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FIELD RESEARCH ON PRIMATES IN THAILAND*

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Abstract

Field research in Thailand is summarized under the following headings: (1) systematic and evolutionary; (2) ecological and behavioral; (3) conservation; and (4) management. Although beginnings have been made in all these fields, a great deal of urgent work needs to be done on the 13 species of nonhuman primates native to Thailand. The most pressing local needs are: (1) survey and inventory of natural populations; (2) training of expertise in primate biology; and (3) establishment of cooperative management and conservation programs.

Introduction

Field research on primates may be classed as (1) systematic and evolutionary; (2) ecological and behavioral; (3) conservation; and (4) management, including breeding under naturalistic conditions, husbandry and "rehabilitation". The distinctions between these categories are not sharp and many research projects described below fall into several categories at once. This paper will briefly summarize work that has been done on Thai primates, and then suggest some priorities for the near future. Occasionally I will mention work done outside Thailand if it bears importantly on Thai species.

There are presently recognized 13 species of primates in Thailand (excluding the tree shrews). These are listed in the Table 1. The most useful recent summary

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of Thai primates is by Lekagul and McNeely¹, with regard to general descriptions, distribution and natural history. Much field work has been carried out, or at least begun, since that book was completed, however.

TABLE 1. PRIMATES NATURALLY OCCURRING IN THAILAND

Family	Scientific name	Common name
Lorisidae	<i>Nycticebus coucang</i>	Slow loris
Cercopithecoidea	<i>Macaca fascicularis</i>	Crab-eating macaque
	<i>Macaca mulatta</i>	Rhesus macaque
	<i>Macaca nemestrina</i>	Pig-tailed macaque
	<i>Macaca assamensis</i>	Assamese macaque
	<i>Macaca arctoides</i>	Stump-tailed macaque
	<i>Presbytis melalophos</i>	Banded langur
	<i>Presbytis cristata</i>	Silvered langur
	<i>Presbytis obscura</i>	Dusky langur
	<i>Presbytis phayrei</i>	Phayre's langur
Hylobatidae	<i>Hylobates lar</i>	White-handed gibbon
	<i>Hylobates agilis</i>	Agile gibbon
	<i>Hylobates pileatus</i>	Pileated gibbon

The special importance of primates derives from the fact that man is a primate. The study of primates, including distribution, phylogeny, social structure and behavior, is providing insights into our evolutionary heritage. The use of primates in biomedical, physiological and behavioral research in the laboratory is regarded as essential to progress in human biological research and in improving man's own health, and provides additional importance to the study of all aspects of primates and to their conservation.

Systematics and Evolution

The majority of works on systematics and evolution consist of descriptions of specimens collected for museums, often with notes on habitats and sometimes with a few natural history observations. As primates are now all classed as "wild protected animals" by the Royal Forest Department, the collection of primate specimens is probably now a thing of the past. Virtually all species are likely to become endangered because of habitat destruction and hunting. The present collections of Thai specimens in museum throughout the world provide us with the basis for understanding the identity and distribution of primates in Thailand. Any further improvements in our knowledge of taxonomy and evolution must now depend largely on skilled field observations of living animals and the use of new kinds of data

which can be collected from living animals, such as photographs, behavioral descriptions and tape recordings.

Among the first scientific collectors of primates to work in Thailand were Gairdner²⁻⁵, Kloss⁶⁻¹⁰ and Robinson and Kloss¹¹. Later collections have been made by Carpenter¹² and Fooden¹³⁻¹⁵. Fooden has nicely summarized the distributional records and taxonomic status of langurs and macaques. The langurs, or leaf monkeys, consist of four species. *Presbytis phayrei* occurs from India into Thailand, where it covers nearly all the northern part of the Kingdom. *P. obscura* is the southern counterpart of *phayrei* and occupies the whole peninsula. *P. cristata* occurs in south-east Thailand and extends (or did extend) west across the southern Bangkok plain through Ratchaburi, Nakhon Pathom and Kanchanaburi Provinces, where it separates the ranges of *phayrei* and *obscura*. *P. melalophos* occurs scattered throughout the peninsula, but is not very common anywhere.

Thailand is rich in macaques with five species, including at least one in each of the major species groups¹⁶. The most common are *Macaca fascicularis*, or crab eating macaque, around coastal and edge habitats of central and southern Thailand, and *M. nemestrina*, the pig-tailed monkey, common in lowland evergreen forest. *M. fascicularis* is replaced by the rhesus monkey, *M. mulatta*, in northern Thailand, and hybrids between the two have been found¹⁷. The other two species are the Assamese macaque, *M. assamensis*, a northerly upland species, and the stump-tailed macaque, *M. arctoides*, which has been found throughout much of central, western and southern Thailand. Once exported in the thousands for medical research, *M. arctoides* seems to be common in Thailand only in scattered locations^{15, 18-19}.

Fooden¹³ and Eudey¹⁸ have found all five species of macaques in central western Thailand, in the region of Kanchanaburi and Uthaitani Provinces. Eudey believes that this area may have been an important moist refugium for macaques and other species during the dry glacial periods. She has encountered all five species in Huay Kha Khaeng Wildlife Sanctuary, where she has undertaken a study of their evolutionary and ecological relationships since 1973. The species do not seem to divide the environment up ecologically, and must roam through patches of a variety of forest types. Mixed species groups are common and some animals which appear to be hybrids have been seen.

Work on the systematics of Thai gibbons has been carried out in recent years by Fooden¹³, Marshall²⁰⁻²¹, and Brockelman²², and is still in progress. The specific taxonomy of gibbons, especially the *lar* group of species, has been continuously in a state of flux²³ and there is still no general agreement over how many species there are. At most five species can be recognized which form a superspecies of populations around the Sunda Shelf. They are all allopatric, but at least three areas of contact have been found in which there is some hybridization. These species are all confusingly polymorphic for coat color, which adds to the taxonomic problem. Three of these five *lar*-group species occur in Thailand: *pileatus* in the southeast, *lar* in the north, west (east of the Salween) and south, and *agilis* near the Malaysian border east of the Tephra River. *H. agilis* was recently discovered on the Thai side by Marshall²⁴, primarily by the distinctive vocal pattern of the male. In

Malaysia *H. agilis* occurs between the Perak and Mudah River, and spills over the mountains into Thailand.

Since the early 1960s Marshall has made sporadic observations in Khao Yai National Park which contains the only area where *lar* and *pileatus* can be found together, in the headwaters of the Takhong River. The finding of typical *lar* and *pileatus* forms together in the same habitat validated the specific status of *pileatus* as *H. pileatus*, and not *H. lar pileatus* as it has been called²⁵. The pileated gibbon is actually the most distinctive of the *lar* group: it is strikingly colored, sexually dichromatic (*lar* is asexually dichromatic) and its vocalizations are very distinctive. But in 1975, Marshall and I began finding some mixed species groups and scattered hybrids in Khao Yai. Since we know the territorial calls of both sexes of both species, we can locate these abnormal individuals and groups easily from auditory information. I have now mapped about 210 groups in the overlap zone, from Khlong Itao in the west to Khao Laem in the east, and I am studying the behavior and stability of mixed groups and the vocal patterns of hybrids. Analysis of the vocal patterns of mothers and daughters in some of the mixed groups has recently revealed that vocal patterns are largely under genetic control, with little, if any, influence of learning (Brockelman and Schilling, in preparation). This adds support to the use of vocalizations in gibbon taxonomy²⁰. Research on various aspects of gibbon behavior in Khao Yai has now been being initiated by S. Andelman and J. and P. Raemaekers, which will shed more light on evolutionary relationships.

There is still no reliable report of gibbons occurring in the northeast, north of the Mun River. The white-cheeked gibbon, *H. concolor*, has been reported by some animal dealers and naturalists, but this has never been confirmed. Another puzzle in primate distribution concerns the absence of langurs in Khao Yai National Park, although there are records of both *P. obscura* and *P. cristata* near Pak Chong to the north and *cristata* to the south. The forest in Khao Yai seems eminently suitable for langurs.

Thus, from the standpoint of evolutionary biology, the most interesting areas are at present, the west central region (for macaques), and Khao Yai Park (gibbons).

Behavior and Ecology

One of the first studies of the natural behavior of a primate was carried out in Chiang Mai in 1937 by C.R. Carpenter¹² as part of the Harvard Asiatic Primate Expedition. Carpenter, in only three months, was able to observe several groups and obtain a basic description of hylobatid social behavior which has stood the rigorous test of time. Subsequent studies have added more to our understanding of vocal behavior, although for a complete understanding of gibbon calling and its meaning we still have a long way to go. After Carpenter demonstrated that *lar* gibbons are monogamous and territorial no further field study of this size was done until Ellefson's two-year study in Malaya²⁶. Some brief observations of gibbons were made by Kawamura²⁷ in northwest Thailand.

The 1970s saw a resurgence of field work on gibbons, nearly all done as Ph.D. dissertations at the University of California at Davis and the University of Cambridge, in Malaysia and Indonesia. A recent one is the work of S.P. Gittins on the behavior of *H. agilis* at its border with *H. lar* in northern Malaya²⁸. Also among these is the first study of the pileated gibbon, carried out by S. Srikosamatara²⁹ in Khao Soi Dao Wildlife Sanctuary. This work has demonstrated that *pileatus* is very similar to *lar* ecologically, but has some significant behavioral differences. Additional work on the vocal behavior of *lar* is being carried out in Khao Yai Park by D. Kessawai, the Raemaekers and myself. Evolutionary separation of these species has involved social behavioral changes as well as changes in coloration.

No intensive studies of ecology or behavior have been performed on species of macaques or langurs in Thailand, but two studies of social behavior are in progress on the semi-tame group of *M. fascicularis* at Khao Sam Muk, Bang Saen, Chonburi Province by students of Mahidol University: K. Meeswat on the male dominance relations, and C. Chuwalsilp on infant social development. Several species of Thai monkeys have not been studied much at all in the field anywhere: *Presbytis phayrei*, *P. cristata*, *Macaca assamensis* and *M. arctoides*. There is also no good enlightening study of the slow loris.

The long term study of ecological relations of sympatric macaques in central-west Thailand initiated by A. A. Eudey was mentioned above^{18, 30-31}. This study emphasizes ranging and foraging behavior and relations with predators, aspects most likely to affect their relative distribution and dispersion.

Conservation

Under conservation I include the survey and protection of natural populations. There has been no systematic survey of wildlife populations in Thailand although a lot of distributional information is available for some groups such as birds and bats. An excellent system of national parks and wildlife sanctuaries has been started, and inventories of the habitat types and wildlife represented in these areas are badly needed. We need to know soon if these areas contain significant populations of all primate and other wildlife species.

I have estimated the area of habitat remaining for the three species of Thai gibbons from Landsat images³²⁻³³, and have started a more intensive survey of the pileated gibbon. All parks and sanctuaries within the range of this species in Thailand have been visited, although a few areas need some additional survey work. Standardized methods for estimating population density from auditory data have been developed³⁴. The population of this species within parks and sanctuaries is now estimated to be roughly 10,000 to 15,000 animals, figures which we will back up with data elsewhere. Most of these are in Khao Soi Dao Wildlife Sanctuary and Khao Yai National Park, with several hundreds in Khao Chamao and Khao Kitchakut Parks. Insignificant numbers remain in Khao Khieo Sanctuary and Khao Srabap Park, areas which have been heavily logged and hunted. On the whole, these areas were found to be about 95 percent unprotected against hunting. Only in Khao Chamao

is there nearly sufficient manpower to protect the forest. There seems to be no hope of saving any gibbon habitat outside of parks and sanctuaries.

A field research station has been initiated in Huai Kha Khaeng Wildlife Sanctuary, at Khao Nang Rum, with support from the New York Zoological Society. This facility, initiated with the help of A.A. Eudey, will benefit primate conservation in the area by encouraging research and education and increasing the presence of Forest Department personnel there.

Management

A major attempt was made by the SEATO Medical Research Laboratory (SMRL; now known as the Armed Forces Research Institute for Medical Science, or AFRIMS) to manage white-handed gibbons, which involved both captive breeding in cages and under free-ranging conditions on an island³⁵. The SMRL had acquired a colony of approximately 200 animals and was intending to use them at that time for research on human malaria. The gibbon subsequently proved not to be the most suitable experimental host for human malaria, but during the 1960s the SMRL pursued a rather vigorous program of breeding and management. The island colony was established in 1964 on Koh Klet Kaeo, a 24-ha island belonging to the Royal Thai Navy near Sattahip. It was discontinued in 1970. It was not as productive a breeding facility as originally hoped, but did yield useful information of social behavioral and ecological problems associated with using captive-reared animals to from a free-ranging population. As an experiment in rehabilitation it was quite successful; of 20 animals which were released during the first two years, four stable groups resulted which occupied their territories until the end, each producing one offspring. The project proved that rehabilitation of captive-reared animals is feasible, providing that they are paired carefully at the beginning and observed and managed properly during their adjustment to the environment³⁶⁻³⁹. The forest habitat on the island was scrubrier and lower than natural gibbon habitat, and additional problems would present themselves in a serious attempt to release gibbons in tall forest on the mainland. These include the presence of wild gibbons, hunters, the lack of barriers to dispersal, and greater difficulty in recapturing individuals which do not adjust properly.

In 1976, AFRIMS decided to discontinue its gibbon program because the animals were no longer essential for any research program, were expensive to maintain and because of some opposition by parties opposed to the use of primates in research. AFRIMS decided to release them as pairs and family groups in some natural habitat in a protected area near Sai Yoke, Kanchanaburi Province⁴⁰. A total of 31 animals were carefully released. Some were observed to survive in the rather dry habitat for many months, and a few joined natural groups in the area. But most simply disappeared in the forest without being seen again. The project might have demonstrated more success with better prior study of the habitat and natural groups in the area and follow-up by trained observers after release.

At present we have no gibbon management program. A program could be set up combining expert and humane care, education, research on behavior, repro-

ductive biology and diseases of gibbons, and selective release into natural environments. Instead, we now have large numbers of captive gibbons, owned by private individuals or animal dealers which are often poorly cared for, are not used for anything useful and which contribute nothing to the perpetuation of their own kind. Some day conservationists will wish they knew more about managing and breeding gibbons.

The captive breeding of Thai primates in general would be desirable because (1) there are legitimate uses for a limited number of primates in Thailand in laboratory research in universities and other institutions, and (2) the knowledge gained in management could in the long run benefit conservation. Animals used for laboratory research should not be taken from the wild. Unfortunately conservation agencies, with their very limited funds, usually can justify support for captive management programs only when the species are already critically endangered, when it is too late even to find enough animals to manage. The concern of university and other researchers over the availability and conservation of primates in Thailand was expressed at a symposium not long ago⁴¹. There is increasing agreement among local researchers that institutions which use primates in research should initiate programs for their long term management and conservation.

There have been several somewhat less systematic attempts to manage macaques. The Royal Forest Department has started a free-ranging colony of *M. fascicularis* at its Wildlife Research Center at Khao Khieo, Chonburi. The Dusit Zoo has also released a mixed colony of macaques at its "open zoo" also located at Khao Khieo, Chonburi. Four species, *M. nemestrina*, *mulatta*, *arctoides* and *fascicularis*, can be seen roaming about together over the ungulate grazing area and nearby deciduous woodland. A large stump-tail is the dominant male.

Macaques, nearly always *M. fascicularis*, are often inadvertently managed about temples or other shrines in rural areas. These are understood to be protected by the local guardian spirits or by religious sanction, and usually constitute the only remaining monkeys in areas over which they were once widespread. They are fed by visitors, but often receive so little exercise from foraging and a diet so rich in calories that they become obese and unsightly. Ways of improving the management and insuring the welfare of these animals should be found. In most areas their habitats are gradually deteriorating and shrinking around the shrines. This is especially true of the Lopburi colony.

Suggestions for Future Work

Future work is needed under every topic above, but I would rank the top priorities as follows.

1. Survey and inventory of primate populations of all species, especially in existing parks and sanctuaries. The data would help in the apportioning of limited protective efforts, obtaining outside financial support for conservation if needed, and in incorporating primates in education and tourism programs.

2. Training of technical expertise in primate biology in Thailand, and incorporation of primates in general wildlife and conservation training programs. To this

end, an M.S. degree curriculum in primate ecology and behavior has been initiated in the Faculty of Graduate Studies, Mahidol University.

3. Establishment of cooperative programs for the scientific management and breeding of primates for research, education and possible release into natural areas where they have been eliminated.

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บทคัดย่อ

ได้กล่าวถึงการวิจัยทางสนามในประเทศไทย ในหัวข้อต่อไปนี้เป็น (1) การจำแนกรูปแบบและวิวัฒนาการ (2) นิเวศวิทยาและพฤติกรรมศาสตร์ (3) การอนุรักษ์ และ (4) การจัดการ ถึงแม้จะมีผลงานอยู่บ้างแล้วในทั้งสี่หัวข้อนี้ แต่ยังมีงานริบด่วนจะต้องทำอีกมากกับไพรเมตที่ไม่ใช่คนอีก 13 สปีชีส์ งานที่มีความจำเป็นที่สุด คือ (1) การสำรวจและทำบัญชีประชากรที่อยู่ตามธรรมชาติ (2) การฝึกผู้ชำนาญในด้านชีววิทยาของไพรเมต และ (3) การจัดทำโครงการร่วมมือด้านการจัดการ และการอนุรักษ์