



Report of a Rapid Biodiversity Assessment at Dapingshan Headwater Forest Nature Reserve, East Guangxi, China, 24 to 27 September 1998

Kadoorie Farm and Botanic Garden
in collaboration with
Guangxi Zhuang Autonomous Region Forestry Department
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South China Institute of Botany

November 2002

South China Forest Biodiversity Survey Report Series: No. 19
(Online Simplified Version)

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Background

The present report details the findings of a trip to East Guangxi by members of Kadoorie Farm and 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 a Rapid Biodiversity Assessment at Dapingshan Headwater Forest Nature Reserve, East Guangxi, China, 24 to 27 September 1998*. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 19. KFBG, Hong Kong SAR, ii + 15 pp.

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November 2002

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Translation of some common Chinese geographical terms

Romanized Chinese (pinyin)	English meaning
Bei	north
Dao	island
Dong	east
Feng shui	the Chinese system of geomancy
Feng, Ding	peak
Gang	harbour
Hai	sea
He, Chuan, Jiang	river
Hu, Chi	lake
Keng, Gu	valley
Kou	outlet
Ling	range
Nan	south
Shan	mountain
Shi	city
Tun	hamlet
Wan	bay
Xi	west
Xi, Yong	stream
Xian	county
Xiang, Cun	village

Report of a Rapid Biodiversity Assessment at Dapingshan Headwater Forest Nature Reserve, East Guangxi, China, 24 to 27 September 1998

Objectives

- The aims of the survey were to collect up-to-date information on the fauna and flora of Dapingshan Headwater Forest Nature Reserve, and to use this to help determine conservation priorities within South China.

Methods

- Having conducted rapid biodiversity assessments in various sections of Dayaoshan National Nature Reserve (Kadoorie Farm and Botanic Garden, 2002a), the survey team from Kadoorie Farm and Botanic Garden (BC, JRF, BH, ML, LKS, GTR), Guangxi Forestry Department (XZH), Guangxi Institute of Botany (LGZ, TSC), South China Normal University (LZC, LPK), Guangxi Normal University (LLR), Xinyang Teachers' College (LHJ) and South China Institute of Botany (CJS) conducted rapid survey at Dapingshan Nature Reserve on 24 to 26 September.
- During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, fish, ants, butterflies and dragonflies was conducted. Frogs and birds were also located by their calls. Plant records were made by field observation, with some specimens collected.
- Status of large and medium-sized mammals (excluding Insectivora, Chiroptera and Muridae) at Dapingshan was inferred largely based on interviews with local people, with reference to colour pictures. For purposes of these interviews a list of South China mammals was compiled from various sources including Guangdong Forestry Department and South China Institute of Endangered Animals (1987), Corbet & Hill (1992) and Zhang Y. *et al.* (1997).
- Vascular plant records were made by LGZ, and edited by NSC. Records of birds were made or verified by LKS, reptiles and amphibians by ML or LZC, fish by BC & CXL, ants by JRF, butterflies by GTR and dragonflies by GTR and KW 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. (1959-2001); Anon. (1991); Anon. (1996-2001); Anon. (2002a, 2002b); The Plant Names Project (2001);
 - Mammals (Mammalia): Wilson & Cole (2000);
 - Birds (Aves): Inskipp *et al.* (1996);
 - Reptiles and Amphibians (Reptilia and Amphibia): Zhao E.-M. & Adler (1993); 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).
- Information on the global status of species is from IUCN publications, notably IUCN Species Survival Commission (2002). Certain taxa, including orchids, reptiles, amphibians, fish and invertebrates, have yet to be properly assessed for global status.
- Protected status in China is based on Hua & Yan (1993) for animals, and State Forestry Administration & Ministry of Agriculture (1999) for plants.

Location and management

- Dapingshan Headwater Forest Nature Reserve is in the northwest of Guiping County, next to Jinxiu Yao Autonomous County, in East-central Guangxi. The coordinates have been given as 23°32'-23°34' N, 109°56'-109°59'E (Forestry Department of Guangxi Zhuang Autonomous Region, 1993) and 23°30'-23°40'N, 109°58'-110°03'E (MacKinnon *et al.*, 1996). The reserve is 19 km² in area.
- The region has a southern subtropical monsoon climate with mean monthly temperature range from 11°C in January to 27°C in July. Average annual rainfall is 1,900 mm, of which most occurs from February to September. Rainfall in the remaining months usually exceeds 50 mm, such that there is no pronounced dry season. The rivers drain south into the Qianjiang, which flows east to the Xijiang (West River).
- The geology is mainly sandstone and conglomerates. The landscape, at the southern tip of the Dayaoshan range, is mountainous with deep ravine valleys and mountain ridges with a mostly northeast-southwest orientation. Altitude in the reserve ranges from about 200 m to 1,158 m at the summit of Dapingshan.
- The area was designated a nature reserve by the Guiping County Government in 1983 (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). The major objective is to protect the tree fern *Alsophila spinulosa*, the tree *Apterosperma oblata*, and *Shinisaurus crocodilurus* (Crocodile Lizard) and its habitat (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). It is listed as a Provincial-level Forest Ecosystem Nature Reserve (Zhang W., 1998), and managed by the provincial Forestry Department.

Vegetation

- The major vegetation in the Dapingshan region is southern subtropical monsoon evergreen broadleaf forest, which is also the zonal vegetation (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). Important families in this vegetation include Euphorbiaceae, Rutaceae, Moraceae, Annonaceae, Areaceae, and Araceae. The forest was dominated in the early 1990s by *Castanopsis fissa*, *Cryptocarya chingii*, *Litsea monopetala*, *Ficus auriculata*, *Saurauia tristyla* and *Macaranga henryi* (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- In ravines below 600 m, tropical monsoon rainforest dominated by *Erythrophloeum fordii*, *Madhuca pasquieri*, *Endospermum chinense* and *Mischocarpus oppositifolius* could be found (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The present study surveyed a secondary forest between 300 and 600 m. The forest canopy was about 10-20 m in height, with individual trees up to 30 m and over 1 m dbh. Some of the natural forest had been replaced several decades earlier by fir plantations.

Results

Flora

- Earlier surveys of the Dapingshan area had recorded 1,015 vascular plant species in 164 families. They included a number of globally Threatened plants, such as *Erythrophloeum fordii*, *Madhuca pasquieri*, *Apterosperma oblata*, and *Zenia insignis* (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The present survey recorded 61 vascular plant species in 39 families, including one fern, two gymnosperms, and 58 flowering plants (Table 1.). The low number of species reflects the low survey effort and the secondary nature of the vegetation surveyed.
- Among the species recorded, some are of particular conservation concern:

- *Artocarpus hypargyreus* is globally Vulnerable, although it is fairly common in South China.
- *Carallia diplopetala* is at Lower Risk (near threatened), and is endemic to southern Guangxi and locally rare.
- *Alsophila spinulosa* is under Class II National Protection. It is widespread in South China but threatened by collection and is restricted to relatively intact forest.

Table 1. Vascular plant species recorded in Dapingshan Headwater Forest Nature Reserve on 24-26 September 1998. Species which are under National Protection (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999) or globally Threatened or Lower Risk (IUCN Species Survival Commission, 2002) or endemic are indicated.

Family	Scientific names	Remarks
PTERIDOPHYTA		
Cyatheaceae	<i>Alsophila spinulosa</i> (Wall. ex Hook.) R.M.Tryon	Protected II
GYMNOSPERMAE		
Gnetaceae	<i>Gnetum montanum</i> Markgr.	
Pinaceae	<i>Pinus massoniana</i> Lamb.	
ANGIOSPERMAE		
Dicotyledonae		
Actinidiaceae	<i>Saurauia tristyla</i> DC.	
Alangiaceae	<i>Alangium chinense</i> (Lour.) Harms.	
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burt et. A.W. Hill	
Annonaceae	<i>Fissistigma oldhamii</i> (Hemsl.) Merr.	
Araliaceae	<i>Schefflera octophylla</i> (Lour.) Harms	
Boraginaceae	<i>Ehretia acuminata</i> (DC.) R. Br.	
Burseraceae	<i>Canarium album</i> (Lour.) Raeusch.	
Caprifoliaceae	<i>Viburnum fordiae</i> Hance	
Combretaceae	<i>Combretum alfredii</i> Hance	
Daphniphyllaceae	<i>Daphniphyllum calycinum</i> Benth	
Euphorbiaceae	<i>Alchornea trewioides</i> (Benth.) Muell.-Arg. <i>Bischofia javanica</i> Blume <i>Bridelia fordii</i> Hemsl. <i>Macaranga henryi</i> (Pax & K. Hoffm.) Rehder <i>Mallotus barbatus</i> (Wall.) Müll. Arg. <i>Mallotus paniculatus</i> (Lam.) Müll. Arg.	
Fagaceae	<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder et E. H. Wilson	
Hamamelidaceae	<i>Distylium myricoides</i> Hemsl. <i>Liquidambar formosana</i> Hance	
Icacinaceae	<i>Mappianthes iodoides</i> Hand.-Mazz.	
Lauraceae	<i>Cinnamomum austrosinense</i> H.T. Chang <i>Cinnamomum porrectum</i> (Roxb.) Kosterm. <i>Litsea cubeba</i> (Lour.) Pers. <i>Litsea monopetala</i> (Roxb. ex Baker) Pers.	
Loganiaceae	<i>Gelsemium elegans</i> (Gardner et Champ.) Benth.	
Melastomataceae	<i>Melastoma sanguineum</i> Sims	
Menispermaceae	<i>Fibraurea recisa</i> Pierre	
Mimosaceae	<i>Albizia kalkora</i> (Roxb.) Prain <i>Pithecellobium clypearia</i> (Jack) Benth.	
Moraceae	<i>Artocarpus hypargyreus</i> Hance ex Benth. <i>Cudrania cochinchinensis</i> (Lour.) Kudo et Masam. <i>Cudrania fruticosa</i> (Roxb.) Wight ex Kurz <i>Ficus auriculata</i> Lour. <i>Ficus esquiroliana</i> H. Lév. <i>Ficus heteromorpha</i> Hemsl. <i>Ficus pumila</i> L. <i>Ficus recisa</i>	Vulnerable
Myrtaceae	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk.	
Olacaceae	<i>Schoepfia jasminodora</i> Siebold & Zucc.	
Papilionaceae	<i>Dalbergia hupeana</i> Hance	

Rhizophoraceae	<i>Carallia diplopetala</i> Hand.-Mazz.	Lower Risk (nt); endemic to Guangxi
Rosaceae	<i>Eriobotrya cavaleriei</i> (H. Lév.) Rehder	
Rubiaceae	<i>Adina pilulifera</i> (Lam.) Franch. ex Drake	
	<i>Morinda cochinchinensis</i> DC.	
	<i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil.	
Rutaceae	<i>Evodia lepta</i> (Spreng.) Merr.	
Sabiaceae	<i>Meliosma velutina</i> Rehder & E.H. Wilson	
Symplocaceae	<i>Symplocos</i> sp.	
Vitaceae	<i>Tetrastigma planicaule</i> (Hook. f.) Gagnep.	
Monocotyledonae		
Araceae	<i>Alocasia macrorrhiza</i> (L.) Schott	
	<i>Epipremnum pinnatum</i> (L.) Engl.	
Areaceae	<i>Caryota mitis</i> Lour.	
	<i>Pinanga sinii</i> Burret	
Pandanaceae	<i>Pandanus austrosinensis</i> T. L. Wu	
Poaceae	<i>Dendrocalamopsis beecheyana</i> (Munro) Keng f.	
Taccaceae	<i>Tacca chantrieri</i> André	
Zingiberaceae	<i>Alpinia galanga</i> (L.) Willd.	
	<i>Amomum austrosinense</i> D. Fang	

Mammals

- No direct mammal records were made. The inferred status of mammals reported to occur by reserve wardens, based largely on their reports and on known distributions, is shown in Table 2.
- A pile of civet scat, containing many seeds of *Choerospondias axillaris*, was seen in forest around Bengyong on 26 September.

Table 2. The status of mammals (excluding Insectivora, Chiroptera and Muridae) at Dapingshan Headwater Foest Nature Reserve, Guangxi, based on interviewing two reserve wardens. “+” = rare, “++” = quite common, “+++” = abundant. Sequence follows Wilson & Cole (2000).

Scientific name	English name	First warden	Second warden	Probable status
<i>Tupaia belangeri</i>	Northern Tree Shrew	+++	-	uncertain
<i>Macaca thibetana</i>	Père David’s Macaque	-	+	insecure or extirpated
<i>Macaca mulatta</i>	Rhesus Monkey	+	-	insecure or extirpated
<i>Prionailurus bengalensis</i>	Leopard Cat	++	++	present
<i>Lutra lutra</i>	Eurasian Otter	-	+	insecure or extirpated
<i>Melogale moschata</i>	Chinese Ferret-badger	+++	+++	present
<i>Mustela kathiah</i>	Yellow-bellied Weasel	+++	+++	present
<i>Mustela sibirica</i>	Siberian Weasel	-	+++	present
<i>Paguma larvata</i>	Masked Palm Civet	+++	+++	present
<i>Viverricula indica</i>	Small Indian Civet	+++	+++	present
<i>Prionodon pardicolor</i>	Spotted Linsang	+?	+++	insecure
<i>Sus scrofa</i>	Wild Boar	+++	+++	present
<i>Moschus berezovskii</i>	Chinese Forest Musk Deer	-	++	insecure or extirpated
<i>Muntiacus crinifrons</i>	Black Muntjac	+	+	uncertain
<i>Muntiacus muntjak</i>	Indian Muntjac	+++	+++	present
<i>Muntiacus reevesii</i>	Reeves’s Muntjac	++	+++	present
<i>Naemorhedus sumatraensis</i>	Serow	+	+	insecure
<i>Manis pentadactyla</i>	Chinese Pangolin	++	++	insecure
<i>Callosciurus erythraeus</i>	Pallas’s Squirrel	-	+++	present
<i>Tamomys pernyi</i>	Perny’s Long-nosed Squirrel	-	+	uncertain
<i>Tamiops maritimus</i> (or <i>T. swinhoei</i>)	Maritime (or Swinhoe’s) Striped Squirrel	-	+++	present
<i>Petaurista philippensis</i> (or <i>P. petaurista</i>)	Indian (or Red) Giant Flying Squirrel	-	+	insecure or extirpated

Scientific name	English name	First warden	Second warden	Probable status
<i>Petaurista elegans</i>	Spotted Giant Flying Squirrel	-	+	uncertain
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat	+++	+++	present
<i>Rhizomys sinensis</i>	Chinese Bamboo Rat	++	+++	present
<i>Hystrix brachyura</i>	Malayan Porcupine	-	+	insecure or extirpated
<i>Lepus sinensis</i>	Chinese Hare	+	+++	present

- Some of the species reported are of particular conservation significance:
 - Black Muntjac *Muntiacus crinifrons* is globally Vulnerable and Class I protected nationally. No firm record of Black Muntjac has been obtained from Guangxi, but the species is known from Yunnan and East China. The observers at Dapingshan described a muntjac similar in size to Indian Muntjac *M. muntjak*, but black in colour.
 - Serow *Naemorhedus sumatraensis* is globally Vulnerable.
 - Chinese Pangolin *Manis pentadactyla*, Rhesus Monkey *Macaca mulatta* and Chinese Forest Musk Deer *Moschus berezovskii* are Near-threatened and Class II protected.
 - Père David's Macaque *Macaca thibetana*, Eurasian Otter *Lutra lutra*, Small Indian Civet *Viverricula indica* and Spotted Linsang *Prionodon pardicolor* are Class II protected nationally.

Birds

- Fifty-one bird species were recorded in and around Dapingshan Nature Reserve during the survey (Table 3).
- The most frequently encountered species included Grey-cheeked Fulvetta *Alcippe morrisonia*, Chestnut Bulbul *Hemixos castanonotus*, Yellow-browed Warbler *Phylloscopus inornatus*, Fork-tailed Sunbird *Aethopyga christinae*, Mountain Bulbul *Hypsipetes mccllellandii*, Streak-breasted Scimitar Babbler *Pomatorhinus ruficollis* and Yellow-cheeked Tit *Parus pilonotus*.

Table 3. Birds recorded in and around Dapingshan Headwater Forest Nature Reserve, 24-26 September 1998. Sequence follows Clements (2000).

English name	Scientific name
Little Heron	<i>Butorides striatus</i>
Crested Goshawk	<i>Accipiter trivirgatus</i>
Silver Pheasant	<i>Lophura nycthemera</i>
Temminck's Tragopan	<i>Tragopan temminckii</i>
Common Sandpiper	<i>Actitis hypoleucos</i>
Green-billed Malkoha	<i>Phaenicophaeus tristis</i>
Mountain Scops Owl	<i>Otus spilocephalus</i>
Dollarbird	<i>Eurystomus orientalis</i>
White-browed Piculet	<i>Sasia ochracea</i>
White Wagtail	<i>Motacilla alba</i>
Grey Wagtail	<i>Motacilla cinerea</i>
Black-winged Cuckooshrike	<i>Coracina melaschistos</i>
Swinhoe's Minivet	<i>Pericrocotus cantonensis</i>
Grey-chinned Minivet	<i>Pericrocotus solaris</i>
Collared Finchbill	<i>Spizixos semitorques</i>
Light-vented Bulbul	<i>Pycnonotus sinensis</i>
Chestnut Bulbul	<i>Hemixos castanonotus</i>
Mountain Bulbul	<i>Hypsipetes mccllellandii</i>
Black Bulbul	<i>Hypsipetes leucocephalus</i>
Orange-bellied Leafbird	<i>Chloropsis hardwickii</i>
Orange-headed Thrush	<i>Zoothera citrina</i>
Hill Prinia	<i>Prinia atrogularis</i>
Asian Stubtail	<i>Urosphena squameiceps</i>
Mountain Tailorbird	<i>Orthotomus cuculatus</i>
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>

English name	Scientific name
Arctic Warbler	<i>Phylloscopus borealis</i>
Eastern Crowned Warbler	<i>Phylloscopus coronatus</i>
Sulphur-breasted Warbler	<i>Phylloscopus ricketti</i>
Pale-legged Leaf Warbler	<i>Phylloscopus tenellipes</i>
Rufous-faced Warbler	<i>Abroscopus albogularis</i>
Grey-streaked Flycatcher	<i>Muscicapa griseisticta</i>
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>
Red-throated Flycatcher	<i>Ficedula parva</i>
Hainan Blue Flycatcher	<i>Cyornis hainanus</i>
Little Forktail	<i>Enicurus scouleri</i>
Slaty-backed Forktail	<i>Enicurus schistaceus</i>
Hwamei	<i>Garrulax canorus</i>
Spot-breasted Scimitar Babbler	<i>Pomatorhinus erythrocnemis</i>
Streak-breasted Scimitar Babbler	<i>Pomatorhinus ruficollis</i>
Rufous-capped Babbler	<i>Stachyris ruficeps</i>
Spot-necked Babbler	<i>Stachyris striolata</i>
Dusky Fulvetta	<i>Alcippe brunnea</i>
Grey-cheeked Fulvetta	<i>Alcippe morrisonia</i>
Striated Yuhina	<i>Yuhina castaniceps</i>
White-bellied Yuhina	<i>Yuhina zantholeuca</i>
Great Tit	<i>Parus major</i>
Yellow-cheeked Tit	<i>Parus spilonotus</i>
Fork-tailed Sunbird	<i>Aethopyga christinae</i>
Black-naped Oriole	<i>Oriolus chinensis</i>
Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>
Large-billed Crow	<i>Corvus macrorhynchus</i>

- Some species recorded are of particular conservation importance:
 - Crested Goshawk *Accipiter trivirgatus*, Silver Pheasant *Lophura nycthemera*, Temminck's Tragopan *Tragopan temminckii* and Mountain Scops Owl *Otus spilocephalus* are Class II Protected species nationally.
- The presence of many forest-dependent bird species indicated that the forests at Dapingshan have fairly high ecological integrity.

Reptiles and Amphibians

- Nine species of amphibian, eight species of lizard and four species of snake were recorded during this rapid survey (Table 4).
- The most frequently encountered species were *Rana limnocharis* and *Sphenomorphus incognitus*.
- Certain of the species could not be firmly identified, and require further study:
 - The *Pachytriton* newt is probably new to science.
 - The small *Scincella* skink resembled *S. rupicola* from South East Asia but differs in having scaly eyelids.

Table 4. Amphibians and reptiles recorded in and around Dapingshan Headwater Forest Nature Reserve. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat
AMPHIBIA	
<i>Pachytriton</i> sp.	stream
<i>Bufo melanostictus</i>	shrubland village abandoned field
	forest
<i>Microhyla heymonsi</i>	forest
<i>Rana guentheri</i>	stream

Species	Habitat
<i>Rana limnocharis</i>	ditch river forest
<i>Rana livida</i>	stream forest
<i>Rana rugulosa</i>	stream
<i>Polypedates dennysi</i>	stream bamboo forest
<i>Polypedates megacephalus</i>	stream bamboo forest village
REPTILIA	
<i>Gekko gekko</i>	cliff
<i>Acanthosaura lepidogaster</i>	forest
<i>Calotes versicolor</i>	grassland shrubland
<i>Platyplacopus kuehnei</i>	plantation
<i>Eumeces quadrilineatus</i>	village
<i>Scincella</i> (cf. <i>rupicola</i>) sp.	forest
<i>Sphenomorphus incognitus</i>	stream forest
<i>Sphenomorphus indicus</i>	forest
<i>Amphiesma stolatum</i>	stream
<i>Cyclophiops multincinctus</i>	forest edge
<i>Psammodynastes pulverulentus</i>	stream
<i>Sinonatrix percarinata</i>	stream

- The fauna included species of conservation concern:
 - the newt *Pachytriton* sp. may be a species new to science and has not been recorded in other reserves surveyed.
 - *Gekko gekko* is Class II protected nationally;
- The presence of stream specialists (*Pachytriton* sp., *Rana livida*) and forest specialists (*Acanthosaura lepidogaster*, *Scincella* (cf. *rupicola*) sp.) indicates quite high integrity in these ecosystems.

Fish

- Sixteen species of freshwater fish were recorded from Dapingshan (Table 5). Some of the species (e.g. *Pterocryptis* sp. 1 and the stream goby *Rhinogobius* sp 1) await specialist verification.
- All species were collected from the large stream draining pass the reserve station, which appeared to be in good condition.
- The most frequently encountered species were *Parazacco spilurus spilurus*, *Schistura fasciolata*, *Coreoperca whiteheadi* and *Rhinogobius duospilus*.

Table 5. Freshwater fish species in streams of Dapingshan Headwater Forest Nature Reserve, Guangxi (***) = nomenclature follows Pan, 1991). Sequence follows Nelson (1994).

Species
<i>Parazacco spilurus spilurus</i>
<i>Zacco platypus</i>
<i>Nicholsicypris normalis</i>
<i>Acrossocheilus hemispinus*</i>
<i>Oreonectes platycephalus</i>
<i>Micronemacheilus pulcher</i>
<i>Schistura fasciolata</i>

Protomyzon sinensis
Pseudogastromyzon fangi
Pterocryptis sp. 1
Pterocryptis gilberti
Mastacembelus armatus
Coreoperca whiteheadi
Philypnus hainanensis
Rhinogobius duospilus
Rhinogobius sp.1

- Some of the species recorded are of particular conservation significance:
 - *Protomyzon sinensis* is endemic to the Xijiang drainage.
 - The unidentified *Pterocryptis* sp. 1 and *Rhinogobius* sp 1. may prove to be of scientific/conservation importance.
- The high abundance of the predatory mandarin fish *Coreoperca whiteheadi* indicates a healthy stream ecosystem with abundant fish life.

Ants

- At least 61 ant species were recorded at Dapingshan (Table 6). Many could not be reliably identified to named species, and further study is required.
- The most frequently encountered included *Diacamma* sp. 1, *Odontoponera* sp. 1, *Odontomachus monticola* and *Prenolepis* sp. 1.

Table 6. Ant species and number of encounters at Dapingshan Headwater Forest Nature Reserve, September 1998. * Species with a strong forest association.

Species	Habitat
<i>Acanthomyrmex</i> (cf. <i>crassispinus</i>) sp. 1 *	open broadleaf forest/ shrubland
<i>Aphaenogaster</i> (cf. <i>beccarii</i>) sp. 1 *	open broadleaf forest
<i>Aphaenogaster</i> (cf. <i>hunanensis</i>) sp. 3 *	closed broadleaf forest
<i>Aphaenogaster</i> sp. A *	open broadleaf forest
<i>Camponotus</i> (nr. <i>aethiops vitiosus</i>) sp. 27	open bamboo wood/ broadleaf shrub
<i>Camponotus</i> (cf. <i>jianghuaensis</i>) sp. 15	open forest, shrubland
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11	forest
<i>Camponotus nicobarensis</i>	open vegetation
<i>Camponotus rufoglaucus</i>	open shrubland/ herb
<i>Camponotus</i> (cf. <i>rufoglaucus</i>) sp. A	open bamboo shrubland
<i>Camponotus</i> (<i>variegatus</i> group) sp. 4	open bamboo shrubland
<i>Camponotus</i> (cf. <i>wasmanni</i>) sp. 35	open broadleaf forest
<i>Cardiocondyla</i> (cf. <i>wroughtonii</i>) sp. 2	open bamboo shrubland
<i>Cataulacus granulatus</i>	grassland
<i>Crematogaster</i> (cf. <i>laboriosa</i>) sp. 3	open forest, shrubland
<i>Crematogaster</i> (cf. <i>biroi</i>) sp. 4	closed broadleaf forest
<i>Diacamma</i> (nr. <i>rugosum</i>) sp. 1	forest
<i>Dolichoderus</i> sp. 10	open broadleaf forest
<i>Dolichoderus</i> (cf. <i>flatidorsus</i>) sp. 6	closed broadleaf forest
<i>Gnamptogenys bicolor</i>	open forest, shrubland
<i>Hypoponera</i> (cf. <i>excoecata</i>) sp. 2 *	open broadleaf forest
<i>Leptogenys kitteli</i> *	forest, shrubland
<i>Mayriella transfuga</i> *	closed broadleaf forest
<i>Monomorium</i> (cf. <i>impexum</i>) sp. 2 *	forest, shrubland
<i>Monomorium</i> sp. 4 *	closed broadleaf forest
<i>Myrmecina</i> (cf. <i>flava</i>) sp. 4 *	closed broadleaf forest
<i>Odontomachus monticola</i> *	broadleaf forest
<i>Odontomachus</i> (cf. <i>silvestrii</i>) sp. 3	open forest, shrubland
<i>Odontomachus</i> (cf. <i>xizangensis</i>) sp. 4	broadleaf forest
<i>Odontoponera</i> (cf. <i>denticulata</i>) sp. 1	forest, shrubland, grassland
<i>Pachycondyla</i> (cf. <i>astuta</i>) sp. 14 *	open broadleaf forest
<i>Pachycondyla</i> (<i>javana</i> group) sp. 1 *	closed broadleaf forest
<i>Pachycondyla leeuwenhoekii</i> *	closed broadleaf forest

Species	Habitat
<i>Pachycondyla</i> (cf. <i>luteipes</i>) sp. 2 *	broadleaf forest
<i>Pachycondyla</i> (cf. <i>nigrita</i>) sp. 17 *	broadleaf forest
<i>Pachycondyla rufipes</i>	open broadleaf forest
<i>Paratrechina</i> (cf. <i>bourbonica</i>) sp. 4	open forest
<i>Paratrechina</i> (cf. <i>opaca</i>) sp. 26 *	forest, shrubland
<i>Paratrechina</i> (nr. <i>indica</i>) sp. 9 *	broadleaf forest
<i>Pheidole</i> (cf. <i>noda</i>) sp. 1	forest, open meadow
<i>Pheidole</i> sp. 11	forest, shrubland
<i>Pheidole</i> sp. 13-A *	closed broadleaf forest
<i>Pheidole</i> sp. 7 complex *	broadleaf forest
<i>Pheidole rinae incensa</i>	forest, shrubland
<i>Pheidologeton</i> (cf. <i>melasolenus</i>) sp. 8 *	closed broadleaf forest
<i>Polyrhachis tyrannica</i>	closed broadleaf forest
<i>Ponera</i> (cf. <i>sinensis</i>) sp. 1 *	closed broadleaf forest
<i>Prenolepis</i> (cf. <i>emmae</i>) sp. 1 *	broadleaf forest
<i>Prenolepis magnocula</i> *	closed broadleaf forest
<i>Pristomyrmex pungens</i>	closed broadleaf forest
<i>Pseudolasius</i> sp.	broadleaf forest
<i>Pyramica canina</i> *	closed broadleaf forest
<i>Recurvidris</i> (cf. <i>glabriceps</i>) sp. *	closed broadleaf forest
<i>Rhoptromyrmex wroughtonii</i>	open broadleaf forest
<i>Solenopsis</i> sp. 5	closed broadleaf forest
<i>Strumigenys</i> (cf. <i>rallarhina</i>) sp. 1 *	closed broadleaf forest
<i>Tapinoma</i> sp. 1	open forest, shrubland
<i>Technomyrmex</i> sp. 2 *	open broadleaf forest
<i>Tetramorium bicarinatum</i>	open bamboo shrubland
<i>Tetramorium</i> (cf. <i>kraepelini</i>) sp. 4 *	closed broadleaf forest
<i>Vollenhovia</i> (cf. <i>emeryi</i>) sp. 1 *	open broadleaf forest

- *Recurvidris glabriceps* was described by Zhou (2001) based on specimens collected during this and other surveys in Dayaoshan and Xidamingshan (Kadoorie Farm and Botanic Garden, 2002a, 2002b). It has not yet been possible to compare the specimens with other described species held in overseas collections.
- *Myrmecina* sp. 4 and *Strumigenys* sp. 1 have been recorded only in high-integrity natural forests.
- The percentage of forest-associated species was about 49%, a figure typical of secondary forest areas.

Dragonflies

- Ten species were encountered over the two-day survey (Table 7).
- The most frequently encountered species were *Pantala flavescens*, *Matrona basilaris* and *Rhinocypha perforata*.

Table 7. Dragonflies recored at Dapingshan Headwater Forest Nature Reserve, 25-26 September 1998,.

Species	Notes
<i>Archineura incarnata</i>	
<i>Matrona basilaris basilaris</i>	
<i>Rhinocypha p. perforata</i>	
<i>Coeliccia cyanomelas</i>	
<i>Boyeria sinensis</i>	restricted to Guangxi and Sichuan
<i>Orthetrum sabina</i>	
<i>Pantala flavescens</i>	
<i>Tramea virginia</i>	
<i>Trithemis aurora</i>	
<i>Trithemis festiva</i>	

- *Boyeria sinensis* is of potential conservation significance, as it is restricted to Guangxi and Sichuan.

Butterflies

- Fifty-five species were encountered over the two-day survey (Table 8).
- *Paralaxita dora* is possibly a new record for mainland China, although it is known from Hainan (Chou, 1994; Bascombe, 1995).

Table 8. Butterflies recorded at Dapingshan Headwater Forest Nature Reserve, 25-26 September 1998. Sequence follows Bascombe (1995).

Species	Habitat	Notes
<i>Bibasis oedipodea</i>	forest	
<i>Mooreana trichoneura</i>	boulder river/forest	
<i>Pelopidas assamensis</i>	boulder river/forest	
<i>Tagiades litigiousus</i>	boulder river/forest	
<i>Atrophaneura aidonea</i>	boulder river/forest	
<i>Chilasa clytia</i>	boulder river/forest	
<i>Graphium agamemnon</i>	forest	
<i>Graphium sarpedon</i>	forest	
<i>Lamproptera curius</i>	forest	
<i>Papilio bianor</i>	forest	
<i>Papilio nephelus</i>	forest	
<i>Papilio paris</i>	forest	
<i>Papilio protenor</i>	boulder river/forest	
<i>Pathysa antiphates</i>	forest	
<i>Troides</i> sp.	boulder river/forest	
<i>Cepora nerissa</i>	boulder river/forest	
<i>Eurema hecabe</i>	boulder river/forest	
<i>Hebomoia glaucippe</i>	forest	
<i>Ixias pyrene</i>	boulder river/forest	
<i>Prioneris thestylis</i>	forest	
<i>Talbotia naganum</i>	forest	
<i>Abisara burnii</i>	forest	
<i>Abisara echerius</i>	boulder river/forest	
<i>Acytolepis puspā</i>	forest	
<i>Heliophorus ila</i>	forest	
<i>Paralaxita dora</i>	boulder river/forest	new Guangxi record
<i>Argyreus hyperbius</i>	boulder river/forest	
<i>Ariadne ariadne</i>	forest	
<i>Athyma cama</i>	boulder river/forest	
<i>Athyma jina</i>	boulder river/forest	
<i>Athyma nefte</i>	boulder river/forest	
<i>Athyma perius</i>	forest	
<i>Athyma selenophora</i>	boulder river/forest	
<i>Charaxes bernardus</i>	boulder river/forest	
<i>Charaxes marmax</i>	forest	
<i>Cupha erymanthis</i>	forest	
<i>Danaus genutia</i>	forest	
<i>Discophora sondaica</i>	forest	
<i>Euploea mulciber</i>	forest	
<i>Euthalia lubentina</i>	boulder river/forest	
<i>Euthalia monina</i>	boulder river/forest	
<i>Euthalia niepelti</i>	forest	
<i>Hypolimnas bolina</i>	forest	
<i>Ideopsis similis</i>	forest	
<i>Kaniska canace</i>	boulder river/forest	
<i>Lethe chandica</i>	boulder river/forest	
<i>Lethe confusa</i>	forest	
<i>Melanitis leda</i>	boulder river/forest	
<i>Mycalesis mineus</i>	boulder river/forest	

Species	Habitat	Notes
<i>Neope bhadra</i>	boulder river/forest	
<i>Neptis sankara</i>	boulder river/forest	
<i>Parasarpa dudu</i>	boulder river/forest	
<i>Symbrenthia lilaea</i>	forest	
<i>Vagrans egista</i>	boulder river/forest	
<i>Ypthima chinensis</i>	boulder river/forest	

- Several of the species recorded (e.g. *Atrophaneura aidonea*, *Euthalia* spp., *Neope bhadra*, *Paralaxita dora* and *Mooreana trichoneura*) may be considered good forest indicators.

Summary of flora and fauna

- Dapingshan retains quite extensive forest, which was originally subtropical monsoon evergreen broadleaf forest on slopes above 600 m and tropical monsoon rainforest lower down. The lowland forests seen in the present survey were largely secondary, with some older trees remaining. Some of the natural forest had been replaced, especially at lower elevations, by plantation and agricultural land.
- Over 1,000 vascular plant species have been recorded from the Dapingshan area. The present rapid survey in lowland secondary forest recorded rather few species of conservation concern, but these included *Artocarpus hypargyreus*, *Carallia diplopetala* and *Alsophila spinulosa*.
- The fauna at Dapingshan was fairly rich but most species were common and widespread. Several rare species were recorded, including Temminck's Tragopan, Swinhoe's Minivet, the skink *Scincella* (cf. *rupicola*) sp. and the snake *Cyclophiops multicinctus*. Residents reported a deer that might be Black Muntjac, as in nearby Dayaoshan (Kadoorie Farm and Botanic Garden, 2002a). Possibly new-to-science species of newt (*Pachytriton* sp.) and fish (*Rhinogobius* sp 1.) were also found during this survey. The large stream flowing pass the reserve station supported a good assembly of freshwater fish with the highest density of the predatory mandarin fish *Coreoperca whiteheadi* seen in KFBG's rapid surveys.
- Dapingshan was considered of only local biodiversity importance by MacKinnon *et al.* (1996) based on its small size. The evidence from this survey confirms its local importance but does not support a higher designation, unless the unidentified taxa prove to be highly restricted. The reserve is a valuable component of the nationally-important network of protected areas in the Dayaoshan range.

Threats and problems

- The major threat to the vegetation of Dapingshan is the destruction of natural forest for establishing plantation and agricultural land. This is fairly serious near the reserve station along the two valleys surveyed, especially at lower altitude.
- Rock slides appeared to be a problem and had caused severe destruction to the vegetation at the time of our visit; the team had to climb up a valley recently filled by boulders to reach the large waterfall. Clearing of vegetation on steep slopes may have played a role in causing the erosion. Further rock slides may pose a serious threat to the important stream fauna.
- The boundary of the reserve is not well defined, and some forests and farmland inside the reserve are owned by villagers. It was not uncommon to find villagers felling trees for firewood and herding, while illegal hunting inside the reserve was seen in both day- and night-time during the survey. Wardens reported difficulties controlling this activity. One problem was to prove animals were killed inside the reserve; another was that confiscated weapons could be reclaimed the following day.

- The nature reserve management authority had tried to develop tourism and invested heavily in building a three-storey guesthouse, which appears to have been an unsuccessful investment. The difficulty of access has limited the potential of Dapingshan for ecotourism.

Opportunities and recommendations

- Improved nature reserve management will call for clarification of objectives of the authorities and of all other stakeholders. Some compromise may be needed between conservation and utilisation, but further degradation of surviving natural forests is in no-one's long-term interest. If the objectives of biodiversity and water conservation are paramount, protection and restoration of natural forests must take precedence (MacKinnon & Xie, 2001).
- Training opportunities are needed for reserve staff, to increase their awareness of conservation and their management effectiveness.
- MacKinnon *et al.* (1996) recommended that the joining of Dapingshan to Dayaoshan National Nature Reserve should be considered. Whether or not the two are administratively merged, coordination and cooperation would be advisable to control the common threats, and ensure that the respective habitats are not too isolated.
- The causes for increased farming activity within the nature reserve should be analysed. The limits to agricultural activity should be clearly set and enforced, so that the conservation objectives are not compromised within the true nature reserve. The reserve area should be extended to include all surrounding forested hillsides.

Acknowledgements

The editors wish to thank the Guangxi Forestry Department for their cooperation and assistance, and all participants of the survey team, including field staff at Dapingshan Nature Reserve. We also thank staff at KFBG, particularly Gloria L.P. Siu for proofreading and our voluntary helper, Sukh Mantel, for data input. This work has been funded by KFBG.

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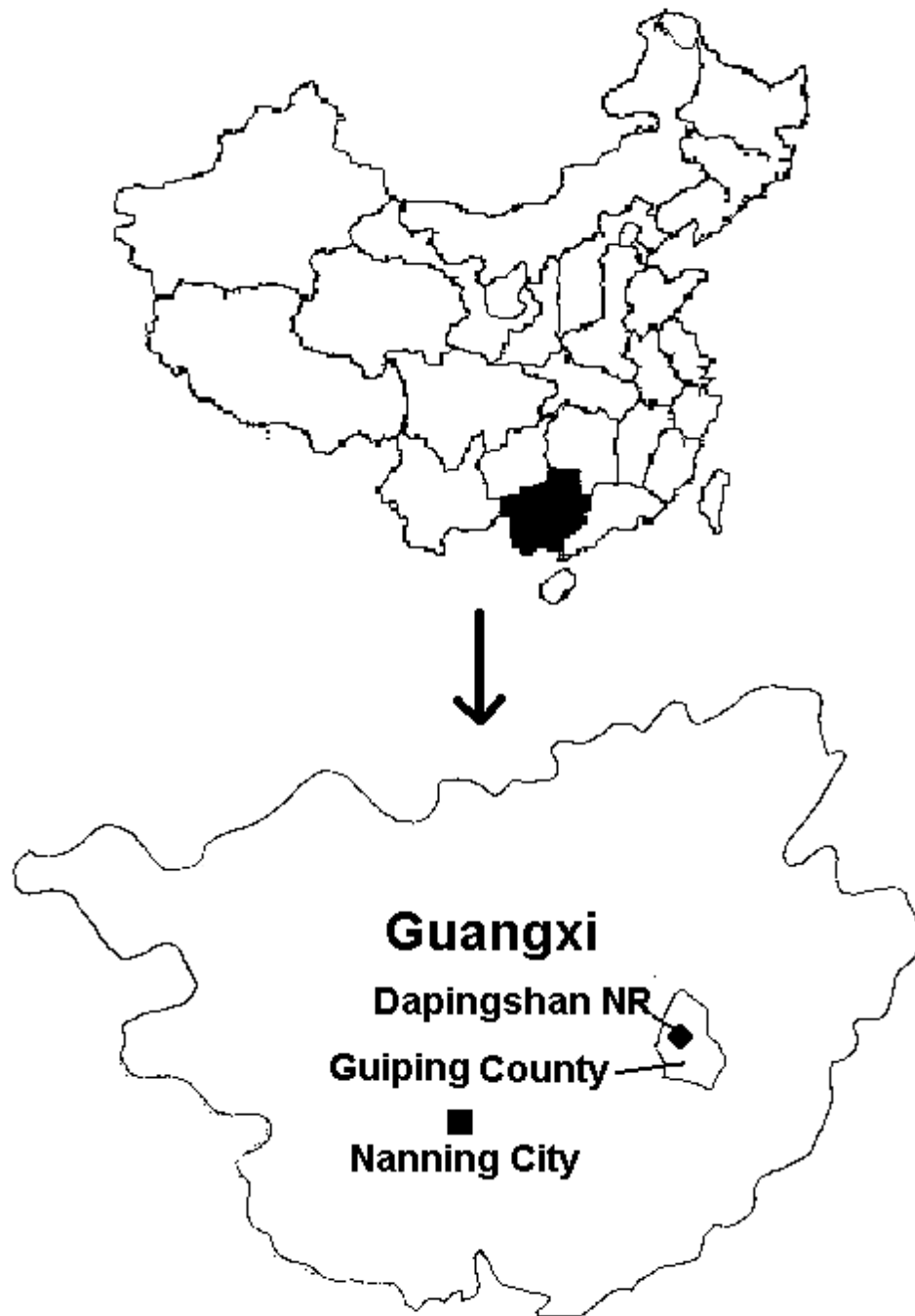


Figure 1. Map showing location of Dapingshan Headwater Forest Nature Reserve, East Guangxi, China.