic studies. In particular, sequences within the mtDNA control region evolve rapidly, and have proven useful for the resolution of population structure. The mitochondria control region has also proven useful for identifying the nesting origin of migratory animals (Bowen and Avise 1996; Avise 1994). Therefore, effective management and conservation can be considered through collaboration efforts between the ASEAN member-countries. Through this project, an effective measure could be implemented in soliciting cooperation in sea turtle conservation in the region, particularly of the hawksbill population. This research project is a collaborative effort between FFI-Indonesia Programme, Research Centre for Biology-LIPI and the D.G. of Forest Protection and Nature Conservation-Ministry of Forestry RI.

Duration and objectives. The project, which covers two years (01 October 2001 to 30 September 2003) of implementation, aims to: a) identify the critical habitat of hawksbill population, a tool for determining a conservation and management policy and strategy in Indonesia; and b) assist the ASEAN member countries in developing a framework for improving technical and institutional approaches through regional cooperation for managing biodiversity conservation. The specific objectives are to: a) develop and improve the

Indonesian Marine Turtle Centre (IMTC) for gathering data and information from other institutions, government, NGOs, and local people, which would focus on the importance of strengthened biodiversity conservation and management policies and strategies, particularly for the hawksbill turtles; b) establish and maintain an appropriate database referral system that would link national and international institutions and agencies holding information relevant to biodiversity conservation, to the ARCBC, database networks, and possibly with the ASEAN web network where appropriate; c) identify the post migration pattern of hawksbill turtles by using the radio transmitters (photo telemetry) for a 5-month monitoring period; d) identify the feeding grounds of post juvenile and adult female hawksbill turtles; and e) map nesting sites of hawksbill turtles throughout Indonesia.

Project sites. The selected nesting sites for sample collection include: Belitung (Southern part of the east coast of Sumatra, Segamat (Lampung), and Seribu (Islands Marine National Park – northern part of Jakarta). These sites are located in between the China and Java seas. An additional sample site is the Komodo National Park–Western part of Sumbawa Island, representing the hawksbill population of the Indian Ocean.

Progress report. As of early 2003, the following are the highlights of the project's progress report:

Tissue sample collection for mtDNA analysis. A total of 41 tissue samples have been stored at the genetic laboratory of LIPI in Cibinong for mtDNA analysis. Samples were collected from Seribu Islands (25 samples), Segamat Islands, Belitung (4), and Sumbawa Island (7). More samples will be collected from various parts of Indonesia like Karimun Jawa National Park (central java).

Tagging programme. The programme aims to discover the turtle's inter-breeding migration, interval of nesting, movement, total population, nesting season, and growth rate in nature, etc. Some 1,000 turtle tags have been provided to support the tagging programme, which was undertaken with the collaboration of various international and local agencies. The tag has records of the number, date of tagging, place of turtle found, size of the turtle (straight carapace length (SCL), straight carapace width (SCW), curve carapace length (CCL), curve carapace width (CCW), place of release, and recapture/re-nesting notes).

Satellite tracking. Four units of Platform Transmitter Terminals, St-14 have been purchased from the USA. The transmitters are used to monitor the movement of tagged turtles. ■