



Report of Rapid Biodiversity Assessments at Dinghushan Biosphere Reserve, Western Guangdong, 1998 and 2000

Kadoorie Farm and Botanic Garden
in collaboration with
South China Institute of Botany
South China Normal University
Xinyang Teachers' College
South China Agricultural University

March 2002

**South China Forest Biodiversity Survey Report Series: No. 7
(Online Simplified Version)**

Report of Rapid Biodiversity Assessments at Dinghushan Biosphere Reserve, Western Guangdong, 1998 and 2000

Editors

John R. Fellowes, Michael W.N. Lau, Billy C.H. Hau, Ng Sai-Chit and Bosco P.L. Chan

Contributors

Kadoorie Farm and Botanic Garden:	Bosco P.L. Chan	(BC)
	John R. Fellowes	(JRF)
	Billy C.H. Hau	(BH)
	Michael W.N. Lau	(ML)
	Lee Kwok Shing	(LKS)
	Ng Sai-Chit	(NSC)
South China Institute of Botany:	Graham T. Reels	(GTR)
	Gloria L.P. Siu	(GS)
	Chen Binghui	(CBH)
	Huang Zhongliang	(HZL)
	Ouyang Xuejun	(OXJ)
	Wang Ruijiang	(WRJ)
South China Agricultural University:	Xiao Mianyuan	(XMY)
South China Normal University:	Chen Xianglin	(CXL)
	Li Zhenchang	(LZC)
Xinyang Teachers' College:	Li Hongjing	(LHJ)
Voluntary consultants:	Keith D.P. Wilson	(KW)
	Guillaume de Rougemont	(GDR)

Background

The present report details the findings of two visits to western Guangdong by members of Kadoorie Farm & Botanic Garden (KFBG) in Hong Kong and their colleagues, as part of KFBG's South China Biodiversity Conservation Programme. The overall aim of the programme is to minimise the loss of forest biodiversity in the region, and the emphasis in the first phase is on gathering up-to-date information on the distribution and status of fauna and flora.

Citation

Kadoorie Farm and Botanic Garden, 2002. *Report of Rapid Biodiversity Assessments at Dinghushan Biosphere Reserve, Western Guangdong, 1998 and 2000*. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 7. KFBG, Hong Kong SAR, ii + 24pp.

Copyright

© Kadoorie Farm and Botanic Garden Corporation
Lam Kam Road, Tai Po, N.T., Hong Kong SAR

March 2002

Contents

Objectives	1
Methods	1
Location and management	2
Vegetation	2
Results	3
Flora	3
Mammals	9
Birds	11
Reptiles and Amphibians	14
Fish	15
Ants	15
Dragonflies	17
Butterflies	18
Rove Beetles	19
Summary of flora and fauna	19
Threats and problems	20
Opportunities and recommendations	20
Acknowledgements	21
References	21
Figure 1.	24

Common geographical descriptions and their Chinese phonetics

English meaning	Chinese phonetics (pinyin)
East	dong
South	nan
West	xi
North	bei
mountain	shan
range	ling
peak	feng, ding
valley	keng, gu
island	dao
river	he, chuan, jiang
stream	xi, yong
lake	hu, chi
sea	hai
harbour	gang
bay	wan
outlet	kou
city	shi
county	xian
village	xiang, cun
hamlet	tun
the Chinese system of geomancy	feng shui

Report of Rapid Biodiversity Assessments at Dinghushan Biosphere Reserve, Western Guangdong, 1998 and 2000

Objectives

Dinghushan Biosphere Reserve has been extensively studied, by members of the South China Institute of Botany and many other scientists. Current KFBG staff and survey participants (Gary Ades, JRF, BH, ML, GTR) visited the Reserve in 1995, collecting some data on the bird, reptile, amphibian and ant fauna. The aim of the present surveys was to supplement this earlier work, to provide a faunal and floral assessment comparable to that conducted at other sites in South China.

Methods

On 6 May 1998, following surveys in Southwest Guangdong (Kadoorie Farm and Botanic Garden, 2002a, 2002b, 2002c) the team (CBH, JRF, BH, ML, LKS, LHJ, LZC, GTR, WRJ, XMY) left Bajia for Dinghushan Biosphere Reserve near Zhaoqing.

During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, ants, butterflies and dragonflies was conducted. In the case of some birds and amphibians, calls were also used to detect and identify species. Estimates of the status of large and medium-sized mammals at Dinghushan were largely based on previous records, combined with observations in the field. The fish fauna of Dinghushan was not surveyed during these trips and the records presented here are collected from various sources. Previous records by team members are also included in this report, including records of mammals, birds, reptiles, amphibians, fish and ants made in September 1995, and those of orchids in December 1997, as detailed in the respective sections below.

All vascular plants species encountered were noted; a checklist was compiled by CBH, WRJ and XMY, and edited by NSC. In the case of orchids, records were verified and compiled by GS. Records of birds were made or verified by LKS, reptiles and amphibians by ML, LZC, or Dr. Allen Greer, fish by BC or CXL, ants by JRF, butterflies by GTR, dragonflies by KW of Hong Kong, and rove beetles by GDR, formerly of Hong Kong.

Nomenclature in the report is standardised based, unless otherwise stated, on the following references:

- Flora (Pteridophyta, Gymnospermae and Angiospermae excluding Orchidaceae): Anon. (1959-2000); Anon. (1996-2000); Anon. (2001); The Plant Names Project (2001);
- Orchids (Angiospermae: Orchidaceae): Chen (1999) and Tsi (1999);
- Mammals (Mammalia): D.E. Wilson & Reeder (1993); D.E. Wilson & Cole (2000);
- Birds (Aves): Inskipp *et al.* (1996);
- Reptiles and Amphibians (Reptilia and Amphibia): Zhao E. *et al.* (2000);
- Fish (Actinopterygii): Nelson (1994); Wu *et al.* (1999);
- Ants (Insecta: Hymenoptera: Formicidae): named species according to Bolton (1995); unnamed species with reference numbers according to the collection currently held by KFBG.
- Dragonflies (Insecta: Odonata): Schorr *et al.* (2001a, 2001b);
- Butterflies (Insecta: Lepidoptera): Bascombe (1995);
- Rove Beetles (Insecta: Coleoptera: Staphylinidae): G. de Rougemont (unpublished).

Information on the global status of species is from IUCN publications, notably IUCN Species Survival Commission (2001). National conservation status of orchids is based on Wang *et al.* (in press). Protected status in China is based on Hua & Yan (1993) for animals and State Forestry Administration & Ministry of Agriculture (1999) for plants. Provincial protected status of plants is based on Guangdong Provincial Environmental Protection Bureau & South China Institute of Botany (1988). Certain taxa, including orchids, reptiles, amphibians, fish and invertebrates, have yet to be properly assessed for global status.

Location and management

Dinghushan Man and Biosphere Reserve is situated in Zhaoqing of Guangdong Province, at 112°31' – 112°34'E, 23°10' – 23°11'N. Bordering Xijiang in the south and the Jiukeng Mountains in the north, Dinghushan is 89 km west of Guangzhou and 19 km east of Zhaoqing city centre. The nature reserve, the oldest in China, was established in 1956 with the objective of protecting southern subtropical monsoonal evergreen broadleaf forest. It is listed as a National-level Forest Ecosystem Nature Reserve (Zhang W., 1998). It is 11.6 km² in size and ranges from 200 to 850 m in altitude. It is under the management of South China Institute of Botany, Academia Sinica.

Vegetation

The zonal vegetation of the region is southern subtropical monsoon evergreen broadleaf forest. This vegetation can be broadly divided into the following types (Kong G. *et al.*, 1993; Kong G.H., 1997):

- (1) Southern subtropical monsoon evergreen riparian forest (6 ha) is distributed along streams below 30m, and mainly dominated by *Cleistocalyx operculatus*, *Syzygium jambos* and *Schefflera octophylla*.
- (2) Northern tropical monsoon ravine rainforest (38 ha) is distributed in low-altitude valleys, and mainly dominated by *Ficus nervosa*, *Caryota ochlandra*, *Canarium pimela* and other species. This vegetation type also has the most well-developed liana community in the area, dominated by *Tetrastigma planicaule*, *Fissistigma glaucescens*, and *Mucuna birdwoodiana*.
- (3) Southern subtropical monsoon evergreen broadleaf forest (125 ha) occurs at medium altitude. Dominant species include *Castanopsis chinensis*, *Cryptocarya concinna*, *Gironniera subaequalis*, *Sterculia lanceolata* and *Schima superba*. This vegetation type and the ravine rainforest contains the largest trees (over 20 m in height), and is probably the closest to primary forest remaining in the region.
- (4) Southern subtropical montane evergreen broadleaf forest (47 ha) is distributed on hillsides at higher altitudes. *Lithocarpus hancei*, *Castanopsis fissa*, *Castanopsis fabri*, *Machilus chinensis*, *Engelhardtia fenzelii* are dominant species.
- (5) Southern subtropical coniferous forest (112 ha), dominated by *Pinus massoniana*, occurs around low altitude.
- (6) Southern subtropical mixed coniferous/broadleaf forest occupies the largest area (404 ha) at 80–400 m, and is dominated by *Pinus massoniana*, *Schima superba*, *Castanopsis chinensis* and *Craibiodendron kwangtungense*. Mixed forests in the area were originally pure stands of conifer plantation, which were invaded by broadleaf tree and shrub species.
- (7) Southern subtropical hillside scrub/grassland (119 ha) is distributed at higher altitudes and is mainly dominated by *Rhododendron moultainense*, *Rhododendron tinghuense*, *Baeckea frutescens*, *Rhodomlyrtus tomentosa* and *Miscanthus sinensis*. This vegetation has probably resulted from prolonged disturbance, such as deforestation and hill fires, in open and impoverished environments, leading to degradation of vegetation and soil.

Results

Flora

Up to 2,054 wild plant species (including 46 orchids) had been recorded from Dinghushan Biosphere Reserve in earlier surveys (Dinghushan Arboretum, 1978). The present surveys recorded 272 species of angiosperm in 87 families, five species of gymnosperm in four families, and 22 species of pteridophyte in 16 families (Table 1). The flora is mainly composed of families with tropical and sub-tropical distribution. The most important families in the communities surveyed include Euphorbiaceae, Lauraceae, Moraceae, Rubiaceae, legume families and Myrtaceae.

Among the plants recorded in these surveys, *Erythrophleum fordii* is listed as globally Endangered, while *Aquilaria sinensis* is listed as Vulnerable. Both are under Class II national protection in China. *Litchi chinensis* var. *euspontanea* is listed as Vulnerable and *Dimocarpus longan* as Lower Risk (Near-threatened) globally, although they are not protected by law in China. In addition to these threatened species, five nationally protected species were found in this survey, of which one (*Cycas taiwaniana*) is Class I Protected and four (*Alsophila spinulosa*, *Gymnosphaera podophylla*, *Cibotium barometz*, *Cinnamomum camphora*) are Class II Protected. It should be noted however that *A. sinensis*, *D. longan* and *C. camphora* have long history of planting as a tree crop in this region, and the plants found here might be naturalized trees. Three plants that are endemic to Guangdong Province (*Ilex asprella* var. *tapuensis*, *Rhododendron tingwuense* and *Maesa salicifolia*) were also found in the present surveys.

Three orchids recorded are listed in CITES Appendix II. Two of these were recorded in December 1997 by GS and Lawrence Chau of KFBG. All three are widespread in South and Southwest China. These few species recorded do not adequately represent the true orchid flora of the reserve (Dinghushan Arboretum, 1978).

A number of other threatened and protected species have previously been recorded from Dinghushan (Dinghushan Arboretum, 1978), but were not encountered during these surveys (Table 2). They include two orchids (*Cymbidium sinense* and *Anoectochilus roxburghii*) which are Endangered nationally, and one (*Cymbidium ensifolium*) which is nationally Vulnerable. Nine nationally protected species have previously been recorded, including *Glyptostrobilus pensilis*, which is now believed to be locally extinct in the wild. Nine species that are endemic to Guangdong have been recorded previously including four species known only from Dinghushan.

Table 1. Vascular plants of Dinghushan Biosphere Reserve recorded in these surveys. Includes two orchid species (#) recorded in December 1997. Species which are Nationally Protected (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999), Protected in Guangdong (Guangdong Provincial Environmental Protection Bureau & South China Institute of Botany, 1988), globally Threatened or Lower Risk (Near-threatened) (IUCN Species Survival Commission, 2001) or endemic to Guangdong are indicated.

Family	Scientific name	Remarks
PTERIDOPHYTA		
Blechnaceae	<i>Blechnum orientale</i> L.	
	<i>Woodwardia japonica</i> (L.f.) Sm.	
Cyatheaceae	<i>Alsophila spinulosa</i> (Wall. ex Hook.) R.M.Tryon	Protected II
	<i>Gymnosphaera podophylla</i> (Hook.) Copel.	Protected II
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Drynariaceae	<i>Pseudodrynaria coronans</i> (Wall. ex Mett.) Ching	
Equisetaceae	<i>Equisetum debile</i> Roxb.	
Gleicheniaceae	<i>Dicranopteris pedata</i> (Houtt.) Nakaike	
Lindsaeaceae	<i>Lindsaea heterophylla</i> Dryand.	
	<i>Stenoloma chusanum</i> (L.) Ching	
Lycopodiaceae	<i>Lycopodium casuarinoides</i> (Spring) Holub	

Family	Scientific name	Remarks
	<i>Palhinhaea cernua</i> (L.) Franco et Vasc.	
Lygodiaceae	<i>Lygodium japonicum</i> (Thunb.) Sw. <i>Lygodium scandens</i> (L.) Sw.	
Nephrolepidaceae	<i>Nephrolepis auriculata</i> (L.) Trimea	
Osmundaceae	<i>Osmunda vachellii</i> Hook.	
Polypodiaceae	<i>Pyrrosia lanceolata</i> (L.) Farw.	
Pteridaceae	<i>Pteris semipinnata</i> L. <i>Pteris vittata</i> L.	
Selaginellaceae	<i>Selaginella uncinata</i> (Desv.) Spring	
Sinopteridaceae	<i>Onychium japonicum</i> (Thunb.) Kunze	
Thelypteridaceae	<i>Cyclosorus parasiticus</i> (L.) Farw.	
GYMNOSPERMAE		
Cycadaceae	<i>Cycas taiwaniana</i> Carruth.	Protected I
Gnetaceae	<i>Gnetum montanum</i> Markgr.	
Pinaceae	<i>Pinus massoniana</i> Lamb.	
Podocarpaceae	<i>Dacrycarpus imbricatus</i> (Blume) de Laub. <i>Nageia fleuryi</i> (Hickel) de Laub.	
ANGIOSPERMAE		
Dicotyledonae		
Acanthaceae	<i>Hygrophila salicifolia</i> (Vahl.) Ness	
Actinidiaceae	<i>Saurauia tristyla</i> DC.	
Alangiaceae	<i>Alangium chinense</i> (Lour.) Harms.	
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burtt et. A.W. Hill <i>Dracontomelon duperreanum</i> Pierre <i>Rhus chinensis</i> Mill. <i>Toxicodendron succedaneum</i> (L.) Kuntze.	
Annonaceae	<i>Artabotrys hexapetalus</i> (L. f.) Bhandari <i>Desmos chinensis</i> Lour. <i>Fissistigma glaucescens</i> (Hance) Merr. <i>Fissistigma oldhamii</i> (Hemsl.) Merr. <i>Fissistigma uonicum</i> (Dunn) Merr. <i>Uvaria microcarpa</i> Champ. ex Benth.	
Apiaceae	<i>Centella asiatica</i> (L.) Urb. <i>Hydrocotyle sibthorpioides</i> Lam.	
Apocynaceae	<i>Melodinus suaveolens</i> Champ. ex Benth. <i>Trachelospermum jasminoides</i> (Lindl.) Lem.	
Aquifoliaceae	<i>Urceola micrantha</i> (Wall. ex G. Don) D.J. Middleton <i>Ilex asprella</i> (Hook. et Arn.) Champ.ex Benth. var. <i>tapuensis</i> S.Y. Hu <i>Ilex kaushue</i> S.Y. Hu <i>Ilex pubescens</i> Hook. et Arn. <i>Ilex rotunda</i> Thunb.	endemic to Guangdong
Araliaceae	<i>Aralia decaisneana</i> Hance <i>Schefflera octophylla</i> (Lour.) Harms	
Asteraceae	<i>Ageratum conyzoides</i> L. <i>Bidens biternata</i> (Lour.) Merr. et Sherff. <i>Elephantopus scaber</i> L. <i>Emilia sonchifolia</i> (L.) DC. <i>Synedrella nodiflora</i> (L.) Gaertn. <i>Vernonia cinerea</i> (L.) Less. <i>Wedelia chinensis</i> (Osbeck) Merr.	introduced from tropical America pantropical weed introduced from tropical America pantropical weed
Balsaminaceae	<i>Impatiens apalophylla</i> Hook.f. <i>Impatiens chinensis</i> L.	
Begoniaceae	<i>Begonia fimbriatipula</i> Hance <i>Begonia palmata</i> D. Don	
Burseraceae	<i>Canarium album</i> (Lour.) Raeusch. <i>Canarium pimela</i> Leenhouts	
Caesalpiniaceae	<i>Bauhinia championii</i> (Benth.) Benth.	

Family	Scientific name	Remarks
	<i>Cassia occidentalis</i> L.	introduced from tropical America
	<i>Cassia tora</i> L.	pantropical weed
	<i>Erythrophleum fordii</i> Oliv.	Protected II, Endangered (IUCN)
Capparaceae	<i>Capparis cantoniensis</i> Lour.	
Caprifoliaceae	<i>Lonicera confusa</i> (Sweet) DC.	
	<i>Sambucus chinensis</i> Lindl.	
	<i>Viburnum fordiae</i> Hance	
	<i>Viburnum odoratissimum</i> Ker Gawl.	
Celastraceae	<i>Euonymus laxiflorus</i> Champ. ex Benth.	
Chloranthaceae	<i>Sarcandra glabra</i> (Thunb.) Nakai	
Clusiaceae	<i>Cratoxylum cochinchinense</i> (Lour.) Blume	
	<i>Garcinia multiflora</i> Champ. ex Benth.	
	<i>Hypericum japonicum</i> Thunb. ex Murray	
Connaraceae	<i>Rourea microphylla</i> (Hook. & Arn.) Planch.	
Convolvulaceae	<i>Erycibe obtusifolia</i> Benth.	
Cucurbitaceae	<i>Gynostemma pentaphylla</i> (Thunb.) Makino	
Daphniphyllaceae	<i>Daphniphyllum calycinum</i> Benth	
	<i>Daphniphyllum oldhami</i> (Hemsl.) Rosenth.	
Dilleniaceae	<i>Tetracera asiatica</i> (Lour.) Hoog.	
Ebenaceae	<i>Diospyros eriantha</i> Champ. ex Benth.	
	<i>Diospyros morrisiana</i> Hance ex Walpers	
Elaeocarpaceae	<i>Elaeocarpus sylvestris</i> (Lour.) Poir.	
Ericaceae	<i>Craibiodendron kwangtungense</i> S. Y. Hu	
	<i>Rhododendron moulmianense</i> Hook. f.	
	<i>Rhododendron simsii</i> Planch.	
	<i>Rhododendron tingwuense</i> P. C. Tam	endemic to Guangdong
Escalloniaceae	<i>Itea chinensis</i> Hook. et Arn	
Euphorbiaceae	<i>Alchornea trewioides</i> (Benth.) Müll. Arg.	
	<i>Aporosa dioica</i> (Roxb.) Müll. Arg.	
	<i>Breynia fruticosa</i> (L.) Hook. f.	
	<i>Bridelia insulana</i> Hance	
	<i>Bridelia tomentosa</i> Blume	
	<i>Croton lachnocarpus</i> Benth.	
	<i>Endospermum chinense</i> Benth.	
	<i>Euphorbia hirta</i> L.	
	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt.	
	<i>Glochidion wrightii</i> Benth.	
	<i>Glochidion zeylanicum</i> (Gaertn.) A. Juss.	
	<i>Macaranga sampsoni</i> Hance	
	<i>Mallotus apelta</i> (Lour.) Müll. Arg.	
	<i>Mallotus paniculatus</i> (Lam.) Müll. Arg.	
	<i>Microdesmis caseariifolia</i> Planch.	
	<i>Phyllanthus cochinchinensis</i> (Lour.) Spreng.	
	<i>Phyllanthus emblica</i> L.	
	<i>Phyllanthus reticulatus</i> Poir.	
	<i>Sapium discolor</i> (Champ. ex Benth.) Müll. Arg.	
	<i>Sapium sebiferum</i> (L.) Roxb.	
Fagaceae	<i>Castanopsis chinensis</i> (Spreng.) Hance	
	<i>Castanopsis fabri</i> Hance	
	<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder et E. H. Wilson	
	<i>Cyclobalanopsis fleuryi</i> (Hickel et A. Camus) Chun ex Q. F. Zheng	
	<i>Lithocarpus hancei</i> (Benth.) Rehder	
	<i>Lithocarpus litseifolius</i> (Hance) Chun	
Flacourtiaceae	<i>Casearia balansae</i> Gagnep.	
Gesneriaceae	<i>Oreocharis benthami</i> C. B. Clarke	
Hamamelidaceae	<i>Altingia chinensis</i> (Champ. ex Benth.) Oliv. ex Hance	
	<i>Liquidambar formosana</i> Hance	
Hernandiaceae	<i>Illigera rhodantha</i> Hance	

Family	Scientific name	Remarks
Hydrangeaceae	<i>Dichroa febrifuga</i> Lour.	
Juglandaceae	<i>Engelhardtia fenzelii</i> Merr.	
Lamiaceae	<i>Anisomeles indica</i> (L.) Kuntze	
Lauraceae	<i>Cassytha filiformis</i> L.	
	<i>Cinnamomum burmanni</i> (Nees et T. Nees) Blume	Protected II
	<i>Cinnamomum camphora</i> (L.) J. Presl.	
	<i>Cinnamomum porrectum</i> (Roxb.) Kosterm.	
	<i>Cryptocarya concinna</i> Hance	
	<i>Lindera aggregata</i> (Sims) Kosterm.	
	<i>Lindera chunii</i> Merr.	
	<i>Litsea cubeba</i> (Lour.) Pers.	
	<i>Litsea glutinosa</i> (Lour.) C. B. Rob.	
	<i>Litsea monopetala</i> (Roxb. ex Baker) Pers.	
	<i>Litsea rotundifolia</i> Hemsl. var. <i>oblongifolia</i> (Nees) C. K. Allen	
	<i>Litsea verticillata</i> Hance	
	<i>Machilus chinensis</i> (Champ. ex Benth.) Hemsl.	
	<i>Machilus velutina</i> Champ. ex Benth.	
	<i>Neolitsea chunii</i> Merr.	
Liliaceae	<i>Ophiopogon japonicus</i> (L. f.) Ker Gawl.	
Loganiaceae	<i>Buddleja lindleyana</i> Fortune	
	<i>Gelsemium elegans</i> (Gardner et Champ.) Benth.	
Magnoliaceae	<i>Manglietia moto</i> Dandy	
Malvaceae	<i>Abelmoschus moschatus</i> (L.) Medic.	
	<i>Abutilon indicum</i> (L.) Sweet	
	<i>Urena lobata</i> L.	pantropical weed
	<i>Urena procumbens</i> L.	
Melastomataceae	<i>Blastus cochinchinensis</i> Lour.	
	<i>Melastoma candidum</i> D. Don	
	<i>Melastoma sanguineum</i> Sims	
Menispermaceae	<i>Diploclisia glaucescens</i> (Blume) Diels	
	<i>Stephania longa</i> Lour.	
Mimosaceae	<i>Acacia confusa</i> Merr.	introduced
	<i>Adenantha pavonina</i> L. var. <i>microsperma</i> (Teijsm. et Binnend.) I. C. Nielsen	
	<i>Albizia corniculata</i> (Lour.) Druce	
	<i>Cylindrokelupha turgida</i> (Merr.) T.L. Wu	
	<i>Pithecellobium clypearia</i> (Jack) Benth.	
	<i>Pithecellobium lucidium</i> Benth.	
Moraceae	<i>Cudrania cochinchinensis</i> (Lour.) Kudo et Masam.	
	<i>Ficus esquiroliana</i> H. Lév.	
	<i>Ficus fistulosa</i> Reinw. ex Blume	
	<i>Ficus hirta</i> Vahl	
	<i>Ficus hispida</i> L. f.	
	<i>Ficus microcarpa</i> L. f.	
	<i>Ficus nervosa</i> B. Heyne ex Roth.	
	<i>Ficus pumila</i> L.	
	<i>Ficus pyriformis</i> Hook. et Arn.	
Moraceae	<i>Ficus religiosa</i> L.	
	<i>Ficus variegata</i> Blume var. <i>chlorocarpa</i> (Benth.) King	
	<i>Ficus variolosa</i> Lindl. ex Benth.	
	<i>Ficus virens</i> Ait.	
Myricaceae	<i>Myrica rubra</i> (Lour.) Sieb. et Zucc.	
Myrsinaceae	<i>Ardisia mamillata</i> Hance	
	<i>Ardisia quinquegona</i> Blume	
	<i>Embelia laeta</i> (L.) Mez	
	<i>Embelia ribes</i> Burm. f.	
	<i>Maesa perlaris</i> (Lour.) Merr.	
	<i>Maesa salicifolia</i> E. Walker	endemic to Guangdong
	<i>Mysine sequinii</i> H. Lév	

Family	Scientific name	Remarks	
Myrtaceae	<i>Acmena acuminatissima</i> (Blume) Merr. et L.M. Perry		
	<i>Baeckea frutescens</i> L.		
	<i>Cleistocalyx operculatus</i> (Roxb.) Merr. et L.M. Perry		
	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk.		
	<i>Syzygium buxifolium</i> Hook. et Arn.		
	<i>Syzygium hancei</i> Merr. et L.M. Perry		
	<i>Syzygium jambos</i> (L.) Alston		
	<i>Syzygium levinei</i> (Merr.) Merr. et L.M. Perry		
	Oleaceae	<i>Jasminum elongatum</i> (Bergius) Willd.	
		<i>Jasminum lanceolarium</i> Roxb.	
Oxalidaceae	<i>Oxalis corymbosa</i> DC.		
Papilionaceae	<i>Bowringia callicarpa</i> Champ. ex Benth.		
	<i>Crotalaria pallida</i> Ait.		
	<i>Dalbergia hancei</i> Benth.		
	<i>Desmodium heterocarpon</i> (L.) DC.		
	<i>Flemingia macrophylla</i> Kuntze ex Prain		
	<i>Kummerowia striata</i> (Thunb.) Schindl.		
	<i>Millettia dielsiana</i> Harms		
	<i>Millettia pachycarpa</i> Benth.		
	<i>Mucuna birdwoodiana</i> Tutch.		
	<i>Phyllodium elegans</i> (Lour.) Desv.		
	<i>Pueraria lobata</i> (Willd.) Ohwi		
<i>Tadehagi triquetrum</i> (L.) H. Ohashi			
Passifloraceae	<i>Passiflora foetida</i> L.		
Piperaceae	<i>Piper hancei</i> Maxim.		
	<i>Piper kadsura</i> (Choisy) Ohwi		
Pittosporaceae	<i>Pittosporum glabratum</i> Lindl.		
Plantaginaceae	<i>Plantago major</i> L.	introduced	
Polygalaceae	<i>Securidaca inappendiculata</i> Hassk.		
Polygonaceae	<i>Polygonum chinense</i> L.		
	<i>Polygonum hydropiper</i> L.		
	<i>Polygonum perfoliatum</i> L.		
Primulaceae	<i>Lysimachia fortunei</i> Maxim.		
Proteaceae	<i>Helicia reticulata</i> W.T. Wang		
Rhizophoraceae	<i>Carallia brachiata</i> (Lour.) Merr.		
Rosaceae	<i>Eriobotrya fragrans</i> Champ. ex Benth.		
	<i>Laurocerasus phaeosticta</i> (Hance) C.K. Schneid.		
	<i>Pygeum topengii</i> Merr.		
	<i>Pyrus calleryana</i> (L.) Lindl. var. <i>koehnei</i> (C.K. Schnieb.) T. T. Yu		
	<i>Raphiolepis indica</i> (L.) Lindl.		
	<i>Rosa laevigata</i> Michx.		
	<i>Rubus alceaefolius</i> Poir.		
	Rubiaceae	<i>Adina pilulifera</i> (Lam.) Franch. ex Drake	
		<i>Aidia pycnantha</i> (Drake) Tirveng.	
		<i>Diplospora dubia</i> (Lindl.) Masam.	
<i>Gardenia jasminoides</i> J. Ellis			
<i>Hedyotis hedyotidea</i> (DC.) Merr.			
<i>Ixora chinensis</i> Lam.			
<i>Morinda umbellata</i> L.			
<i>Mussaenda pubescens</i> W.T. Aiton			
<i>Ophiorrhiza cantoniensis</i> Hance			
<i>Paederia scandens</i> (Lour.) Merr.			
<i>Pavetta hongkongensis</i> Brem.			
<i>Psychotria asiatica</i> L.			
<i>Psychotria serpens</i> L.		epiphytic	
<i>Wendlandia uvariifolia</i> Hance			
Rutaceae	<i>Evodia lepta</i> (Spreng.) Merr.		
	<i>Toddalia asiatica</i> (L.) Lam.		
	<i>Zanthoxylum nitidum</i> (Roxb.) DC.		

Family	Scientific name	Remarks
Santalaceae	<i>Dendrotrophe frutescens</i> (Champ. ex Benth.) Danser	
Sapindaceae	<i>Dimocarpus longan</i> Lour. <i>Litchi chinensis</i> Sonn. var. <i>euspontanea</i> H.H. Hsue <i>Mischocarpus pentapetalus</i> (Roxb.) Radlk.	Lower Risk (IUCN) Vulnerable (IUCN)
Sapotaceae	<i>Sarcosperma laurinum</i> (Benth.) Hook. f.	
Saururaceae	<i>Houttuynia cordata</i> Thunb.	
Scrophulariaceae	<i>Lindernia crustacea</i> (L.) F. Muell. <i>Scoparia dulcis</i> L.	
Sterculiaceae	<i>Byttneria aspera</i> Colebr. ex Wall. <i>Helicteres angustifolia</i> L. <i>Pterospermum heterophyllum</i> Hance <i>Sterculia lanceolata</i> Cav.	
Styracaceae	<i>Alniphyllum fortunei</i> (Hemsl.) Makino <i>Styrax suberifolius</i> Hook. et Arn.	
Symplocaceae	<i>Symplocos adenopus</i> Hance	
Theaceae	<i>Camellia oleifera</i> Abel <i>Camellia semiserrata</i> C. W. Chi <i>Eurya chinensis</i> R. Br. <i>Eurya groffii</i> Merr. <i>Schima superba</i> Gardn. et Champ.	
Thymelaeaceae	<i>Aquilaria sinensis</i> (Lour.) Spreng. <i>Wikstroemia indica</i> (L.) C. A. Mey.	Protected II, Vulnerable (IUCN)
Tiliaceae	<i>Microcos paniculata</i> L. <i>Triumfetta rhomboidea</i> Jacq.	
Ulmaceae	<i>Trema orientalis</i> (L.) Blume	
Urticaceae	<i>Boehmeria nivea</i> (L.) Gaudich. <i>Pouzolzia zeylanica</i> (L.) Benn. et R. Br. ex Benn. Etal	
Verbenaceae	<i>Callicarpa formosana</i> Rolfe <i>Clerodendrum cyrtophyllum</i> Turcz. <i>Clerodendrum fortunatum</i> L. <i>Vitex quinata</i> (Lour.) F. N. Williams	
Violaceae	<i>Viola diffusa</i> Ging.	
Vitaceae	<i>Ampelopsis cantoniensis</i> (Hook. & Arn.) Planch. <i>Cayratia japonica</i> (Thunb.) Gagnep. <i>Tetrastigma planicaule</i> (Hook. f.) Gagnep.	
Monocotyledonae		
Araceae	<i>Acorus gramineus</i> Sol. <i>Alocasia macrorrhiza</i> (L.) Schott <i>Pothos chinensis</i> (Raf.) Merr. <i>Pothos repens</i> (Lour.) Druce <i>Calamus rhabdocladus</i> Burret <i>Caryota ochlandra</i> Hance	
Commelinaceae	<i>Floscopa scandens</i> Lour.	
Dioscoreaceae	<i>Dioscorea cirrhosa</i> Lour.	
Liliaceae	<i>Asparagus cochinchinensis</i> (Lour.) Merr. <i>Dianella ensifolia</i> (L.) DC. <i>Smilax china</i> L. <i>Smilax lanceifolia</i> Roxb.	
Orchidaceae	<i>Acampe rigida</i> (Buch.-Ham. ex Sm.) P.F. Hunt <i>Cleisostoma</i> sp. <i>Pholidota chinensis</i> Lindl.	# epiphytic # epiphytic epiphytic
Pandanaceae	<i>Pandanus austrosinensis</i> T. L. Wu	
Poaceae	<i>Ischaemum indicum</i> (Houtt.) Merr. <i>Microstegium vagans</i> (Nees ex Steud.) A. Camus <i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum et Lauterb. <i>Miscanthus sinensis</i> Andersson <i>Paspalum orbiculare</i> Forst. <i>Setaria palmifolia</i> (J. Koenig) Stapf	

Family	Scientific name	Remarks
	<i>Thysanolaena maxima</i> (Roxb.) Kuntze	
Zingiberaceae	<i>Costus speciosus</i> (J. Koenig) Smith	

Table 2. Previously recorded endemic, endangered and protected species in Dinghushan Biosphere Reserve that were not encountered in these surveys. Species that are Nationally Protected (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999), nationally Threatened (Wang *et al.*, in press), Protected in Guangdong (Guangdong Provincial Environmental Protection Bureau & South China Institute of Botany, 1988), globally Threatened or Lower Risk (Near-threatened) (IUCN, 2001) or endemic to Guangdong are indicated.

Family	Scientific name	Remarks
Athyriaceae	<i>Monomelangium dinghushanicum</i> Ching et S.H. Wu	endemic to Dinghushan
Blechnaceae	<i>Brainea insignis</i> (Hook.) J. Sm.	Protected II
Cyatheaceae	<i>Alsophila latebrosa</i> Wall. ex Hook.	Protected II
Cyatheaceae	<i>Gymnosphaera gigantea</i> (Wall. ex Hook.) Ching	Protected II
Helminthostachyaceae	<i>Helminthostachys zeylanica</i> (L.) Hook.	Protected II
Parkeriaceae	<i>Ceratopteris thalictroides</i> (L.) Brongn.	Protected II
Taxodiaceae	<i>Glyptostrobus pensilis</i> (Staunton) K. Koch	Protected I
Asclepiadaceae	<i>Merrillanthus hainanensis</i> Chun et Tsiang	Protected II
Caesalpiniaceae	<i>Caesalpinia sappan</i> L.	Protected in Guangdong
Celastraceae	<i>Euonymus kwangtungensis</i> C.Y. Cheng	endemic to Guangdong
Fagaceae	<i>Cyclobalanopsis dinghuensis</i> (C.C. Huang) Y.C. Hsu & H. W. Jen	endemic to Dinghushan
Lauraceae	<i>Litsea pittosporifolia</i> Yen C. Yang & P.H. Huang	endemic to Dinghushan
Meliaceae	<i>Toona ciliata</i> M. Roem. var. <i>pubescens</i> (Franch.) Hand.-Mazz.	Protected II
Orchidaceae	<i>Anoectochilus roxburghii</i> (Wall.) Lindl.	terrestrial, Endangered in China
	<i>Cymbidium ensifolium</i> (L.) Sw.	terrestrial, Vulnerable in China
	<i>Cymbidium sinense</i> (Andr.) Willd.	terrestrial, Endangered in China
Papilionaceae	<i>Ormosia pachycarpa</i> Champ. ex Benth. <i>Tenuis</i> Chun	endemic to Guangdong
Rubiaceae	<i>Hedyotis matthewii</i> Dunn	endemic to Guangdong
	<i>Neanotis thwaitesiana</i> (Hance) W.H. Lewis	endemic to Guangdong
Sapotaceae	<i>Madhuca pasquieri</i> (Dubard) H.J. Lam	Protected II
Theaceae	<i>Camellia hongkongensis</i> Seem.	endemic to Guangdong
Verbenaceae	<i>Callicarpa tingwuensis</i> H.T. Chang	endemic to Dinghushan

Mammals

No local residents were interviewed during these brief surveys. On these occasions, and on a previous visit from 25 to 27 September 1995, no firm evidence of medium-sized or large mammals was found. Droppings of a large murid rodent (probably *Bandicota indica* or *Leopoldamys edwardsi*) were found in 1995 (G. Ades & Fellowes, 1996). Previous records were given by Liu (1982) (Table 3).

Table 3. Mammals recorded at Dinghushan. List from Liu (1982, cited by Kong G. *et al.*, 1993). Identifications and scientific names corrected with reference to Corbet & Hill (1992), D.E. Wilson & Reeder (1993) and D.E. Wilson & Cole (2000).

Scientific name	English name	Specimen	Probable local status
<i>Suncus murinus</i>	Asian House Shrew		present
<i>Rousettus leschenaulti</i>	Leschenault's Rousette		present
<i>Hipposideros armiger</i>	Great Roundleaf Bat		present
<i>Hipposideros larvatus</i>	Intermediate Roundleaf Bat		present
<i>Hipposideros pomona</i>	Pomona Roundleaf Bat		present
<i>Kerivoula picta</i>	Painted Bat		not known
<i>Nyctalus noctula</i>	Noctule		present
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle		absent; probable misidentification of <i>P. abramus</i> or <i>P. pulveratus</i> , which have been recorded in Hong Kong (G.W.J. Ades 1994).

Scientific name	English name	Specimen	Probable local status
<i>Scotophilus kuhlii</i>	Lesser Asiatic Yellow Bat		present (recorded as <i>S. temmincki</i>)
<i>Scotophilus heathi</i>	Greater Asiatic Yellow Bat		not known
<i>Cuon alpinus</i>	Dhole		extirpated
<i>Nyctereutes procyonoides</i>	Raccoon Dog	✓	insecure or extirpated
<i>Vulpes vulpes</i>	Red Fox		extirpated
<i>Prionailurus bengalensis</i>	Leopard Cat	✓	insecure (recorded as <i>Felis bengalensis</i>)
<i>Panthera pardus</i>	Leopard		extirpated
<i>Panthera tigris</i>	Tiger		extirpated
<i>Herpestes javanicus</i>	Javan Mongoose		insecure (recorded as <i>H. auropunctata</i>)
<i>Lutra lutra</i>	European Otter		extirpated
<i>Mustela sibirica</i>	Siberian Weasel		insecure
<i>Mustela kathiah</i>	Yellow-bellied Weasel		insecure or extirpated
<i>Melogale moschata</i>	Chinese Ferret-badger	✓	insecure
<i>Paguma larvata</i>	Masked Palm Civet		insecure
<i>Prionodon pardicolor</i>	Spotted Linsang	✓	extirpated
<i>Viverricula indica</i>	Small Indian Civet	✓	insecure
<i>Sus scrofa</i>	Wild Boar	✓	present
<i>Muntiacus muntjak</i>	Indian Muntjac	✓	very rare
<i>Naemorhedus sumatraensis</i>	Serow		extinct (recorded as <i>Capricornis sumatraensis argyrochaetes</i>)
<i>Manis pentadactyla</i>	Chinese Pangolin	✓	very rare or extinct
<i>Bandicota indica</i>	Greater Bandicoot Rat		present
<i>Leopoldamys edwardsi</i>	Edwards's Long-tailed Giant Rat		present (recorded as <i>Rattus edwardsi bedwardsi</i> [sic])
<i>Mus musculus</i>	House Mouse		present
<i>Niviventer fulvescens</i>	Chestnut White-bellied Rat		present (recorded as <i>Rattus huang</i>)
<i>Rattus nitidus</i>	Himalayan Field Rat		present
<i>Rattus norvegicus</i>	Brown Rat		present
<i>Rattus rattus</i>	House Rat		present (including the form known as <i>R. flavipectus</i>)
<i>Rattus turkestanicus</i>	Turkestan Rat		(recorded as <i>R. rattoides bexiguus</i>)
<i>Hystrix brachyura</i>	Malayan Porcupine		insecure or extinct (recorded as <i>H. hodgsoni subcristata</i>)

The specimen records should be treated with caution because animals confiscated by officials have often been released into the reserve (Prof. Kong Guohui, South China Institute of Botany, pers. comm., 1998).

Due to the small size and isolation of the reserve, and to severe hunting pressure, the mammal fauna is highly impoverished. Many of the larger mammals recorded previously are likely to be locally extinct; the remainder are likely to be scarce, and confined largely to the upper slopes (Liu 1982; G. Ades & Fellowes 1996).

Malayan Porcupine *Hystrix brachyura* is considered globally Vulnerable. Chinese Pangolin *Manis pentadactyla* is Lower Risk (Near-threatened) globally, and Class II protected in China. Small Indian Civet *Viverricula indica* is Class II protected in China.

Birds

A total of 24 species of birds were recorded in Dinghushan on the two visits (Table 4). The most frequently encountered species were Black-browed Barbet *Megalaima oorti*, Fire-breasted Flowerpecker *Dicaeum ignipectus* and Grey-cheeked Fulvetta *Alcippe morrisonia*. Only one species, Dusky Fulvetta *Alcippe brunnea*, was a new record for the reserve; this species was predicted to occur by Woodward & Carey (1996).

Table 4. Birds recorded at Dinghushan, 6-7 May 1998 and 6 April 2000, with number of birds in each encounter. Species recorded from Dinghushan between 1990 and 1995 (Lewthwaite, 1996; Woodward & Carey, 1996; Fellowes & Hau, 1997) also shown. Sequence follows Clements (2000).

Scientific name	English name
<i>Ardeola bacchus</i>	Chinese Pond Heron
<i>Anas crecca</i>	Common Teal
<i>Aviceda leuphotes</i>	Black Baza
<i>Milvus migrans</i>	Black Kite
<i>Spilornis cheela</i>	Crested Serpent Eagle
<i>Accipiter trivirgatus</i>	Crested Goshawk
<i>Accipiter gentilis</i>	Northern Goshawk
<i>Buteo buteo</i>	Common Buzzard
<i>Falco subbuteo</i>	Eurasian Hobby
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Francolinus pintadeanus</i>	Chinese Francolin
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge
<i>Lophura nycthemera</i>	Silver Pheasant
<i>Streptopelia orientalis</i>	Oriental Turtle Dove
<i>Streptopelia chinensis</i>	Spotted Dove
<i>Chalcophaps indica</i>	Emerald Dove
<i>Clamator coromandus</i>	Chestnut-winged Cuckoo
<i>Hierococcyx sparverioides</i>	Large Hawk Cuckoo
<i>Hierococcyx fugax</i>	Hodgson's Hawk Cuckoo
<i>Cuculus micropterus</i>	Indian Cuckoo
<i>Cacomantis merulinus</i>	Plaintive Cuckoo
<i>Surniculus lugubris</i>	Drongo Cuckoo
<i>Eudynamis scolopacea</i>	Asian Koel
<i>Centropus bengalensis</i>	Lesser Coucal
<i>Centropus sinensis</i>	Greater Coucal
<i>Otus bakkamoena</i>	Collared Scops Owl
<i>Otus sunia</i>	Oriental Scops Owl
<i>Glaucidium brodiei</i>	Collared Owlet
<i>Glaucidium cuculoides</i>	Asian Barred Owlet
<i>Ninox scutulata</i>	Brown Hawk Owl
<i>Caprimulgus indicus</i>	Grey Nightjar
<i>Hirundapus cochinchinensis</i>	Silver-backed Needletail
<i>Apus affinis</i>	House Swift
<i>Alcedo atthis</i>	Common Kingfisher
<i>Halcyon smyrnensis</i>	White-throated Kingfisher
<i>Megalaima virens</i>	Great Barbet
<i>Megalaima oorti</i>	Black-browed Barbet
<i>Picumnus innominatus</i>	Speckled Piculet
<i>Blythipicus pyrrhotis</i>	Bay Woodpecker
<i>Hirundo rustica</i>	Barn Swallow
<i>Hirundo daurica</i>	Red-rumped Swallow
<i>Delichon dasypus</i>	Asian House Martin
<i>Motacilla alba</i>	White Wagtail
<i>Motacilla flava</i>	Yellow Wagtail
<i>Motacilla cinerea</i>	Grey Wagtail
<i>Anthus richardi</i>	Richard's Pipit
<i>Anthus hodgsoni</i>	Olive-backed Pipit
<i>Pericrocotus divaricatus</i>	Ashy Minivet
<i>Pericrocotus brevirostris</i>	Short-billed Minivet

Scientific name	English name
<i>Pericrocotus flammeus</i>	Scarlet Minivet
<i>Pericrocotus solaris</i>	Grey-chinned Minivet
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul
<i>Pycnonotus sinensis</i>	Light-vented Bulbul
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul
<i>Hemixos castanonotus</i>	Chestnut Bulbul
<i>Hypsipetes mcclllandii</i>	Mountain Bulbul
<i>Hypsipetes leucocephalus</i>	Black Bulbul
<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird
<i>Myophonus caeruleus</i>	Blue Whistling Thrush
<i>Zoothera citrina</i>	Orange-headed Thrush
<i>Zoothera sibirica</i>	Siberian Thrush
<i>Zoothera dauma</i>	Scaly Thrush
<i>Turdus hortulorum</i>	Grey-backed Thrush
<i>Turdus cardis</i>	Japanese Thrush
<i>Turdus merula</i>	Eurasian Blackbird
<i>Turdus obscurus</i>	Eyebrowed Thrush
<i>Turdus pallidus</i>	Pale Thrush
<i>Cisticola juncidis</i>	Zitting Cisticola
<i>Prinia atrogularis</i>	Hill Prinia
<i>Prinia rufescens</i>	Rufescent Prinia
<i>Prinia flaviventris</i>	Yellow-bellied Prinia
<i>Prinia inornata</i>	Plain Prinia
<i>Urosphena squameiceps</i>	Asian Stubtail
<i>Cettia canturians</i>	Manchurian Bush Warbler
<i>Cettia fortipes</i>	Brownish-flanked Bush Warbler
<i>Bradypterus seebohmi</i>	Russet Bush Warbler
<i>Orthotomus cuculatus</i>	Mountain Tailorbird
<i>Orthotomus sutorius</i>	Common Tailorbird
<i>Phylloscopus fuscatus</i>	Dusky Warbler
<i>Phylloscopus proregulus</i>	Pallas's Leaf Warbler
<i>Phylloscopus inornatus</i>	Yellow-browed Warbler
<i>Phylloscopus borealis</i>	Arctic Warbler
<i>Phylloscopus tenellipes</i>	Pale-legged Leaf Warbler
<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler
<i>Phylloscopus reguloides</i>	Blyth's Leaf Warbler
<i>Seicercus burkii</i>	Golden Spectacled Warbler
<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler
<i>Muscicapa sibirica</i>	Dark-sided Flycatcher
<i>Muscicapa dauurica</i>	Asian Brown Flycatcher
<i>Ficedula zanthopygia</i>	Yellow-rumped Flycatcher
<i>Ficedula narcissina</i>	Narcissus Flycatcher
<i>Ficedula strophiiata</i>	Rufous-gorgeted Flycatcher
<i>Ficedula parva</i>	Red-throated Flycatcher
<i>Cyanoptila cyanomelana</i>	Blue-and-white Flycatcher
<i>Niltava davidi</i>	Fujian Niltava
<i>Cyornis hainanus</i>	Hainan Blue Flycatcher
<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher
<i>Luscinia sibilans</i>	Rufous-tailed Robin
<i>Tarsiger cyanurus</i>	Orange-flanked Bush Robin
<i>Copsychus saularis</i>	Oriental Magpie Robin
<i>Phoenicurus aureus</i>	Daurian Redstart
<i>Rhyacornis fuliginosus</i>	Plumbeous Water Redstart
<i>Enicurus schistaceus</i>	Slaty-backed Forktail
<i>Enicurus leschenaulti</i>	White-crowned Forktail
<i>Saxicola torquata</i>	Common Stonechat
<i>Terpsiphone atrocaudata</i>	Japanese Paradise Flycatcher
<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush
<i>Garrulax chinensis</i>	Black-throated Laughingthrush
<i>Garrulax canorus</i>	Hwamei
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler

Scientific name	English name
<i>Pneopyga pusilla</i>	Pygmy Wren Babbler
<i>Stachyris ruficeps</i>	Rufous-capped Babbler
<i>Leiothrix lutea</i>	Red-billed Leiothrix
<i>Alcippe brunnea</i>	Dusky Fulvetta
<i>Alcippe morrisonia</i>	Grey-cheeked Fulvetta
<i>Yuhina castaniceps</i>	Striated Yuhina
<i>Yuhina zantholeuca</i>	White-bellied Yuhina
<i>Aegithalos concinnus</i>	Black-throated Tit
<i>Parus venustus</i>	Yellow-bellied Tit
<i>Parus major</i>	Great Tit
<i>Parus spilonotus</i>	Yellow-cheeked Tit
<i>Sitta frontalis</i>	Velvet-fronted Nuthatch
<i>Aethopyga christinae</i>	Fork-tailed Sunbird
<i>Dicaeum concolor</i>	Plain Flowerpecker
<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker
<i>Dicaeum cruentatum</i>	Scarlet-backed Flowerpecker
<i>Zosterops japonicus</i>	Japanese White-eye
<i>Oriolus chinensis</i>	Black-naped Oriole
<i>Lanius tigrinus</i>	Tiger Shrike
<i>Dicrurus hottentottus</i>	Spangled Drongo
<i>Garrulus glandarius</i>	Eurasian Jay
<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie
<i>Dendrocitta formosae</i>	Grey Treepie
<i>Pica pica</i>	Common Magpie
<i>Corvus macrorhynchus</i>	Large-billed Crow
<i>Acridotheres cristatellus</i>	Crested Myna
<i>Passer montanus</i>	Eurasian Tree Sparrow
<i>Lonchura striata</i>	White-rumped Munia
<i>Lonchura punctulata</i>	Scaly-breasted Munia
<i>Carpodacus erythrinus</i>	Common Rosefinch
<i>Melophus lathami</i>	Crested Bunting
<i>Emberiza tristrami</i>	Tristram's Bunting
<i>Emberiza pusilla</i>	Little Bunting
<i>Emberiza rutila</i>	Chestnut Bunting
<i>Emberiza spodocephala</i>	Black-faced Bunting

Lewthwaite (1996) summarised bird records made at Dinghushan from 1990-1995, showing highest numbers recorded during spring, summer, autumn and winter. Woodward & Carey (1996) added some more records (including Grey Nightjar *Caprimulgus indicus*). Japanese Paradise Flycatcher *Terpsiphone atrocaudata* was recorded in September 1995 by ML and Gary Ades (1995, in litt.). A migrating flock of 20 Black Bazas *Aviceda leuphotes* was seen in September 1995 by JRF and BH (1995, in litt.). In all some 145 species have been recorded at Dinghushan since 1990. Dinghushan has also been the site of several ornithological studies, notably those on Silver Pheasant *Lophura nycthemera* by Gao Yuren of South China Institute of Endangered Animals (Gao Yuren, pers. comm., April 1997).

In addition, there are specimens of Cattle Egret *Bubulcus ibis*, Common Buzzard *Buteo buteo*, Crested Serpent Eagle *Spilornis cheela*, Chinese Bamboo Partridge *Bambusicola thoracica*, Silver Pheasant *Lophura nycthemera*, Grass Owl *Tyto capensis*, Common Kingfisher *Alcedo atthis*, Lesser Necklaced Laughing Thrush *Garrulax monileger* and Blue Magpie *Urocissa erythrorhyncha* in the specimen room of the reserve.

A high proportion of forest species was recorded, indicating high habitat integrity.

Japanese Paradise Flycatcher is a Lower Risk (Near-threatened) species globally. Black Baza, Black Kite *Milvus migrans*, Crested Serpent Eagle, Crested Goshawk *Accipiter trivirgatus*,

Northern Goshawk *Accipiter gentilis*, Common Buzzard, Eurasian Hobby *Falco subbuteo*, Peregrine Falcon *Falco peregrinus*, Greater Coucal *Centropus sinensis*, Lesser Coucal *Centropus bengalensis*, Collared Scops Owl *Otus bakkamoena*, Oriental Scops Owl *Otus sunia*, Collared Owlet *Glaucidium brodiei*, Asian Barred Owlet *Glaucidium cuculoides*, Brown Hawk Owl *Ninox scutulata* and Silver-backed Needletail *Hirundapus cochinchinensis* are all Class II protected species in China.

Reptiles and Amphibians

A total of nine species of amphibian and 14 species of reptile were recorded at Dinghushan during the 1995 and 1998 surveys (Table 5). The most commonly encountered species were *Rana limnocharis* and *Rana guentheri*.

Table 5. Amphibians and reptiles recorded at Dinghushan, 6 May 1998. Species recorded in September 1995 (Lau 1996a) and 6 April 2000 are also indicated. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat
AMPHIBIA	
<i>Bufo melanostictus</i>	forest forest/shrubland plantation
<i>Rana exilispinosa</i>	primary forest
<i>Rana guentheri</i>	forest stream forest/shrubland pool fields
<i>Rana limnocharis</i>	agricultural field secondary forest
<i>Rana livida</i>	forest stream
<i>Polypedates megacephalus</i>	forest/shrubland
<i>Kaloula pulchra</i>	plantation forest edge
<i>Microhyla heymonsi</i>	primary forest
<i>Microhyla pulchra</i>	secondary forest
REPTILIA	
<i>Hemidactylus bowringi</i>	town
<i>Gekko chinensis</i>	village forest
<i>Calotes versicolor</i>	secondary forest
<i>Ateuchosaurus chinensis</i>	forest
<i>Scincella</i> (cf. <i>rupicola</i>) sp.	forest
<i>Sphenomorphus incognitus</i>	forest stream
<i>Sphenomorphus indicus</i>	forest
<i>Ramphotyphlops braminus</i>	secondary forest
<i>Pareas margaritophorus</i>	secondary forest
<i>Sibynophis chinensis</i>	primary forest
<i>Psammodynastes pulverulentus</i>	primary forest
<i>Amphiesma stolatum</i>	secondary forest
<i>Rhabdophis sibiniatus</i>	primary forest
<i>Bungarus multicinctus</i>	secondary forest

The skink *Sphenomorphus incognitus*, which had not been recorded from Guangdong before, was found at Dinghushan during the 1998 survey; it was also found at Qixingkeng, Baiyong and Hweishan on the same trip (Kadoorie Farm and Botanic Garden 2002a, 2002b, 2002c respectively). A possibly new skink species (*Scincella* (cf. *rupicola*) sp.) was also found; it is very similar to *Scincella rupicola* from Thailand except in having unequivocally scaly eyelids (A.

Greer, Australian Museum, pers. comm. 1998). This skink was also found at Dinghushan in the 1980s (Lazell, 1988, recorded as *Scincella modesta*) and in 1995 (Lau, 1996a) and has otherwise been found only at Chebaling in North Guangdong (Lau, 1996b). It seems to be restricted to low-altitude, well-established forest. The record of *Ateuchosaurus chinensis* is apparently the first for the reserve.

Additional species that have been recorded from Dinghushan include: *Ichthyophis bannanicus*, *Hyla simplex*, *Rana rugulosa*, *Rana spinosa*, *Rana japonica*, *Kalophrynus interlineatus*, *Microhyla ornata*, *Cuora trifasciata*, *Chinemys nigricans*, *Platysternon megacephalum*, *Pelodiscus sinensis*, *Eumeces chinensis*, *Eumeces quadrilineatus*, *Scincella reevesii*, *Takydromus sexlineatus*, *Python molurus*, *Achalinus rufescens*, *Ahaetulla prasina*, *Boiga multomaculata*, *Calamaria septentrionalis*, *Cyclophiops major*, *Elaphe porphyracea*, *Elaphe taeniura*, *Elaphe radiata*, *Enhydris chinensis*, *Enhydris plumbea*, *Oligodon formosanus*, *Opisthotropis balteata*, *Ptyas korros*, *Ptyas mucosus*, *Sinonatrix aequifasciata*, *Sinonatrix percarinata*, *Xenochrophis piscator*, *Bungarus fasciatus*, *Calliophis maccllellandi* and *Naja atra* (Zhou *et al.*, 1981; Lazell & Liao, 1986; Lazell, 1988). The current status of these species at Dinghushan is uncertain.

The following species are also present in the specimen room of the reserve: *Cyclemys tcheponensis*, *Varanus bengalensis*, *Varanus salvator* and *Python molurus*. These records have to be treated with caution because animals confiscated by officials are often released into the reserve (Kong G., South China Institute of Botany, pers. comm., 1998). This explains the presence of exotic species such as *Cyclemys tcheponensis* and *Varanus bengalensis*.

Due to the limited time input into this survey, only a small number of amphibian and reptile species was recorded and the results are far from adequate in assessing the reserve. Hence, this discussion must rely quite heavily on published information gathered by other researchers (see above). A large number of forest-dependent reptile species occur at Dinghushan (e.g. *Ateuchosaurus chinensis*, *Scincella* (cf. *rupicola*) sp., *Ahaetulla prasina*, *Elaphe porphyracea*, *Sibynophis chinensis* and *Calliophis maccllellandi*), indicating the high ecological integrity of the forest. Several rare stream-associated species, such as *Ichthyophis bannanicus*, *Cuora trifasciata*, *Chinemys nigricans* and *Opisthotropis balteata* have been recorded.

Cuora trifasciata is a Critically Endangered species globally, while *Chinemys nigricans* and *Platysternon megacephalum* are globally Endangered. *Pelodiscus sinensis* is globally Vulnerable, and *Python molurus* is Lower Risk (Near-threatened). *Rana rugulosa* is a Class II protected species in China.

Fish

The hill streams of Dinghushan were not surveyed due to lack of time. The loach *Micronemacheilus pulcher* was recorded in September 1995 (M.W.N. Lau, unpublished data). In addition, the following species are known from Dinghushan: *Parazacco spilurus spilurus*, *Zacco platypus*, *Opsariichthys bidens*, *Hemiculter leucisculus*, *Capoeta semifasciolata*, *Acrossocheilus parallens*, *Liniparhomaloptera disparis disparis*, *Oreonectes platycephalus*, *Monopterus albus*, and *Channa asiatica* (Chen Xianglin, South China Normal University, pers. comm., February 2002). It appears that Dinghushan supports a fish community typical of hill streams in southern Guangdong.

Ants

Twenty-nine ant species were recorded on this visit. The most frequently recorded species were *Paratrechina* sp. 9, *Pheidole* sp. 7, *Technomyrmex* sp. 2, *Polyrhachis* sp. 5, *Diacamma* sp. 1, *Vollenhovia* sp., *Crematogaster* sp. 8 and *Monomorium* sp. 4. Eleven of these and an additional

25 species were recorded in September 1995 (Fellowes & Hau, 1997). *Camponotus* sp. 43 was earlier misidentified as *Dolichoderus* sp. 5, while *Odontomachus* sp. 2 was identified as *O. silvestrii*. Together these surveys bring the recorded ant fauna of Dinghushan to 54 species (Table 6).

Table 6. Ant species recorded at Dinghushan, 6 May 1998. Species recorded in 25-27 September 1995 (Fellowes & Hau, 1997) are also indicated.

Species	Recorded, 25-27 Sep 1995	Habitat
<i>Acanthomyrmex</i> (cf. <i>crassispinus</i>) sp. 1		tall forest
<i>Aenictus</i> (<i>dentatus</i> group) sp. 4	✓	
<i>Aenictus</i> (<i>laeviceps</i> group) sp. 2	✓	
<i>Anochetus risii</i>		tall forest
<i>Aphaenogaster</i> (cf. <i>beccarii</i>) sp. 1		tall forest
<i>Bothriomyrmex</i> sp. 2	✓	
<i>Camponotus</i> (cf. <i>jianghuaensis</i>) sp. 15	✓	tall forest
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11	✓	
<i>Camponotus nicobarensis</i>	✓	shrubland
<i>Camponotus rufoglaucus</i>	✓	
<i>Camponotus</i> (nr. <i>selene</i>) sp. 43	✓	
<i>Crematogaster</i> (cf. <i>dohrni</i>) sp. 8	✓	forest
<i>Crematogaster</i> sp. 7	✓	
<i>Diacamma</i> (nr. <i>rugosum</i>) sp. 1	✓	tall forest
<i>Hypoponera</i> sp.		tall forest
<i>Lepisiota rothneyi</i>	✓	
<i>Leptogenys kitteli</i>	✓	
<i>Leptogenys peuqueti</i>	✓	
<i>Monomorium chinense</i>	✓	
<i>Monomorium</i> (cf. <i>impexum</i>) sp. 2		tall forest
<i>Monomorium</i> sp. 4		tall forest
<i>Odontomachus monticola</i>		tall forest
<i>Odontomachus</i> (nr. <i>silvestrii</i>) sp. 2	✓	
<i>Odontoponera</i> (cf. <i>denticulata</i>) sp. 1	✓	
<i>Pachycondyla (javana</i> group) sp. 1	✓	forest
<i>Pachycondyla leeuwenhoekii</i>		tall forest
<i>Pachycondyla</i> (cf. <i>luteipes</i>) sp. 2	✓	forest
<i>Paratrechina</i> (cf. <i>bourbonica</i>) sp. 4	✓	
<i>Paratrechina</i> (nr. <i>indica</i>) sp. 9	✓	tall forest
<i>Pheidole megacephala</i>		tall forest
<i>Pheidole</i> (cf. <i>noda</i>) sp. 1		tall forest
<i>Pheidole</i> (cf. <i>yeensis</i>) sp. 40		tall forest
<i>Pheidole</i> (cf. <i>tsailuni</i>) sp. 7	✓	forest
<i>Pheidole</i> (<i>rinae</i> group) sp. 9		tall forest
<i>Pheidologeton diversus</i>	✓	
<i>Polyrhachis demangei</i>	✓	
<i>Polyrhachis dives</i>	✓	
<i>Polyrhachis halidayi</i>	✓	
<i>Polyrhachis tyrannica</i>	✓	
<i>Polyrhachis vigilans</i>		tall forest
<i>Polyrhachis wolffi</i>	✓	
<i>Polyrhachis</i> (nr. <i>sculpturata</i>) sp. 5	✓	tall forest
<i>Prenolepis</i> (cf. <i>emmae</i>) sp. 1	✓	tall forest
<i>Prenolepis magnocula</i>	✓	
<i>Pristomyrmex pungens</i>	✓	open habitat
<i>Recurvidris</i> sp.		tall forest
<i>Solenopsis</i> sp. 7		tall forest
<i>Strumigenys</i> sp.		forest
<i>Tapinoma</i> sp. 1	✓	
<i>Technomyrmex albipes</i>	✓	
<i>Technomyrmex</i> sp. 2		tall forest
<i>Tetramorium nipponense</i>	✓	

Species	Recorded, 25-27 Sep 1995	Habitat
<i>Tetraoponera allaborans</i>	✓	
<i>Vollenhovia</i> sp.	✓	tall forest

None of the species are known to be new to science; some await further investigation. New records for Guangdong Province include the genera *Acanthomyrmex*, *Anochetus* and *Recurvidris*, and the species *Pachycondyla leeuwenhoekii*.

Some of the species recorded, such as *Acanthomyrmex* sp. 1, *Aenictus* sp. 4, *Aphaenogaster* sp. 1, *Odontomachus* sp. 2 and *Polyrhachis* sp. 5, appear to be restricted. *Odontomachus* sp. 2 is currently known only from Dinghushan.

Dragonflies

Only six species of dragonfly were recorded during the very brief 1998 survey. All were forest species. Two were new records for the reserve, and another three have yet to be identified.

The dragonfly fauna of Dinghushan has been well studied by K.D.P. Wilson (1999). Wilson's records and those from the 1998 survey are shown in Table 7. *Cephalaeschna dinghuensis* is of great conservation importance, as it is known only from Dinghushan.

Table 7. Dragonflies recorded at Dinghushan, 6 May 1998. Previously recorded species (K.D.P. Wilson, 1999) are also shown. Sequence follows Schorr *et al.* (2001a; 2001b).

Species	Previous records	Habitat	Notes
<i>Calopteryx melli</i>	✓		
<i>Matrona basilaris</i>	✓		
<i>Mnais mneme</i>	✓	forest	
<i>Neurobasis chinensis</i>	✓		
<i>Rhinocypha perforata</i>	✓		
<i>Aciagrion tillyardi</i>	✓		
<i>Agriocnemis femina</i>	✓		
<i>Cercion sexlineatum</i>	✓		
<i>Ceriagrion auranticum</i>	✓		
<i>Ischnura senegalensis</i>	✓		
<i>Pseudagrion rubriceps</i>	✓		
<i>Pseudagrion pruinosum</i>	✓		
<i>Euphaea decorata</i>	✓		
<i>Agriomorpha fusca</i>		forest	new record for reserve
<i>Philosina alba</i>	✓		
<i>Coeliccia cyanomelas</i>	✓	forest	
<i>Copera ciliata</i>	✓		
<i>Copera marginipes</i>	✓		
<i>Drepanosticta brownelli</i>	✓	forest	
<i>Protosticta beaumonti</i>	✓		
<i>Prodasineura autumnalis</i>	✓		
<i>Prodasineura croconata</i>	✓		
<i>Sinolestes edita</i>		forest	new record for reserve
<i>Anax guttatus</i>	✓		
<i>Anax immaculifrons</i>	✓		
<i>Anax parthenope</i>	✓		
<i>Cephalaeschna dinghuensis</i>	✓		
<i>Cephalaeschna</i> sp.		forest	pending identification
<i>Gynacantha japonica</i>	✓		
<i>Gynacantha saltatrix</i>	✓		
<i>Gynacantha subinterrupta</i>	✓		
<i>Polycanthagyna erythromelas</i>	✓		
<i>Tetracanthagyna waterhousei</i>	✓		
<i>Anotogaster flaveola</i>	✓		

Species	Previous records	Habitat	Notes
<i>Epopthalmia elegans</i>	✓		
<i>Idionyx victor</i>	✓		
<i>Macromia urania</i>	✓		
<i>Macromidia rapida</i>	✓		
<i>Anisogomphus anderi</i>	✓		
<i>Anisogomphini</i> sp.	✓		pending identification
<i>Asiagomphus</i> sp.	✓		pending identification
<i>Burmagomphus vermicularis</i>	✓		
<i>Gomphidia krugeri</i>	✓		
<i>Heliogomphus retroflexus</i>	✓		
<i>Ictinogomphus pertinax</i>	✓		
<i>Labrogomphus torvus</i>	✓		
<i>Leptogomphus perforatus</i>	✓		
<i>Merogomphus paviei</i>	✓		
<i>Sieboldius alexanderi</i>	✓		
<i>Sinictinogomphus clavatus</i>	✓		
<i>Stylurus clathratus</i>	✓		
<i>Stylurus nanningensis</i>	✓		
<i>Acisoma panorpoides</i>	✓		
<i>Crocothemis servilia</i>	✓		
<i>Brachydiplax chalybea</i>	✓		
<i>Brachythemis contaminata</i>	✓		
<i>Diplacodes nebulosa</i>	✓		
<i>Hydrobasileus croceus</i>	✓		
<i>Lyriothemis elegantissima</i>	✓		
<i>Nannophya pygmaea</i>	✓		
<i>Neurothemis fulvia</i>	✓		
<i>Neurothemis tullia</i>	✓		
<i>Onychothemis testacea</i>	✓		
<i>Orthetrum chrysis</i>	✓		
<i>Orthetrum glaucum</i>	✓		
<i>Orthetrum luzonicum</i>	✓		
<i>Orthetrum pruinosum</i>	✓		
<i>Orthetrum sabina</i>	✓		
<i>Orthetrum triangulare</i>	✓		
<i>Palpopleura sexmaculata</i>	✓		
<i>Pantala flavescens</i>	✓		
<i>Pseudothemis zonata</i>	✓		
<i>Rhyothemis triangularis</i>	✓		
<i>Sympetrum eroticum</i>	✓		
<i>Tetrathemis platyptera</i>	✓		
<i>Tholymis tillarga</i>	✓		
<i>Tramea virginia</i>	✓		
<i>Trithemis aurora</i>	✓		
<i>Trithemis festiva</i>	✓		
<i>Zygonyx takasago</i>	✓		
<i>Zyxomma petiolatum</i>	✓		

Butterflies

Although only nine species of butterfly were encountered, they included three good forest species - *Lethe syrcis*, *Thaumantis diores* and *Abisara neophron* - not recorded at the other sites visited during the same survey trip in southwest Guangdong (Kadoorie Farm and Botanic Garden, 2002a, 2002b, 2002c). The species list obtained, although small, is indicative of mature forest with relatively few open-habitat species (Table 8).

Table 8. Butterflies recorded at Dinghushan, 6 May 1998. Sequence of families follows Bascombe (1995).

Species	Habitat
<i>Notocrypta curvifascia</i>	forest
<i>Ixias pyrene</i>	forest

Species	Habitat
<i>Abisara neophron</i>	forest
<i>Neopithecops zalmora</i>	forest
<i>Cyrestis thyodamas</i>	forest
<i>Euthalia niepelti</i>	forest
<i>Lethe syrcis</i>	forest
<i>Mycalesis panthaka</i>	forest
<i>Thaumantis diores</i>	forest

Rove Beetles

Ten species of staphylinid beetle were recorded from Dinghushan (Table 9). Of these at least one (*Domene* sp.), and up to seven, are new to science. The genus *Domene* has not previously been recorded in Guangdong.

Table 9. Rove beetles (Staphylinidae) recorded at Dinghushan, 6 May 1998.

Species	Habitat	Notes
<i>Acylophorus furcatus</i> Mots.	forest litter	
Aleocharinae sp.	primary forest litter	
<i>Anotylus</i> sp.	primary forest litter	
<i>Astenus flavipennis</i> Cam.	forest litter	apparently widespread in southern Asia
<i>Atanygnathus</i> sp.	primary forest litter	
<i>Coproporus bruneicollis</i> Mots.	primary forest litter	widespread and common in forest litter in Asia
<i>Domene</i> sp.	primary forest	new to science; genus new to Guangdong
<i>Myllaena</i> sp.	primary forest litter	
<i>Oxytelopsis</i> sp.	primary forest litter	Different to Guangdong spp. collected in 1997
<i>Scopaeus</i> sp.	forest litter	

Summary of flora and fauna

Despite the small size of the reserve, Dinghushan has a rather rich flora with 297 vascular plant species recorded in one day of survey. The flora is typical of the region but includes several protected, endangered, or Guangdong-endemic species, including the globally rare and endangered tree *Erythrophleum fordii*. At least part of the vegetation is very tall and well developed in structure, and is probably the closest surviving vegetation to the original lowland forest of the region. This good forest is mainly restricted to certain locations. Most of the area is covered in secondary vegetation (coniferous/broadleaf mixed forest and *Pinus* plantation) and shrub/grassland.

Considering the maturity of the forest at Dinghushan, a richer mammal and bird fauna might have been expected; evidently the populations of large to medium-sized species have been depleted or extirpated by hunting and habitat isolation. The herpetofauna at Dinghushan is diverse with several rare species such as the caecilian *Ichthyophis bannanicus*, the terrapins *Cuora trifasciata* and *Chinemys nigricans* (though neither could be confirmed to survive) and the skink *Scincella* (cf. *rupicola*) sp. The ant fauna is also good, with a number of species which are rare or dependent on high-integrity forest. Although fish were not sampled in this survey, they are known to be numerous in the main stream based on observations during previous visits. The dragonfly fauna of the reserve is well studied, and numbers 80 species, a remarkable figure for an area of only 11 km², indicating the high integrity of the forest and its streams. One dragonfly, *Cephalaeschna dinghuensis*, is known only from Dinghushan. Thus Dinghushan continues to provide an important refuge for biodiversity, despite the loss of larger fauna. It has been considered of national significance to biodiversity (MacKinnon *et al.*, 1996), an assessment supported by these surveys.

Threats and problems

Many people visit the Qingyun temple inside the reserve and may cause problems such as littering and disturbance. There is pressure to improve/increase existing facilities for tourists, such as installing cable cars, which may not be beneficial to the important forest ecosystem at Dinghushan.

Despite the checkpoints at the core area of Dinghushan, it is likely that hunting continues to be a threat. In 1995, wildlife on sale in the adjacent town included Leopard Cat *Prionailurus bengalensis* and Indian Muntjac *Muntiacus muntjak* (G. Ades & Fellowes, 1996), both presumably captured locally. Terrapin populations appear also to be extremely depleted, and with continued pressure the outlook for such edible wildlife seems bleak.

An additional problem is the practise of releasing confiscated animals into the reserve. This can cause introduction of disease to wild populations, conflicts with surviving wild populations, genetic contamination with non-native subspecies, and even local extinctions through competition and predation by (frequently misidentified) non-native species.

Opportunities and recommendations

Dinghushan is one of the better-known reserves in southern China. It is close to Guangzhou and Zhaoqing and is easy to get to. Some 600,000 people visit the area each year (mainly to visit the temple rather than to look at the reserve) and there is a great potential for developing an environmental education programme (education centre, nature trails, guided walks etc.) targeting these visitors.

Already there is a relatively large staff at the reserve, and considerable revenue. During a visit in 1999, reserve staff expressed an intention to recruit qualified staff, and an enthusiasm to train existing staff in wildlife survey techniques. With such a positive attitude, the prospects for more effective management and monitoring are good. Strengthening the research conducted at Dinghushan should be directed toward monitoring changes and threats, and modifying habitat management to minimise the further loss of biodiversity. A first step would be a more concerted effort to inventory the existing species, particularly the globally threatened species and habitats at higher elevations, which have been neglected in most studies (including the present brief surveys). This could be most effectively carried out through collaboration with various research institutes and universities in Guangdong and Hong Kong.

Policing is of great importance in conservation management, and should be tailored to the nature and degree of threats. If the threatened turtle species survive at Dinghushan, it should be a top priority to regularly patrol streams, by day and night, to protect them from illegal collecting and trapping. Hunting and collection of threatened plants should also be strictly prevented.

The effectiveness of Dinghushan as a nature reserve is severely limited by its small size. Options for enlargement could be investigated; addition of a larger reserve in the Pingyangjia area (south of the western Pearl River) was recommended by MacKinnon *et al.* (1996). Where it is possible to restore forest in areas surrounding the reserve, this should be conducted using native trees in a mix resembling the natural forests. Further encroachment of tourist facilities on natural habitats at Dinghushan should not be allowed without full environmental impact assessment for the reserve and nearby areas, and appropriate mitigation to ensure biodiversity value is upheld and improved.

The objectives of managing Dinghushan might be refined to emphasise the most endangered and unique elements of the biota, including those highlighted in this report. Objectives should be fully

understood by the staff. Implementation might be helped through a programme of capacity building (addressing specific needs and proposals for recruitment, training and deployment of staff), revising zonal boundaries to maximise protection of the most important habitats and species, and the application of the results of research, monitoring and patrolling to management actions. IUCN guidelines on various subjects, including ecotourism, reintroduction and control of alien invasive species, give valuable guidance which should be followed as far as possible.

Acknowledgements

The editors wish to thank the South China Institute of Botany for their cooperation and assistance, and all participants of the survey team, including field staff at Dinghushan Biosphere Reserve. Joanne Loi helped to check plant nomenclature and status, Keith Wilson provided the cover photograph. We are also indebted to Dr Allen Greer, Australia Museum, for identifying some of the skink specimens. This work has been funded by KFBG.

References

- Ades, G. and Fellowes, J., 1996. *Dinghushan 2: Mammals*. Porcupine! 14: 18.
- Ades, G.W.J., 1994. *A Comparative Ecological Study of Insectivorous Bats (Hipposideridae, Vespertilionidae and Rhinolophidae) in Hong Kong, with Special Reference to Dietary Seasonality*. Unpublished Ph.D. Thesis, The University of Hong Kong, Hong Kong.
- Anon., 1959-2000. *Flora Reipublicae Popularis Sinicae. Tomus 2-80*. Science Press, Beijing. (In Chinese.)
- Anon., 1996-2000. *Flora of China Vol. 4, 15, 16, 17, 18, & 24*. Science Press, Beijing, and Missouri Botanic Garden Press, St. Louis.
- Anon., 2001. *Flora of China Checklist*. Published on the Internet. <http://mobot.mobot.org/W3T/Search/foc.html> [accessed 1 September, 2001]
- Bascombe, M.J., 1995. Check list of the butterflies of South China. *Memoirs of the Hong Kong Natural History Society* 20: 1-206.
- Bolton, B., 1995. *A New General Catalogue of the Ants of the World*. Harvard University Press, Cambridge, Massachusetts, 504 pp.
- Chen, S.C. (ed.), 1999. *Angiospermae Monocotyledoneae Orchidaceae (2)*. *Flora Reipublicae Popularis Sinicae. Tomus 18*. Science Press, Beijing, 463 pp. (In Chinese.)
- Clements, J.F., 2000. *Birds of the World: A Checklist. Fifth Edition*. Ibis Publishing Company, California, 867 pp.
- Corbet, G.B. and Hill, J.E., 1992. *The Mammals of the Indomalayan Region: a Systematic Review*. Oxford University Press, New York, 488 pp.
- Dinghushan Arboretum, 1978. *A Handbook of Plants of Dinghushan*. Academia Sinica, South China Institute of Botany, Guangzhou, 647 pp. (In Chinese.)
- Fellowes, J.R. and Hau, C.H., 1997. *A Faunal Survey of Nine Forest Reserves in Tropical South China, with a Review of Conservation Priorities in the Region*. Kadoorie Farm and Botanic Garden, Hong Kong, 167 pp.

- Guangdong Provincial Environmental Protection Bureau and South China Institute of Botany (eds.), 1988. *Illustrations of Rare and Endangered Plants in Guangdong Province*. China Environmental Science Press, Beijing, 46 pp. (In Chinese.)
- Hua W.L. and Yan Q.W., 1993. *Protected Animals in China*. Shanghai Scientific and Technological Education Publishing House, Shanghai, 618 pp. (In Chinese with English abstract.)
- Inskipp, T., Lindsey, N. and Duckworth, W., 1996. *An Annotated Checklist of the Birds of the Oriental Region*. Oriental Bird Club, Sandy, Bedfordshire, U.K., 294 pp.
- IUCN Species Survival Commission, 2001. 2000 IUCN Redlist of Threatened Species. Published on the Internet: <http://www.redlist.org/> [accessed 1 September, 2001.]
- Kadoorie Farm and Botanic Garden, 2002a. *Report of Rapid Biodiversity Assessments at Qixingkeng Nature Reserve, Southwest Guangdong, 29 April to 1 May and 24 November to 1 December, 1998*. South China Biodiversity Survey Report Series: No. 4. KFBG, Hong Kong SAR, ii + 24 pp.
- Kadoorie Farm and Botanic Garden, 2002b. *Report of Rapid Biodiversity Assessment at Yangchun Baiyong Nature Reserve, Southwest Guangdong, 3 May 1998*. South China Forest Biodiversity Survey Report Series: No. 5. KFBG, Hong Kong SAR, ii + 16 pp.
- Kadoorie Farm and Botanic Garden, 2002c. *Report of Rapid Biodiversity Assessment at Heweishan Forest Farm, 4 to 5 May 1998*. South China Forest Biodiversity Survey Report Series: No. 6. KFBG, Hong Kong SAR, ii + 17 pp.
- Kong, G., Liang, C., Wu, H. and Huang, Z., 1993. *Dinghushan Biosphere Reserve – Ecological Research History and Perspective*. Science Press, Beijing, 38 pp.
- Kong, G.H., Huang, Z.L., Zhang, Q.M., Liu, S.Z., Mo, J.M. and He, D.Q., 1997. Type structure, dynamics and management of the lower subtropical evergreen broad-leaved forest in the Dinghushan Biosphere Reserve of China. *Tropics* 6(4): 335-350.
- Lau, M., 1996a. Amphibians and reptiles, Dinghushan 3. *Porcupine!* 14: 19.
- Lau, M., 1996b. Chebaling herpetofauna. *Porcupine!* 15: 28.
- Lazell, J.D., 1988. Herpetology in South China. *Herpetological Review* 19: 49-51.
- Lazell, J.D. and Liao W., 1986. Contribution to the herpetofauna of Dinghushan. *Acta Herpetologica Sinica* 5: 70-71.
- Lewthwaite, R.W., 1996. Forest birds of Southeast China: observations during 1984-1996. *Hong Kong Bird Report 1995*, 150-203.
- Liu, Z.H., 1982. An investigation on the mammals from Dinghushan. *Tropical and Subtropical Forest Ecosystem* 1: 209-231.
- MacKinnon, J., Meng, S., Cheung, C., Carey, G., Zhu, X. and Melville, D., 1996. *A Biodiversity Review of China*. World Wide Fund for Nature (WWF) International, WWF China Programme, Hong Kong, 529 pp.
- Nelson, J.S., 1994. *Fishes of the World*, 3rd edition. John Wiley & Sons, New York, 600 pp.
- Schorr, M., Lindeboom, M. and Paulson, D., 2001a. *List of Odonata of the World (Part 1, Zygoptera and Anisozygoptera)*. July 2001 version. Published on Internet: <http://www.ups.edu/biology/museum/worldodonates.html>.

- Schorr, M., Lindeboom, M. and Paulson, D., 2001b. *List of Odonata of the World (Part 2, Anisoptera)*. April 2001 version. Published on Internet: <http://www.ups.edu/biology/museum/worldanisops.html>.
- State Forestry Administration and Ministry of Agriculture, 1999. *State Protection List of Wild Plants*. (In Chinese.)
- The Plant Names Project, 2001. *International Plant Names Index*. Published on the Internet: <http://www.ipni.org/> [accessed 1 September, 2001.]
- Tsi, Z.H. (ed.), 1999. Angiospermae Monocotyledoneae Orchidaceae (3). *Flora Reipublicae Popularis Sinicae*. Tomus 19. Science Press, Beijing, 485 pp. (In Chinese.)
- Wang, X.P. *et al.* (in press). *Plants of the Chinese Region – Status Survey and Conservation Action Plan. Appendix 1 Red Lists*. IUCN/SSC China Plant Specialist Group.
- Wilson, D.E. and Cole, F.R., 2000. *Common Names of Mammals of the World*. Smithsonian Institution Press, Washington and London, xiv + 204 pp.
- Wilson, D.E. and Reeder, D.M. (eds.), 1993. *Mammal Species of the World: A Taxonomic and Geographic Reference, 2nd Edition*. Smithsonian Institution Press, Washington and London, 1207 pp.
- Wilson, K.D.P., 1999. The dragonflies (Odonata) of Dinghu Shan Biosphere Reserve, Guangdong Province, China. *International Journal of Odonatology* 2(1): 23-53.
- Woodward, T.J. and Carey, G., 1996. *Where to Watch Birds and Other Wildlife in Guangdong*. Privately published, Hong Kong, 197 pp.
- Wu, H.L., Shao, K.T. and Lai, C.F. (eds.), 1999. *Latin-Chinese Dictionary of Fishes' Names*, Sueichan Press, Taiwan, 1028 pp.
- Zhang, W. (ed.), 1998. *China's Biodiversity: A Country Study*. China Environmental Science Press, Beijing, 476 pp.
- Zhao, E., Chang, H.W., Zhao, H. and Adler, K., 2000. Revised Checklist of Chinese Amphibia & Reptilia. *Sichuan Journal of Zoology* 19(3): 196-207.
- Zhao, E.-M. and Adler, K., 1993. *Herpetology of China*. Society for the Study of Amphibians and Reptiles, Oxford, Ohio, U.S.A., 522 pp.
- Zhou, Y., Qin, Y., Wang, Y. and Yu, S., 1981. A survey of the invertebrates in the Dinghushan area, pp. 562-575, in the Chinese Academy of Sciences, South China Institute of Botany (ed.) *Collected Papers on Forest Ecosystems at Dinghushan*, South China Institute of Botany, Guangzhou.

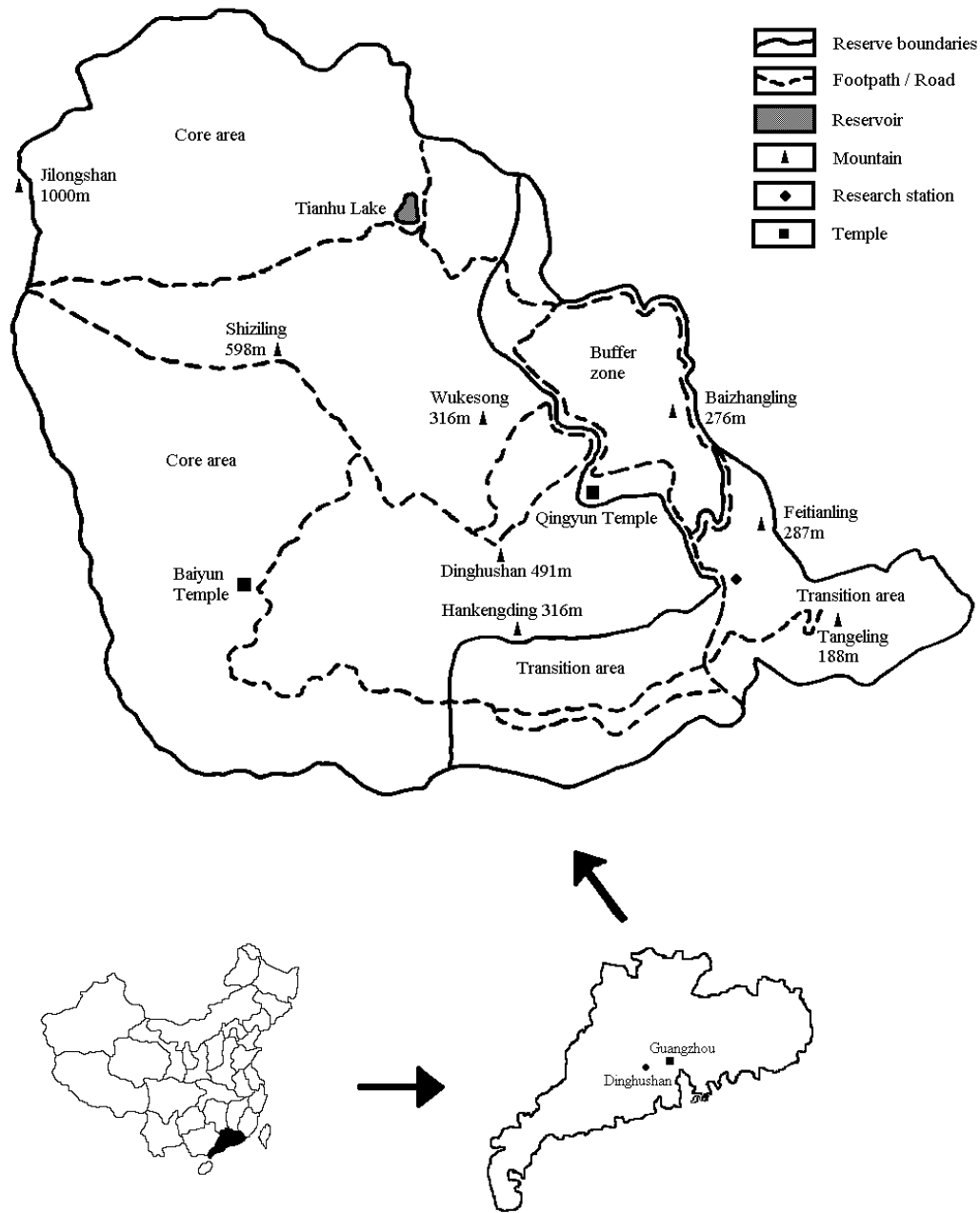


Figure 1. Map showing location of Dinghushan Biosphere Reserve, Western Guangdong, China