



**Report of a Rapid Biodiversity Assessment at
Qingshitan Headwater Forest Nature Reserve,
Northeast Guangxi, China, 25 to 26 August 1998**

Kadoorie Farm and Botanic Garden
in collaboration with
Guangxi Forestry Department
Guangxi Institute of Botany
Guangxi Normal University
South China Institute for Endangered Animals
South China Normal University
Xinyang Teachers' College

August 2002

South China Forest Biodiversity Survey Report Series: No. 17
(Online Simplified Version)

Report of a Rapid Biodiversity Assessment at Qingshitan Headwater Forest Nature Reserve, Northeast Guangxi, China, 25 to 26 August 1998

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Background

The present report details the findings of a trip to Northeast 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 Qingshitan Headwater Forest Nature Reserve, Northeast Guangxi, China, 25 to 26 August 1998*. South China Forest Biodiversity Survey Report Series (Online Simplified Version): No. 17. KFBG, Hong Kong SAR, ii + 12 pp.

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August 2002

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Common geographical descriptions and their Chinese Romanized phonetics

English meaning	Romanized Chinese
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 a Rapid Biodiversity Assessment at Qingshitan Headwater Forest Nature Reserve, Northeast Guangxi, China, 25 to 26 August 1998

Objectives

- The aims of the survey were to collect up-to-date information on the fauna and flora of Qingshitan Headwater Forest Nature Reserve, and to use this to help determine conservation priorities within South China. Only the lowland part near the reservoir could be visited in the time available.

Methods

From 15 to 24 August a survey team conducted rapid biodiversity assessments at Huaping National Nature Reserve in Longsheng County (Kadoorie Farm and Botanic Garden, 2002a), and Maershan Nature Reserve in Xingan, Ziyuan and Lingchuan Counties (Kadoorie Farm and Botanic Garden, 2002b). The team included members of Kadoorie Farm and Botanic Garden (BH, ML, JRF, LKS, GTR), Guangxi Forestry Department (XZH), Guangxi Institute of Botany (LGZ, TSC), South China Institute for Endangered Animals (ZFS), South China Normal University (LPK), Guangxi Normal University (LLR, ZSY) and Xinyang Teachers' College (LHJ). On 25 August, the team drove from Huajiang to Lingchuan County Town to visit the Forestry Bureau before heading for Qingshitan Reservoir (290 m asl).

- On 26 August, the team made a reconnaissance boat trip round the reservoir, and stayed at the Yangguang Resort. Part of the faunal team surveyed amphibians and reptiles near the resort (290 m) from 21.00 to 21.45. The weather was clear. On 26 August, the team crossed the reservoir by boat and surveyed Jiuwu Forest Protection Area (290–490 m). The weather was sunny, reaching 30°C in the shade.
- On 27 August the team headed back to Guilin.
- 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.
- The status of large and medium-sized mammals (excluding Insectivora, Muridae and Chiroptera) was inferred largely based on interviews with the reserve warden, 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 & 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, 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): Anon. (1959-2000); Anon. (1991); Anon. (1996-2000); Anon. (2001); The Plant Names Project (2001);
 - Mammals (Mammalia): Wilson & Cole (2000);
 - Birds (Aves): Inskipp *et al.* (1996);
 - Reptiles & Amphibians (Reptilia and Amphibia): Zhao E.-M. & Adler (1993); Zhao E. *et al.* (2000);
 - 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

- Qingshitan Headwater Forest Nature Reserve is in the northern part of Lingchuan County, Northeast Guangxi, adjacent to Xingan, Lingui and Longsheng counties. The coordinates have been given as 25°26'20"-25°47'30"N, 110°05'15"-110°17'30"E (Forestry Department of Guangxi Zhuang Autonomous Region, 1993) or 25°20'-25°47'N by 110°05'-110°17'E (MacKinnon *et al.*, 1996). The total reserve area is 391 km². In the early 1990s 34% of this area was covered by broadleaf forest, and 40% by plantations of pine, China Fir and bamboo (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The region has a subtropical monsoon climate with mean monthly temperature range from 7.9°C in January to 27.1 °C in July, and mean annual precipitation of 2,052 mm (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). The catchments drain south into the Lijiang.
- The geology of the region is mainly sandy shale. The area has a mountainous landscape with altitude ranging from 220 up to 1,722 m at the northwestern boundary.
- The reserve was established in 1982 to protect the headwater forests. It is listed as a Provincial-level Forest Ecosystems Nature Reserve (Zhang W., 1998), and managed by the provincial Forestry Department.

Results

Vegetation

- The zonal vegetation of the region should be subtropical evergreen broadleaf forest (Forestry Department of Guangxi Zhuang Autonomous Region, 1993), but much of the original natural forest was cleared for the creation of the reservoir and for agriculture. The forests at Qingshitan have now been closed to logging for about 20 years. The present broadleaf vegetation is mainly secondary and is dominated by Fagaceae, Lauraceae, and Theaceae. Common community associations in the vegetation (Forestry Department of Guangxi Zhuang Autonomous Region, 1993) included:
 - a *Castanopsis carlesii* - *Itea chinensis* - *Woodwardia japonica* association;
 - an *Elaeocarpus japonicus* - *Cinnamomum appelianum* + *Ternstroemia gymnanthera* - *Alpinia pumila* association; and
 - a *Castanopsis carlesii* - *Syzygium buxifolium* - *Hicriopteris laevisissima* association.
- There were also large areas of plantation of China Fir (*Cunninghamia lanceolata*), bamboo (*Phyllostachys edulis*), pine (*Pinus massoniana*) and oil-tea tree (*Camellia oleifera*).

Flora

- No comprehensive survey has been done at Qingshitan. It is estimated that there might be at least 600 vascular plant species in the reserve.
- The present rapid survey of the lowland forests around the reservoir (across from Yangguang Resort, at 300 to 320 m) recorded 59 vascular plant species, including three ferns and 56 angiosperms in 38 families (Table 1). The low number of species recorded reflected the low survey effort. The flora was mainly tropical to southern subtropical in composition.

- Only two Class II Nationally Protected plant species were found in the present survey (*Cibotium barometz* and *Cinnamomum camphora*). The former is also listed in CITES Appendix II but is both common at the site and widespread in South China; the latter is also regionally widespread and has a long history of planting in South China.
- Earlier surveys have recorded several Protected and globally Threatened species including *Rhoiptelea chiliantha* (Class II, Vulnerable), *Michelia odora* (= *Tsoongiodendron odorum*) (Lower Risk), *Phoebe bournei* (Class II, Lower Risk), *Ormosia hosiei* (Lower Risk), *Semiliquidambar cathayensis* (Class II, Lower Risk), *Toona ciliata* (Class II), *Zenia insignis* (Class II, Lower Risk), and *Taxus chinensis* var. *mairei* (Class I) (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).

Table 1. Vascular plants of Qingshitan Headwater Forest Nature Reserve recorded in the present survey. Species which are Nationally Protected (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999), globally Threatened or Lower Risk (Near-threatened) (IUCN Species Survival Commission, 2002) or endemic to South China are indicated.

Family	Scientific name	Remarks
PTERIDOPHYTA		
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Gleicheniaceae	<i>Diplazium chinensis</i> (Rosenst.) DeVol	
Marattiaceae	<i>Angiopteris fokiensis</i> Hieron.	
ANGIOSPERMAE		
Dicotyledonae		
Acanthaceae	<i>Peristrophe japonica</i> (Thunb.) Bremek.	
Actinidiaceae	<i>Actinidia callosa</i> Lindl.	
Alangiaceae	<i>Alangium chinense</i> (Lour.) Harms.	
Anacardiaceae	<i>Rhus chinensis</i> Mill.	
	<i>Toxicodendron succedaneum</i> (L.) Kuntze.	
Annonaceae	<i>Fissistigma oldhamii</i> (Hemsl.) Merr.	
	<i>Millettia chunii</i> W. T. Wang	
Apocynaceae	<i>Alyxia odorata</i> Wall. ex G. Don	
Aquifoliaceae	<i>Ilex pubescens</i> Hook. et Arn.	
Araliaceae	<i>Aralia cordata</i> Thunb.	
Caesalpiniaceae	<i>Bauhinia championii</i> (Benth.) Benth.	
Capparaceae	<i>Capparis urophylla</i> F. Chun	
Clusiaceae	<i>Garcinia multiflora</i> Champ. ex Benth.	
Cucurbitaceae	<i>Siraitia grosvenorii</i> (Swingle) C. Jeffrey ex A.M. Lu & Zhi Y. Zhang	
Daphniphyllaceae	<i>Daphniphyllum oldhamii</i> (Hemsl.) Rosenth.	
Ericaceae	<i>Rhododendron mariae</i> Hance	
Euphorbiaceae	<i>Alchornea trewioides</i> (Benth.) Müll. Arg.	
	<i>Croton lachnocarpus</i> Benth.	
	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt.	
	<i>Mallotus apelta</i> (Lour.) Müll. Arg.	
	<i>Mallotus japonicus</i> (Thunb.) Müll. Arg.	
Fagaceae	<i>Castanea henryi</i> (Skan) Rehder & E.H. Wilson	
	<i>Castanopsis carlesii</i> (Hemsl.) Hayata	
	<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder et E. H. Wilson	
	<i>Cyclobalanopsis glauca</i> (Thunb.) Oerst.	
Hamamelidaceae	<i>Liquidambar acalycina</i> H.T. Chang	
	<i>Liquidambar formosana</i> Hance	
Lamiaceae	<i>Gomphostemma chinense</i> Oliv.	
Lauraceae	<i>Cinnamomum camphora</i> (L.) J. Presl.	Protected II
	<i>Phoebe shearerii</i> (Hemsl.) Gamble	
Moraceae	<i>Ficus hirta</i> Vahl	
Myrsinaceae	<i>Ardisia crenata</i> Sims	
	<i>Ardisia quinquegona</i> Blume	
Myrtaceae	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk.	
Oleaceae	<i>Chionanthus ramiflorus</i> Roxb.	
Papilionaceae	<i>Millettia nitida</i> Benth.	

Family	Scientific name	Remarks
	<i>Rhynchosia volubilis</i> Lour.	
Piperaceae	<i>Piper hancei</i> Maxim. <i>Piper hongkongense</i> C. DC.	
Rubiaceae	<i>Adina pilulifera</i> (Lam.) Franch. ex Drake <i>Tarenna attenuata</i> (Voigt) Hutch.	
Rutaceae	<i>Evodia lepta</i> (Spreng.) Merr.	
Scrophulariaceae	<i>Adenosma glutinosum</i> (L.) Druce	
Theaceae	<i>Schima superba</i> Gardn. et Champ.	
Ulmaceae	<i>Trema cannabina</i> Lour.	
Verbenaceae	<i>Callicarpa bodinieri</i> H. Lév.	
Monocotyledonae		
Amaryllidaceae	<i>Curculigo capitulata</i> (Lour.) Kuntze	
Araceae	<i>Pothos chinensis</i> (Raf.) Merr.	
Areaceae	<i>Calamus platyacanthus</i> Warb. ex Becc.	
Liliaceae	<i>Dianella ensifolia</i> (L.) DC.	
Pandanaceae	<i>Pandanus</i> sp.	
Poaceae	<i>Bambusa multiplex</i> (Lour.) Raeusch. ex Schult. & Schult. f. cv. <i>Fernleaf</i> <i>Lophatherum gracile</i> Brongn. <i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum et Lauterb.	
Zingiberaceae	<i>Alpinia pumila</i> Hook. f. <i>Zingiber mioga</i> (Thunb.) Roscoe	

Mammals

- No direct mammal records were made during the survey. Inferred status of mammals, based on an interview with reserve warden Mrs. Chen and on observed habitat availability, is shown in Table 2.

Table 2. The status of mammals (excluding Insectivora, Chiroptera and Muridae) at Qingshitan Nature Reserve, Guangxi. Based on an interview with Mrs. Chen, reserve warden (“+” = rare, “++” = common, “+++” = abundant). Species names and sequence follow Wilson & Cole (2000).

Scientific name	English name	Mrs. Chen	Probable local status
<i>Vulpes vulpes</i>	Red Fox	+	insecure
<i>Arctonyx collaris</i>	Hog Badger	+	insecure
<i>Melogale moschata</i>	Chinese Ferret-badger	++	present
<i>Ursus thibetanus</i>	Asiatic Black Bear	+	insecure or extirpated
<i>Paguma larvata</i>	Masked Palm Civet	+++	present
<i>Sus scrofa</i>	Wild Boar	+++	present
<i>Moschus berezovskii</i>	Chinese Forest Musk Deer	+	insecure or extirpated
<i>Manis pentadactyla</i>	Chinese Pangolin	+	insecure
<i>Callosciurus erythraeus</i>	Pallas's Squirrel	+++	present
<i>Tamiops maritimus</i>	Maritime Striped Squirrel	+++	present
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat	+++	present
<i>Lepus sinensis</i>	Chinese Hare	+++	present

- From the information available, the mammal fauna is likely to be impoverished near the reservoir, but it was not possible to interview local hunters or to visit more remote habitats. It is likely that more species survive than listed here. Of the species reported to occur, some are of particular conservation concern:
 - Asiatic Black Bear *Ursus thibetanus* is Vulnerable and Class II Protected in China;
 - Chinese Forest Musk Deer *Moschus berezovskii* and Chinese Pangolin *Manis pentadactyla* are at Lower Risk (Near-threatened) and Class II Protected.

Birds

- Thirty-one species of birds were recorded at Qingshitan during this survey (Table 3).

- The most frequently encountered species were Chestnut Bulbul *Hemixos castanonotus*, Grey-cheeked Fulvetta *Alcippe morrisonia* and Chinese Bamboo Partridge *Bambusicola thoracica*.

Table 3. Birds recorded at Qingshitan Nature Reserve, 25-26 August 1998. Sequence follows Clements (2000).

Scientific name	English name
<i>Ardeola bacchus</i>	Chinese Pond Heron
<i>Butorides striatus</i>	Little Heron
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron
<i>Spilornis cheela</i>	Crested Serpent Eagle
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge
<i>Lophura nycthemera</i>	Silver Pheasant
<i>Actitis hypoleucos</i>	Common Sandpiper
<i>Streptopelia orientalis</i>	Oriental Turtle Dove
<i>Alcedo atthis</i>	Common Kingfisher
<i>Halcyon pileata</i>	Black-capped Kingfisher
<i>Hirundo daurica</i>	Red-rumped Swallow
<i>Motacilla cinerea</i>	Grey Wagtail
<i>Pericrocotus solaris</i>	Grey-chinned Minivet
<i>Spizixos semitorques</i>	Collared Finchbill
<i>Pycnonotus sinensis</i>	Light-vented Bulbul
<i>Hemixos castanonotus</i>	Chestnut Bulbul
<i>Hypsipetes mcclllandii</i>	Mountain Bulbul
<i>Prinia inornata</i>	Plain Prinia
<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush
<i>Garrulax canorus</i>	Hwamei
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler
<i>Pomatorhinus erythrocnemis</i>	Spot-breasted Scimitar Babbler
<i>Stachyris ruficeps</i>	Rufous-capped Babbler
<i>Alcippe morrisonia</i>	Grey-cheeked Fulvetta
<i>Alcippe brunnea</i>	Dusky Fulvetta
<i>Yuhina zantholeuca</i>	White-bellied Yuhina
<i>Parus major</i>	Great Tit
<i>Aethopyga christinae</i>	Fork-tailed Sunbird
<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker
<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie
<i>Dendrocitta formosae</i>	Grey Treepie

- The birds recorded are mostly quite common in South China forests. Crested Serpent Eagle *Spilornis cheela* and Silver Pheasant *Lophura nycthemera* are Class II Protected species in China.
- The forest, though young, contained a variety of forest birds, including game species, indicating that disturbance had not been too severe.

Reptiles and Amphibians

- Six species of amphibian, three species of lizard and two species of snake were recorded from Qingshitan Nature Reserve (Table 4).
- The most commonly seen species was the lizard *Platyplacopus kuehnei*.
- Unconfirmed records included young tadpoles that appeared to be *Paa spinosa*, but which were too small to be identified reliably. Also skinks that probably belonged to *Sphenomorphus indicus* were seen.

Table 4. Amphibians and reptiles of Qingshitan Nature Reserve, 25-26 August 1998. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat	
<i>Bufo andrewsi</i>	stream	✓
<i>Bufo melanostictus</i>	bamboo plantation	✓
	stream	✓
	forest	✓
	reservoir	✓
<i>Paa boulengeri</i>	stream	✓, tadpoles
<i>Rana guentheri</i>	reservoir	✓
<i>Rana limnocharis</i>	reservoir	✓
	stream	✓
<i>Rana livida</i>	stream	✓
<i>Platyplacopus kuehnei</i>	forest	✓
	fir plantation	✓
<i>Eumeces chinensis</i>	village/plantation	✓
<i>Eumeces elegans</i>	forest	✓
<i>Pareas chinensis</i>	stream	✓
<i>Rhabdophis subminiatus</i>	shrubland	✓

- The presence of the frogs *Paa boulengeri* and *Rana livida* and the snake *Pareas chinensis* indicated that the forests and streams at Qingshitan had not been drastically disturbed in recent years.

Fish

- Freshwater fishes seemed to be absent in the small streams visited during the rapid survey. Although fishes were seen in the reservoir, none could be caught or reliably identified.

Ants

- Forty-two ant species were recorded from Qingshitan (Table 5).
- The most frequently encountered were *Crematogaster* sp. 3, *Pheidole* sp. 13, *Diacamma* sp. 1, *Monomorium* sp. 2, *Pachycondyla* sp. 1, *Pheidole* sp. 1, *Technomyrmex* sp. 2 and *Recurvidris* sp. 1.
- Many specimens could not be assigned to described species. These require further study.

Table 5. Ant species and number of encounters at Qingshitan Nature Reserve, 25 to 26 August 1998.

* Species with a strong forest association.

Species	Habitat
<i>Enicospilus (dentatus group)</i> sp. 4	shrubland
<i>Anochetus risii</i>	open broadleaf forest
<i>Aphaenogaster</i> sp. *	open forest
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11	closed forest
<i>Cataulacus granulatus</i>	forest
<i>Crematogaster</i> (cf. <i>laboriosa</i>) sp. 3	forest & shrubland
<i>Diacamma</i> (nr. <i>rugosum</i>) sp. 1	various
<i>Dolichoderus</i> (cf. <i>flatidorsus</i>) sp. 6	closed broadleaf forest
<i>Hypoponera</i> (cf. <i>excoecata</i>) sp. 2 *	broadleaf forest
<i>Lepisiota rothneyi</i>	forest
<i>Lepisiota</i> (cf. <i>capensis</i>) sp. 3	open forest/grassland
<i>Mayriella transfuga</i> *	broadleaf forest
<i>Monomorium chinense</i>	grassland/buildings
<i>Monomorium</i> (cf. <i>impexum</i>) sp. 2 *	closed forest
<i>Odontomachus monticola</i> *	closed forest
<i>Pachycondyla</i> (<i>javana</i> group) sp. 1 *	forest
<i>Pachycondyla</i> (cf. <i>luteipes</i>) sp. 2 *	forest

Species	Habitat
<i>Pachycondyla</i> (cf. <i>nigrita</i>) sp. 17 *	closed broadleaf forest
<i>Paratrechina</i> (cf. <i>bourbonica</i>) sp. 4	grassland/buildings
<i>Paratrechina</i> (nr. <i>indica</i>) sp. 9 *	open broadleaf forest
<i>Pheidole</i> (cf. <i>yeensis</i>) sp. 40	grassland/buildings
<i>Pheidole</i> (cf. <i>noda</i>) sp. 1	forest & shrubland
<i>Pheidole</i> sp. 13 *	broadleaf forest
<i>Pheidole tsailuni</i>	open broadleaf forest
<i>Pheidologeton diversus</i>	(missing data)
<i>Polyrhachis demangei</i>	forest/ shrubland
<i>Polyrhachis dives</i>	grassland/buildings
<i>Polyrhachis</i> (cf. <i>bicolor</i>) sp. 17 *	closed broadleaf forest
<i>Polyrhachis lamellidens</i> *	closed forest
<i>Polyrhachis</i> sp. 5 *	open broadleaf forest
<i>Polyrhachis tyrannica</i>	open broadleaf forest
<i>Polyrhachis vigilans</i> *	closed broadleaf forest
<i>Prenolepis magnocula</i> *	closed forest
<i>Prenolepis</i> (cf. <i>emmae</i>) sp. 1 *	open broadleaf forest
<i>Pristomyrmex pungens</i>	forest
<i>Pyramica canina</i> *	open broadleaf forest
<i>Pyramica elegantula</i>	closed broadleaf forest
<i>Recurvidris</i> (cf. <i>recurvispinosa</i>) sp. 1 *	broadleaf forest
<i>Technomyrmex</i> sp. 2 *	broadleaf forest
<i>Tetramorium</i> sp. 25 *	closed forest
<i>Tetramorium</i> (nr. <i>parvispinum</i>) sp. 2	open forest
<i>Vollenhovia</i> (cf. <i>emeryi</i>) sp. 1 *	open low forest

- In general the ant fauna was typical of lowland secondary forests, but *Polyrhachis* sp. 17 and *Tetramorium* sp. 25 are apparently restricted to primary or mature vegetation.
- Of the species recorded, some 21 (50%) are strongly forest-associated.

Dragonflies

- Sixteen species of odonates were recorded, including two which have not yet been identified (Table 6).
- The record of *Calopteryx melli* is important, as the genus had not been recently recorded from China and was previously known only from Guangdong. The Qingshitan record follows the first provincial record for the species, made at Huaping on 16 August 1998 (Kadoorie Farm and Botanic Garden, 2002a).

Table 6. Dragonfly species recorded at Qingshitan.

Species
<i>Calopteryx melli</i>
<i>Matrona basilaris</i>
<i>Vestalis smaragdina veluta</i>
<i>Agriocnemis</i> sp.
<i>Anisopleura qingyuanensis</i>
<i>Coeliccia cyanomelas</i>
<i>Cephalaeschna</i> sp.
<i>Gynacantha japonica</i>
<i>Labrogomphus torvus</i>
<i>Orthetrum pruinosum</i>
<i>Orthetrum sabina</i>
<i>Orthetrum triangulare</i>
<i>Pantala flavescens</i>
<i>Pseudothemis zonata</i>
<i>Sympetrum eroticum</i>
<i>Trithemis aurora</i>

Butterflies

- Fifty-four species of butterfly were recorded at Qingshitan over the two-day period (Table 7).
- *Dercas nina*, *Euthalia patala* and *Dercas nina* are new provincial records, not recorded from Guangxi by Chou (1994) or Bascombe (1995).

Table 7. Butterflies at Qingshitan, 25-26 August 1998.

Species	Habitat	Notes
<i>Abraximorpha davidii</i>	shrub/forest	
<i>Astictopterus jama</i>	shrub/forest	
<i>Bibasis gomata</i>	shrub/forest	
<i>Celaenorrhinus sp.</i>	shrub/forest	
<i>Erionota torus</i>	shrub/forest	
<i>Iambrix salsala</i>	shrub/forest	
<i>Notocrypta curvifascia</i>	shrub/forest	
<i>Tagiades litigiosus</i>	shrub/forest	
<i>Telicota colon</i>	shrub/forest	
<i>Graphium sarpedon</i>	reservoir, shrub/forest	
<i>Graphium (Pathysa) antiphates</i>	shrub/forest	
<i>Lamproptera curius</i>	shrub/forest	
<i>Meandrusa payeni</i>	shrub/forest	
<i>Papilio memnon</i>	reservoir, shrub/forest	
<i>Papilio nephelus</i>	reservoir	
<i>Papilio paris</i>	reservoir, shrub/forest	
<i>Papilio polytes</i>	reservoir	
<i>Papilio xuthus</i>	shrub/forest	
<i>Appias lyncida</i>	shrub/forest	
<i>Cepora nerissa</i>	shrub/forest	
<i>Dercas nina</i>	shrub/forest	new Guangxi record
<i>Eurema blanda</i>	shrub/forest	
<i>Hebomoia glaucippe</i>	reservoir, shrub/forest	
<i>Ixias pyrene</i>	shrub/forest	
<i>Abisara echerius</i>	shrub/forest	
<i>Abisara fylla</i>	shrub/forest	
<i>Abisara neophron</i>	shrub/forest	
<i>Dodona deodata</i>	shrub/forest	new Guangxi record
<i>Heliophorus ila</i>	shrub/forest	
<i>Jamides bochus</i>	shrub/forest	
<i>Spindasis lohita</i>	shrub/forest	
<i>Aemona amathusia</i>	shrub/forest	
<i>Athyma cama</i>	shrub/forest	
<i>Athyma nefte</i>	shrub/forest	
<i>Athyma selenophora</i>	shrub/forest	
<i>Danaus genutia</i>	reservoir, shrub/forest	
<i>Discophora sondaica</i>	shrub/forest	
<i>Euploea midamus</i>	reservoir, shrub/forest	
<i>Euthalia niepelti</i>	shrub/forest	
<i>Euthalia patala</i>	shrub/forest	new Guangxi record
<i>Helcyra superba</i>	shrub/forest	
<i>Kallima inachus</i>	shrub/forest	
<i>Lethe chandica</i>	shrub/forest	
<i>Limenitis (Bhagadatta) austenia</i>	shrub/forest	
<i>Melanitis leda</i>	shrub/forest	
<i>Melanitis phedima</i>	shrub/forest	
<i>Mycalesis gotama</i>	shrub/forest	
<i>Neptis clinia</i>	shrub/forest	
<i>Neptis sp.</i>	shrub/forest	
<i>Pantoporia hordonia</i>	shrub/forest	
<i>Precis (Junonia) iphita</i>	shrub/forest	
<i>Stibochiona nicea</i>	shrub/forest	
<i>Stichophthalma howqua</i>	shrub/forest	
<i>Symbrenthia brabira</i>	shrub/forest	

- Most species were typical of mixed habitats, although a few forest specialists were present, such as *Meandrusa payeni*, *Aemona amathusia*, *Bhagadatta austenia*, *Kallima inachus* and *Stichopthalma howqua*.

Summary of flora and fauna

- The vegetation of Qingshitian was secondary regrowth of subtropical evergreen broadleaf forest, dominated by Fagaceae, Lauraceae, and Theaceae. The present survey, in forests near the reservoir, did not record species of exceptional conservation concern.
- The fauna of Qingshitian was typical of young secondary forests. A fairly diverse forest fauna was present, including larger birds susceptible to extirpation under heavy hunting pressure, and the reserve has the potential of developing into a more mature community if the existing young forests are allowed to grow and spread.
- Qingshitian was considered of national biodiversity importance by MacKinnon *et al.* (1996), based on the reserve size and reported forest cover (73%). The present survey was insufficient to verify this designation, but further work at higher elevations is needed to ascertain its importance.

Threats and problems

- The forests at Qingshitian were young and fragmented. Much of the original natural forest had been cleared for the construction of the reservoir, for agriculture and plantation forestry. The process of forest recovery is slow.
- Development of tourism had caused some problems, such as the accumulation of plastic litter along the reservoir shoreline. Boat engines were another source of water pollution.

Opportunities and recommendations

- Protection of the nature reserve had reportedly improved recently. For instance, the reserve staff not only patrolled in the forest to prevent illegal logging, electro-fishing and hunting, but also encouraged villagers to patrol and protect the forest. The shift in the local economy appears to have been beneficial in reducing hunting pressure, as suggested by the sightings of game birds such as Silver Pheasant and Chinese Bamboo Partridge during our brief survey.
- The reservoir seemed quite a popular tourist destination with several guesthouses around it. Given adequate planning, support and management to control the impact of tourists and enhance their environmental awareness, the reserve might become a successful ecotourism site. The potential to develop an education programme for nearby schoolchildren might also be explored with the Education Authority.
- Given adequate protection and reforestation with native tree species, the vegetation on the surrounding hills has the potential of developing into good secondary forest, enhancing the scenic and ecological value of Qingshitian, and providing improved environmental services (MacKinnon *et al.*, 2001). Existing plantations should be improved by thinning to allow the seedlings of native tree and shrub species in the forest floor to develop. Where native plants fail to recolonise, the planting of suitable native tree seedlings should be considered.
- Profits from tourism at Qingshitian, and economic returns from water supplied from the reservoir, should be returned to the source. This would enable funding of anti-poaching patrols, natural forest recovery, active reforestation work and other aspects of reserve management.
- Discharge of sewage and other forms of pollution from all sources at Qingshitian should be strictly controlled.

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 Qingshitan Headwater Forest Nature Reserve. We also thank our voluntary helper Sukh Mantel, for data input. This work has been funded by KFBG.

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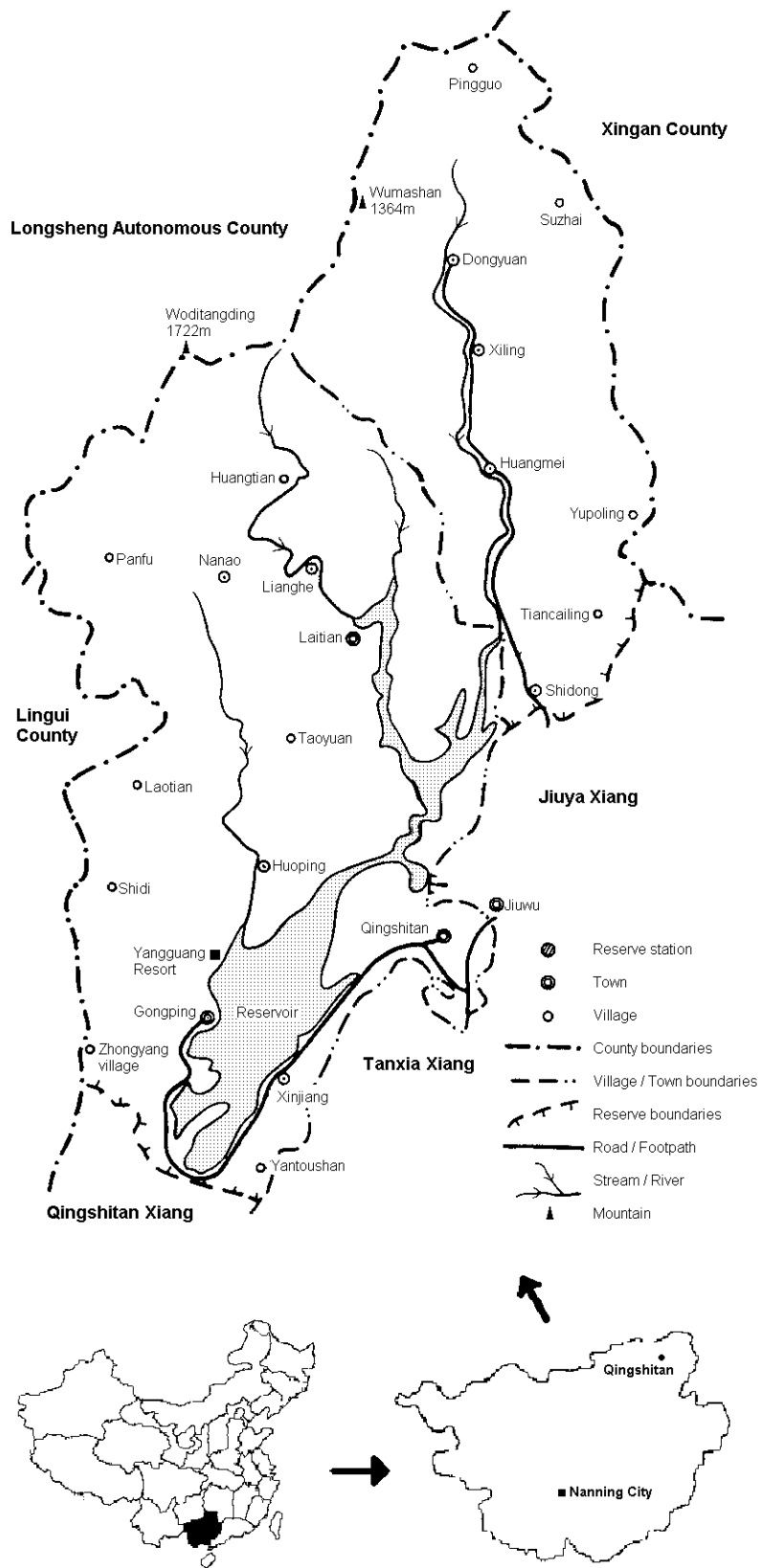


Figure 1. Map showing location of Qingshitan Headwater Forest Nature Reserve, Northeast Guangxi, China