



**Report of Rapid Biodiversity Assessments at
Jiulianshan Nature Reserve, South Jiangxi, China,
2000, 2001 and 2003**

Kadoorie Farm and Botanic Garden
in collaboration with
Jiulianshan Nature Reserve (Jiangxi Provincial Forestry Department)
South China Institute of Botany
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Report of Rapid Biodiversity Assessments at Jiulianshan Nature Reserve, South Jiangxi, China, 2000, 2001 and 2003

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Background

The present report details the findings of visits to South Jiangxi 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.

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Translation of 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, Gou	valley, stream
Kou	outlet
Ling	range
Nan	south
Ping	flat
Shan	mountain
Shi	city
Tun	hamlet
Wan	bay
Xi	west
Xi, Yong	stream
Xian	county
Xiang, Cun	village

Report of Rapid Biodiversity Assessments at Jiulianshan Nature Reserve, South Jiangxi, China, 2000, 2001 and 2003

Objectives

- The aims of the 2000 survey were to collect up-to-date information on the fauna and flora of Jiulianshan Nature Reserve, and to use this to help determine conservation priorities within South China. The 2001 visit was part of a species-specific survey for White-eared Night Heron *Gorsachius magnificus*, after confirming its presence at nearby Chebaling National Nature Reserve in Guangdong (Fellowes *et al.*, 2001). The 2003 survey was to initiate a collaborative mammal study with the reserve management.

Methods

- On 18-20 August 2000 a team of biologists from Hong Kong (BH, BC, JRF, ML, LKS, NSC, GTR, CW), Xinyang (LHJ), Guangxi (ZSY, HJH) and Guangzhou (XZ, DHJ, CZY, CBH) conducted a rapid biodiversity survey at Jiulianshan Nature Reserve.
- On 24-26 July 2001 a team of biologists from Hong Kong (BC, LKS, SS), France (OP) and Guangdong (HSL) visited Jiulianshan Nature Reserve as part of the 2001 survey for White-eared Night Heron *Gorsachius magnificus* (to be reported elsewhere).
- On 8-10 January 2003 a team of biologists from Hong Kong (BC, LKS, NSC), plus two volunteers Miss Karin Chan and Miss Vicky Yeung, visited Jiulianshan Nature Reserve for a camera trapping survey.
- During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, fish, ants, butterflies and dragonflies were conducted. Frogs and birds were also identified 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 Jiulianshan was inferred largely based on Dai *et al.* (2002) and interviews with reserve staff, 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). Additional information was obtained from the preliminary results of the camera-trapping survey.
- Vascular plant records were made by CBH, CZY, and NSC, and edited by NSC, except for orchids, for which records were verified and edited by Ms. Gloria Siu of Kadoorie Farm & Botanic Garden. Mammal records were made by LKS, BC, ML, JRF, or BH. Records of birds were made or verified by LKS, CW or ML, reptiles and amphibians by ML or BC, fish by BC, DHJ and CXL, dragonflies by KW or GTR and butterflies by GTR. Ant records have yet to be processed, and will be published elsewhere.
- Nomenclature in the report is standardised based, unless otherwise stated, on the following references:
 - Flora (Pteridophyta, Gymnospermae and Angiospermae): Anon. (1959-2001); Anon. (1996-2001); Anon. (2002a, 2002b); The Plant Names Project (2002);
 - 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);
 - 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 (2002). Certain taxa, including orchids, reptiles, amphibians, fish and invertebrates, have yet to be properly assessed for global status. 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.

Location and management

- Jiulianshan Nature Reserve is in the southernmost part of Longnan County, South Jiangxi, bordering Lianping County of Guangdong, at 24°29'18"-24°38'55"N by 114°22'50"-114°31'32"E (Liu X.Z. *et al.*, 2002). The original nature reserve was about 42 km² in size (MacKinnon *et al.*, 1996; Zhang W., 1998), with two core areas, at Xiagongtang and Daqiutian, separated by buffer zone (as referred to above). In 2002 it was enlarged to 134 km² including a core area of 43 km² (32% of total reserve area, from Huangniushi in the south to Shanghualu in the north), a buffer zone of 14 km² (11%, immediately fringing the core) and an experimental zone of 77 km² (57%) (Liu X.Z. *et al.*, 2002).
- The nature reserve has a mountainous landscape with altitude range from 280 to 1,434 m at the summit of Huangniushi. The geology is dominated by granite, sand stone and sandy shale (Liu X.Z. *et al.*, 2002).
- The nature reserve has a reported forest cover of 95%, reaching 98% in the core areas (Liu X.Z. *et al.*, 2002).
- The reserve has 15 villages and 245 families with 975 inhabitants, with an annual income of 1,329 yuan per head. The level of the economy is significantly lower than surrounding townships in Lianping, Longnan and Quannan Counties (Liu X.Z. *et al.*, 2002).
- Jiulianshan has a subtropical climate. The mean monthly temperature ranges from 6.8°C in January to 24.4°C in July, with a mean annual precipitation of 2,156 mm, which occurs mainly in the wet season from February to September. October to November is the dry season (Liu X.Z. *et al.*, 2002). Rivers drain northward to the Tao Jiang, and on to the Gan Jiang, which drains into Poyang Lake of the Yangtze (Chang Jiang) system.
- The Xiagongtang forest segment at Jiulianshan was first protected in 1975, and by 1981 it was designated a provincial nature reserve to protect its subtropical evergreen broadleaf forests (MacKinnon *et al.*, 1996; Liu X.Z. *et al.*, 2002). It is classified as a Forest Ecosystem nature reserve at the provincial level (Zhang W., 1998). In 2002, the reserve had 47 staff, including seven management staff, 28 technicians and 12 workers (Liu X.Z. *et al.*, 2002).
- In 2001 the reserve management authority submitted a proposal to upgrade Jiulianshan to national-level nature reserve (Liu X.Z. *et al.*, 2002). This has been approved by the Provincial Government and at the time of writing is awaiting approval from the State Council.

Results

Vegetation

- In the 1980s the major vegetation types at Jiulianshan were reported to include subtropical evergreen broadleaf forest, low hill coniferous forest, bamboo forest, montane dwarf forest and montane grassland (Ye and Chen S.F., 2002).
- The present surveys included the core areas at Xiagongtang and at Daqiutian, and the buffer and experimental zones of Daqiutian near Lengshuikeng. Extensive mature secondary forest up to 30 m in height with trees up to 100 cm dbh could be found, up to 1,200 m on the slope of Huangniushi. This forest was dominated largely by *Castanopsis carlesii*, *C. fabri*, *C. lamontii*, *Liquidambar formosana*, *Engelhardtia roxburghiana* and *C. eyrei* below high altitude. Above that, the dominant species gradually become *Schima superba*, *Michelia maudiae*, *Michelia foveolata* and *Quercus serrata* var. *brevipetiolata*. Here the forest was up to 15 m tall with trees up to 60 cm dbh. At higher altitude the vegetation became montane dwarf forest about 2-3 m in height, dominated by *Rhododendron simiarum*, *Cyclobalanopsis glauca*, *Michelia maudiae* and *Vaccinium bracteatum*. Montane grassland dominated by Poaceae could be found on or near the summit.
- The core area at Daqiutian had a more degraded landscape, with vegetation at lower altitudes largely transformed to agricultural fields and plantations of *Phyllostachys heterocycla* cv. *Pubescens*, *Cunninghamia lanceolata* (China Fir) and *Vernicia* spp. There were also patches of plantation of *Camptotheca acuminata*. Fragmented but apparently connected mature secondary forest, up to 30 m tall was seen at a distance, but not surveyed.
- The experimental and buffer zones of Daqiutian core area near Lengshuikeng also had a fragmented

forested hillside landscape, with small patches of abandoned farmland and plantation in between. The hillside forest was mature secondary forest up to 30 m tall and dominated by *Castanopsis carlesii*, *C. fargesii*, *Michelia chapensis*, *Schima superba*, *Engelhardtia roxburghiana* and *Liquidambar formosana*.

Flora

- The present surveys recorded 389 vascular plant species including 62 fern species in 27 families, three gymnosperms in three families, and 324 angiosperms in 92 families (Table 1). This is a fairly high number given the three days of botanical fieldwork. Many of the species recorded at Daqiutian, however, were weedy species typical of human-disturbed areas. Earlier surveys had recorded 1,479 vascular plant species in 231 families (Yao *et al.*, 2002).
- Two taxa (*Manglietia fordiana* var. *kwangtungensis* and *Ainsliaea ramosa*) were recorded from Jiangxi for the first time. The latter species had been recorded from the nearby Lianping County of Guangdong (Vol. 79 of Anon. (1959-2001)); only a few individuals were seen at Lengshuikeng. The fern *Ctenitopsis sinii* has only recently been recorded from Jiangxi (Chen Y.-j. *et al.*, 2002).
- Among the flora recorded in the present surveys, there are several plant species of conservation importance:
 - *Bretschneidera sinensis* is considered globally Endangered and is under Class I National Protection in China. It was found at Xiagongtang in the present surveys.
 - *Taxus wallichiana* var. *mairei* is under Class I National Protection. A single tree was found in the forest at Xiagongtang. We were told by wardens that a large population could be found deeper inside the forest at higher altitude. The species has a widely scattered distribution and is locally rare where it occurs.
 - *Toona ciliata* var. *pubescens* and *Eurycorymbus cavaleriei* are under Class II National Protection. The latter is also considered Near-threatened globally. Both were locally common in the mature forest at Xiagongtang. They are widespread in South China but are restricted to forest habitat.
 - *Gymnosphaera hancockii* belongs to the treefern family of which all members are under Class II National Protection. It was locally abundant in the mature forest at Xiagongtang. This species has a wide distribution in South China but is usually restricted to well-preserved mature forest.
 - *Cibotium barometz* is under Class II National Protection but is both widespread in South China and is abundant in degraded shrubland and forest margins.
 - *Cinnamomum camphora* is Class II Protected nationally, although the trees seen were all planted individuals next to villages.
 - *Michelia odora* is considered Near-threatened globally. Two small trees and one larger population with more than 20 plants were found at Xiagongtang and Daqiutian respectively.
 - *Manglietia fordiana* var. *kwangtungensis* is known only from Guangdong, Guangxi and (now) Jiangxi.

Table 1. Vascular plants of Jiulianshan Nature Reserve recorded in the present surveys (2000 & 2003). Species which are nationally Protected (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999), globally Threatened or Lower Risk (Near-threatened) (IUCN, 2002) or globally restricted are indicated.

Family	Scientific name	Remarks
PTERIDOPHYTA		
Adiantaceae	<i>Adiantum flabellulatum</i> L.	
Aspidiaceae	<i>Ctenitis rhodolepis</i> (C.B. Clarke) Ching	
	<i>Ctenitopsis sinii</i> (Ching) Ching	new Jiangxi record
Aspleniaceae	<i>Asplenium normale</i> D. Don	
	<i>Asplenium prolongatum</i> Hook.	
	<i>Asplenium wrightii</i> Eaton ex Hook.	
Athyriaceae	<i>Allantodia metteniana</i> (Miq.) Ching	
	<i>Allantodia virescens</i> (Kunze) Ching	
	<i>Diplazium crassiusculum</i> Ching	
	<i>Diplazium subsinuatum</i> (Wall. ex Hook. & Grev.) Tagawa	
Blechnaceae	<i>Blechnum orientale</i> L.	
	<i>Chieniopteris harlandii</i> (Hook.) Ching	
	<i>Woodwardia japonica</i> (L.f.) Sm.	
	<i>Woodwardia prolifera</i> Hook. & Arn.	
	<i>Woodwardia orientalis</i> Sw.	

Family	Scientific name	Remarks
Cyatheaceae	<i>Gymnosphaera hancockii</i> (Copel.) Ching	Protected II
Dennstaedtiaceae	<i>Microlepia hookeriana</i> (Wall. ex Hook.) C. Presl. <i>Microlepia marginata</i> (Houtt.) C. Chr.	
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Dryopteridaceae	<i>Arachniodes chinensis</i> (Rosenst.) Ching <i>Dryopteris championii</i> (Benth.) C. Chr. <i>Dryopteris chinensis</i> (Baker) Koidz. <i>Dryopteris setosa</i> (Thunb.) Akasawa	
Equisetaceae	<i>Equisetum ramosissimum</i> Desf.	
Gleicheniaceae	<i>Dicranopteris pedata</i> (Houtt.) Nakaike <i>Diplopterygium chinensis</i> (Rosenst.) DeVol	
Hemionitidaceae	<i>Coniogramme japonica</i> (Thunb.) Diels	
Hymenophyllaceae	<i>Hymenophyllum barbatum</i> (Bosch) Baker	
Lindsaeaceae	<i>Stenoloma chusanum</i> (L.) Ching	
Lycopodiaceae	<i>Palhinhaea cernua</i> (L.) Franco & Vasc.	
Lygodiaceae	<i>Lygodium japonicum</i> (Thunb.) Sw.	
Marattiaceae	<i>Angiopteris fokiensis</i> Hieron.	
Nephrolepidaceae	<i>Nephrolepis auriculata</i> (L.) Trimea	
Osmundaceae	<i>Osmunda banksiifolia</i> (C. Presl) Kuhn <i>Osmunda japonica</i> Thunb. <i>Osmunda vachellii</i> Hook.	
Plagiogyriaceae	<i>Plagiogyria distinctissima</i> Ching <i>Plagiogyria dunnii</i> Copel.	
Polypodiaceae	<i>Colysis elliptica</i> (Thunb.) Ching <i>Colysis elliptica</i> (Thunb.) Ching var. <i>pothifolia</i> Ching <i>Colysis hemitoma</i> (Hance) Ching <i>Lemmaphyllum microphyllum</i> C. Presl <i>Lepisorus thunbergianus</i> (Kaulf.) Ching <i>Lepisorus tosaensis</i> (Makino) H. Itô <i>Microsorium buergerianum</i> (Miq.) Ching <i>Microsorium fortunei</i> (T. Moore) Ching <i>Neolepisorus ovatus</i> (Wall. ex Bedd.) Ching <i>Polypodioides amoena</i> (Wall. ex Mett.) Ching <i>Polypodiastrum mengtzeense</i> (H. Christ) Ching <i>Pyrrosia lingua</i> (Thunb.) Farw	
Pteridaceae	<i>Histiopteris incisa</i> (Thunb.) J. Sm. <i>Pteris insignis</i> Mett. ex Kuhn <i>Pteris multifida</i> Poir. <i>Pteris semipinnata</i> L. <i>Pteris vittata</i> L.	
Pteridiaceae	<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i> (Desv.) Underw. ex A. Heller	
Selaginellaceae	<i>Selaginella doederleinii</i> Hieron	
Sinopteridaceae	<i>Onychium japonicum</i> (Thunb.) Kunze	
Thelypteridaceae	<i>Cyclosorus acuminatus</i> (Houtt.) Nakai ex H. Itô <i>Dictyocline wilfordii</i> (Hook.) J. Sm. <i>Pronephrium aspera</i> (C. Presl) W. C. Shieh & J. L. Tsai	
Vittariaceae	<i>Vittaria flexuosa</i> Fée	
GYMNOSPERMAE		
Pinaceae	<i>Pinus massoniana</i> Lamb.	
Taxaceae	<i>Taxus wallichiana</i> Zucc. var. <i>mairei</i> (Lemée & H. Lév.) L.K. Fu & Nan Li	Protected I
Taxodiaceae	<i>Cunninghamia lanceolata</i> (Lamb.) Hook.	planted
ANGIOSPERMAE		
Dicotyledonae		
Acanthaceae	<i>Justicia procumbens</i> L.	
Aceraceae	<i>Acer cinnamomifolium</i> Hayata <i>Acer fabri</i> Hance	
Actinidiaceae	<i>Actinidia callosa</i> Lindl. <i>Actinidia latifolia</i> (Gardner & Champ.) Merr.	
Alangiaceae	<i>Alangium kurzii</i> Craib	
Amaranthaceae	<i>Achyranthes bidentata</i> Blume	

Family	Scientific name	Remarks
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burt & A.W. Hill <i>Rhus chinensis</i> Mill. <i>Toxicodendron succedaneum</i> (L.) Kuntze.	
Annonaceae	<i>Artabotrys hongkongensis</i> Hance <i>Fissistigma oldhamii</i> (Hemsl.) Merr.	
Apiaceae	<i>Angelica decursiva</i> (Miq.) Franch. & Sav. <i>Centella asiatica</i> (L.) Urb. <i>Cryptotaenia japonica</i> Hassk. <i>Hydrocotyle nepalensis</i> Hook.	
Apocynaceae	<i>Trachelospermum jasminoides</i> (Lindl.) Lem.	
Aquifoliaceae	<i>Ilex championii</i> Loes. <i>Ilex dasyphylla</i> Merr. <i>Ilex ficoidea</i> Hemsl. <i>Ilex pubescens</i> Hook. & Arn. <i>Ilex rotunda</i> Thunb. <i>Ilex viridis</i> Champ. ex Benth.	
Araliaceae	<i>Acanthopanax evodiifolius</i> Franch. var. <i>gracilis</i> W.W. Sm. <i>Aralia decaisneana</i> Hance <i>Dendropanax dentigerus</i> (Harms ex Diels) Merr. <i>Eleutherococcus trifolius</i> (L.) S.Y. Hu <i>Hedera nepalensis</i> K. Koch var. <i>sinensis</i> (Tobler) Rehder <i>Schefflera delavayi</i> (Franch.) Harms <i>Schefflera minutistellata</i> Merr. ex H.L. Li	
Aristolochiaceae	<i>Asarum wulingense</i> C.F. Liang	
Asclepiadaceae	<i>Cynanchum auriculatum</i> Royle ex Wight <i>Pentasacme caudatum</i> Wall. ex Wight	
Asteraceae	<i>Ageratum conyzoides</i> L. <i>Ainsliaea ramosa</i> Hemsl. <i>Aster ageratooides</i> Turcz. <i>Cirsium japonicum</i> Fisch. ex DC. <i>Conyza canadensis</i> (L.) Cronquist <i>Crassocephalum crepidioides</i> (Benth.) S. Moore <i>Elephantopus scaber</i> L. <i>Kalimeris indica</i> (L.) Sch. Bip. <i>Wedelia wallichii</i> Less.	introduced from tropical America new Jiangxi record introduced from North America introduced from Africa
Begoniaceae	<i>Begonia palmata</i> D. Don	
Brassicaceae	<i>Rorippa indica</i> (L.) Hiern	
Bretschneideraceae	<i>Bretschneidera sinensis</i> Hemsl.	Endangered, Protected I
Caesalpiniaceae	<i>Bauhinia championii</i> (Benth.) Benth. <i>Caesalpinia decapetala</i> (Roth) Alston <i>Gleditsia fera</i> (Lour.) Merr.	
Campanulaceae	<i>Codonopsis lanceolata</i> (Siebold & Zucc.) Trautv. <i>Lobelia melliana</i> E. Wimm. <i>Pratia nummularia</i> (Lam.) A. Br. & Aschers.	
Caprifoliaceae	<i>Viburnum fordiae</i> Hance	
Celastraceae	<i>Celastrus hindsii</i> Benth. <i>Euonymus centidens</i> H. Lév. <i>Euonymus laxiflorus</i> Champ. ex Benth.	
Chloranthaceae	<i>Chloranthus henryi</i> Hemsl. <i>Sarcandra glabra</i> (Thunb.) Nakai	
Clethraceae	<i>Clethra cavaleriei</i> H. Lév.	
Clusiaceae	<i>Garcinia multiflora</i> Champ. ex Benth.	
Convolvulaceae	<i>Cuscuta japonica</i> Choisy <i>Ipomoea batatas</i> (L.) Lam.	
Cornaceae	<i>Dendrobenthamia angustata</i> (Chun) W.P. Fang <i>Dendrobenthamia hongkongensis</i> (Hemsl.) Hutch.	
Cucurbitaceae	<i>Gynostemma pentaphylla</i> (Thunb.) Makino	
Daphniphyllaceae	<i>Daphniphyllum calycinum</i> Benth <i>Daphniphyllum oldhami</i> (Hemsl.) Rosenth.	
Ebenaceae	<i>Diospyros japonica</i> Siebold & Zucc. <i>Diospyros kaki</i> Thunb. <i>Diospyros morrisiana</i> Hance ex. Walpers	planted
Elaeocarpaceae	<i>Elaeocarpus decipiens</i> Hemsl. <i>Elaeocarpus japonicus</i> Siebold & Zucc. <i>Elaeocarpus sylvestris</i> (Lour.) Poir.	

Family	Scientific name	Remarks
Ericaceae	<i>Sloanea sinensis</i> (Hance) Hemsl.	
	<i>Gaultheria leucocarpa</i> Blume var. <i>crenulata</i> (Kurz) T.Z. Hsu	
	<i>Lyonia ovalifolia</i> (Wall.) Drude	
	<i>Rhododendron championiae</i> Hook. f.	
	<i>Rhododendron fortunei</i> Lindl.	
	<i>Rhododendron mariae</i> Hance	
	<i>Rhododendron moulmainsense</i> Hook. f.	
	<i>Rhododendron ovatum</i> (Lindl.) Planch. ex Maxim.	
	<i>Rhododendron simiarum</i> Hance	
	<i>Vaccinium bracteatum</i> Thunb.	
Erythroxylaceae	<i>Vaccinium trichocladum</i> Merr. & F.P. Metcalf	
	<i>Erythroxylum sinense</i> Y. C. Wu	
Escalloniaceae	<i>Itea chinensis</i> Hook. & Arn	
Euphorbiaceae	<i>Alchornea trewioides</i> (Benth.) Müll. Arg.	
	<i>Antidesma japonicum</i> Siebold & Zucc.	
	<i>Bischofia polycarpa</i> (H. Lév.) Airy Shaw	
	<i>Glochidion puberum</i> (L.) Hutch.	
	<i>Mallotus apelta</i> (Lour.) Müll. Arg.	
	<i>Mallotus paniculatus</i> (Lam.) Müll. Arg.	
	<i>Sapium discolor</i> (Champ. ex Benth.) Müll. Arg.	
	<i>Vernicia fordii</i> (Hemsl.) Airy Shaw	planted
	<i>Vernicia montana</i> Lour.	planted
	Fagaceae	<i>Castanea mollissima</i> Blume
<i>Castanopsis carlesii</i> (Hemsl.) Hayata		
<i>Castanopsis eyrei</i> (Champ. ex Benth.) Tutcher		
<i>Castanopsis fabri</i> Hance		
<i>Castanopsis fargesii</i> Franch.		
<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder & E. H. Wilson		
<i>Castanopsis fordii</i> Hance		
<i>Castanopsis hystrix</i> Miq.		
<i>Castanopsis lamontii</i> Hance		
<i>Castanopsis tibetana</i> Hance		
<i>Cyclobalanopsis fleuryi</i> (Hickel & A. Camus) Chun ex Q. F. Zheng		
<i>Cyclobalanopsis glauca</i> (Thunb.) Oerst.		
<i>Cyclobalanopsis myrsinifolia</i> (Blume) Oerst.		
<i>Fagus lucida</i> Rehder & E.H. Wilson		
<i>Lithocarpus fenestratus</i> (Roxb.) Rehder		
<i>Lithocarpus chrysocomus</i> Chun & Tsiang		
<i>Lithocarpus hancei</i> (Benth.) Rehder		
<i>Lithocarpus litseifolius</i> (Hance) Chun		
<i>Lithocarpus uvariifolius</i> (Hance) Rehder		
<i>Quercus serrata</i> Thunb. var. <i>brevipetiolata</i> (A. DC.) Nakai		
Flacourtiaceae	<i>Idesia polycarpa</i> Maxim.	
Hamamelidaceae	<i>Altingia chinensis</i> (Champ. ex Benth.) Oliv. ex Hance	
	<i>Eustigma oblongifolium</i> Gardner & Champ.	
	<i>Exbucklandia tonkinensis</i> (Lecomte) Steenis	
Hydrangeaceae	<i>Liquidambar formosana</i> Hance	
	<i>Loropetalum chinense</i> (R. Br.) Oliv.	
Hydrangeaceae	<i>Hydrangea paniculata</i> Siebold	
	<i>Pileostegia tomentella</i> Hand.-Mazz.	
Juglandaceae	<i>Engelhardtia fenzelii</i> Merr.	
	<i>Engelhardtia roxburghiana</i> Wall.	
Lamiaceae	<i>Pterocarya stenoptera</i> C. DC.	
	<i>Anisomeles indica</i> (L.) Kuntze	
Lardizabalaceae	<i>Isodon lophanthoides</i> (Buch.-Ham. ex D. Don) H. Hara	
	<i>Stauntonia obovatifoliola</i> Hayata ssp. <i>urophylla</i> (Hand.-Mazz.) H.N. Qin	
Lauraceae	<i>Stauntonia chinensis</i> DC.	
	<i>Cinnamomum austrosinense</i> H.T. Chang	
	<i>Cinnamomum burmanni</i> (Nees & T. Nees) Blume	
	<i>Cinnamomum camphora</i> (L.) J. Presl.	Protected II, planted
	<i>Cinnamomum porrectum</i> (Roxb.) Kosterm.	
Lauraceae	<i>Lindera aggregata</i> (Sims) Kosterm.	
	<i>Lindera communis</i> Hemsl.	

Family	Scientific name	Remarks
	<i>Litsea elongata</i> (Nees) Benth. & Hook. f.	
	<i>Machilus grijsii</i> Hance	
	<i>Machilus leptophylla</i> Hand.-Mazz.	
	<i>Machilus pauhoi</i> Kanehira	
	<i>Machilus thunbergii</i> Siebold & Zucc.	
	<i>Machilus velutina</i> Champ. ex Benth.	
	<i>Neolitsea aurata</i> (Hayata) Koidz.	
	<i>Neolitsea chunii</i> Merr.	
	<i>Neolitsea levinei</i> Merr.	
	<i>Neolitsea phanerophlebia</i> Merr.	
	<i>Sassafras tzumu</i> (Hemsl.) Hemsl.	
Magnoliaceae	<i>Liriodendron chinense</i> (Hemsl.) Sarg.	planted
	<i>Manglietia fordiana</i> Oliv.	
	<i>Manglietia fordiana</i> Oliv. var. <i>kwangtungensis</i> (Merr.) B. L. Chen & Nooteb.	restricted to Guangdong & Guangxi
	<i>Michelia chapensis</i> Dandy	
	<i>Michelia foveolata</i> Merr. ex Dandy	
	<i>Michelia maudiae</i> Dunn	
	<i>Michelia odora</i> (Chun) Nooteb. & B. L. Chen	Lower Risk (nt)
	<i>Michelia skinneriana</i> Dunn	
Malvaceae	<i>Urena lobata</i> L.	pantropical weed
	<i>Urena procumbens</i> L.	
Melastomataceae	<i>Blastus apricus</i> (Hand.-Mazz.) H.L. Li	
	<i>Melastoma dodecandrum</i> Lour.	
Meliaceae	<i>Melia azedarach</i> L.	planted
	<i>Toona ciliata</i> M. Roem. var. <i>pubescens</i> (Franch.) Hand.-Mazz.	Protected II
	<i>Toona sinensis</i> (Juss.) Roem.	planted
Moraceae	<i>Artocarpus hypargyreus</i> Hance ex Benth.	
	<i>Cudrania cochinchinensis</i> (Lour.) Kudo & Masam.	
	<i>Ficus pumila</i> L.	
	<i>Ficus variolosa</i> Lindl. ex Benth.	
	<i>Humulus scandens</i> (Lour.) Merr.	
Myrsinaceae	<i>Ardisia crenata</i> Sims	
	<i>Ardisia pusilla</i> A.DC.	
	<i>Ardisia lindleyana</i> D. Dietr.	
	<i>Embelia laeta</i> (L.) Mez	
	<i>Embelia vestita</i> Roxb.	
	<i>Maesa japonica</i> (Thunb.) Moritz & Zoll.	
	<i>Mysine seguinii</i> H. Lév	
Myrtaceae	<i>Syzygium buxifolium</i> Hook. & Arn.	
Nyssaceae	<i>Camptotheca acuminata</i> Decne.	planted
Olacaceae	<i>Schoepfia jasminodora</i> Siebold & Zucc.	
Oleaceae	<i>Ligustrum sinense</i> Lour.	
	<i>Olea tsoongii</i> (Merr.) P.S. Green	
Orobanchaceae	<i>Aeginetia sinensis</i> Beck	
Oxalidaceae	<i>Oxalis corniculata</i> L.	
Papilionaceae	<i>Dalbergia hancei</i> Benth.	
	<i>Desmodium caudatum</i> (Thunb.) DC.	
	<i>Desmodium heterocarpon</i> (L.) DC.	
	<i>Desmodium microphyllum</i> (Thunb.) DC.	
	<i>Flemingia philippinensis</i> Merr. & Rolfe	
	<i>Indigofera decora</i> Lindl.	
	<i>Lespedeza cuneata</i> (Dum. Cours.) G. Don	
	<i>Millettia nitida</i> Benth.	
	<i>Millettia congestiflora</i> T.C. Chen	
	<i>Ormosia semicastrata</i> Hance	
	<i>Podocarpium podocarpum</i> (DC.) Yen C. Yang & P.H. Huang	
	<i>Pueraria lobata</i> (Willd.) Ohwi	
Piperaceae	<i>Piper hancei</i> Maxim.	
Pittosporaceae	<i>Pittosporum glabratum</i> Lindl.	
Polygonaceae	<i>Antenoron filiforme</i> (Thunb.) Roberty & Vautier	
	<i>Polygonum chinense</i> L.	
	<i>Reynoutria japonica</i> Houtt.	
Portulacaceae	<i>Portulaca oleracea</i> L.	
Proteaceae	<i>Helicia cochinchinensis</i> Lour.	

Family	Scientific name	Remarks
Ranunculaceae	<i>Ranunculus sieboldii</i> Miq.	
Rhamnaceae	<i>Berchemia floribunda</i> (Wall.) Brongn. <i>Hovenia acerba</i> Lindl. <i>Rhamnus crenata</i> Siebold & Zucc.	
Rosaceae	<i>Agrimonia nipponica</i> Koidz. var. <i>occidentalis</i> Skalicky <i>Eriobotrya deflexa</i> (Hemsl.) Nakai <i>Laurocerasus phaeosticta</i> (Hance) C. K. Schneid. <i>Laurocerasus undulata</i> (Buch.-Ham. ex D. Don) Roem. <i>Laurocerasus zippeliana</i> (Miq.) T.T. Yu & L.T. Lu <i>Photinia davidsoniae</i> Rehder & E.H. Wilson <i>Photinia prunifolia</i> (Hook. & Arn.) Lindl. <i>Rosa cymosa</i> Tratt. <i>Rubus alceaefolius</i> Poir.	
Rubiaceae	<i>Adina pilulifera</i> (Lam.) Franch. ex Drake <i>Aidia cochinchinensis</i> Lour. <i>Coptosapelta diffusa</i> (Champ. ex Benth.) Steenis <i>Diplospora dubia</i> (Lindl.) Masam. <i>Lasianthus japonicus</i> Miq. var. <i>lancilimbus</i> (Merr.) C.Y. Wu & H. Zhu <i>Mussaenda esquirolii</i> H. Lév. <i>Mussaenda pubescens</i> W. T. Aiton <i>Ophiorrhiza japonica</i> Blume <i>Paederia scandens</i> (Lour.) Merr. <i>Rubia wallichiana</i> Decne. <i>Tarenna mollissima</i> (Hook. & Arn.) B.L. Rob. <i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil.	
Rutaceae	<i>Evodia compacta</i> Hand.-Mazz. <i>Toddalia asiatica</i> (L.) Lam. <i>Zanthoxylum avicennae</i> (Lam.) DC. <i>Zanthoxylum scandens</i> Blume	
Sabiaceae	<i>Meliosma myriantha</i> Siebold & Zucc. <i>discolor</i> Dunn <i>Meliosma fordii</i> Hemsl. <i>Meliosma rigida</i> Siebold & Zucc. <i>Sabia japonica</i> Maxim.	
Sapindaceae	<i>Eurycorymbus cavaleriei</i> (H. Lév.) Rehder & Hand.-Mazz.	Protected II, Lower Risk (nt)
Sargentodoxaceae	<i>Sargentodoxa cuneata</i> (Oliv.) Rehder & E.H. Wilson	
Saururaceae	<i>Houttuynia cordata</i> Thunb.	
Schisandraceae	<i>Kadsura longipedunculata</i> Finet & Gagnep.	
Scrophulariaceae	<i>Torenia asiatica</i> L.	
Solanaceae	<i>Solanum americanum</i> Mill.	introduced from America
Staphyleaceae	<i>Euscaphis japonica</i> (Thunb.) Kanitz <i>Turpinia arguta</i> (Lindl.) Seem.	
Sterculiaceae	<i>Pterospermum heterophyllum</i> Hance	
Styracaceae	<i>Alniphyllum fortunei</i> (Hemsl.) Makino <i>Huodendron biaristatum</i> (W.W. Sm.) Rehder <i>Styrax confusus</i> Hemsl. <i>Styrax faberi</i> Perkins <i>Styrax suberifolius</i> Hook. & Arn.	
Symplocaceae	<i>Symplocos adenopus</i> Hance <i>Symplocos cochinchinensis</i> (Lour.) S. Moore <i>Symplocos cochinchinensis</i> (Lour.) S. Moore ssp. <i>laurina</i> (Retz.) Noot. <i>Symplocos congesta</i> Benth. <i>Symplocos lucida</i> (Thunb.) Siebold & Zucc.	
Theaceae	<i>Adinandra millettii</i> (Hook. & Arn.) Benth. & Hook. f. ex Hance <i>Anneslea fragrans</i> Wall. <i>Camellia cordifolia</i> (F.P. Metcalf) Nakai <i>Camellia oleifera</i> Abel <i>Camellia salicifolia</i> Champ. ex Benth. <i>Cleyera japonica</i> Thunb. <i>Eurya distichophylla</i> Hemsl. <i>Eurya loquaiana</i> Dunn <i>Schima superba</i> Gardn. & Champ. <i>Ternstroemia gymnanthera</i> (Wight & Arn.) Bedd.	
Ulmaceae	<i>Ulmus bergmanniana</i> C.K. Schneid.	
Urticaceae	<i>Gonostegia hirta</i> (Hassk.) Miq.	

Family	Scientific name	Remarks	
Verbenaceae	<i>Pellionia scabra</i> Benth.		
	<i>Callicarpa kochiana</i> Makino		
	<i>Clerodendrum cyrtophyllum</i> Turcz.		
	<i>Paraphlomis javanica</i> (Blume) Prain		
Violaceae	<i>Viola diffusa</i> Ging.		
Vitaceae	<i>Ampelopsis cantoniensis</i> (Hook. & Arn.) Planch.		
	<i>Ampelopsis grossedentata</i> (Hand.-Mazz.) W.T. Wang		
	<i>Cayratia japonica</i> (Thunb.) Gagnep.		
	<i>Parthenocissus dalzielii</i> Gagnep.		
	<i>Tetragium hemsleyanum</i> Diels & Gilg		
Monocotyledonae			
Araceae	<i>Acorus gramineus</i> Sol.		
	<i>Arisaema heterophyllum</i> Blume		
Araceae	<i>Trachycarpus fortunei</i> (Hook.) H. Wendl.		
Commelinaceae	<i>Commelina communis</i> L.		
	<i>Floscopa scandens</i> Lour.		
	<i>Murdannia nudiflora</i> (L.) Brenan		
Cyperaceae	<i>Pollia japonica</i> Thunb.		
	<i>Carex baccans</i> Nees		
	<i>Carex perakensis</i> C.B. Clarke		
	<i>Carex scaposa</i> C.B. Clarke		
	<i>Cyperus rotundus</i> L.		
	<i>Fimbristylis dichotoma</i> (L.) Vahl		
	<i>Kyllinga brevifolia</i> Rottb.		
	<i>Rhynchospora rubra</i> (Lour.) Makino		
	<i>Scleria terrestris</i> (L.) Fassett		
	<i>Belamcanda chinensis</i> (L.) DC.		
Iridaceae	<i>Aspidistra elatior</i> Blume		
Liliaceae	<i>Dianella ensifolia</i> (L.) DC.		
	<i>Hemerocallis citrina</i> Baroni		
	<i>Paris polyphylla</i> Sm. var. <i>chinensis</i> (Franch.) H. Hara		
	<i>Polygonatum cyrtoneura</i> Hua		
	<i>Smilax china</i> L.		
Orchidaceae	<i>Smilax lanceifolia</i> Roxb.		
	<i>Anoectochilus</i> (cf. <i>roxburghii</i> (Wall.) Lindl.) sp.		
	<i>Calanthe graciliflora</i> Hayata		
	<i>Cymbidium floribundum</i> Lindl.		
Poaceae	<i>Habenaria rhodocheila</i> Hance		
	<i>Alopecurus aequalis</i> Sobol.		
	<i>Arthraxon hispidus</i> (Thunb.) Makino		
	<i>Arundinella anomala</i> Steud.		
	<i>Capillipedium assimile</i> (Steud. ex Zoll.) A. Camus		
	<i>Cynodon dactylon</i> (L.) Pers.		
	<i>Echinochloa colonum</i> (L.) Link.		
	<i>Eleusine indica</i> (L.) Gaertn.		
	<i>Eragrostis unioloides</i> (Retz.) Nees ex Steud.		
	<i>Imperata koenigii</i> (Retz.) P. Beauv.		
	<i>Indocalamus latifolius</i> (Keng) McClure		
	<i>Isachne globosa</i> (Thunb.) Kuntze		
	<i>Ischaemum barbatum</i> Retz.		
	<i>Lophatherum gracile</i> Brongn.		
	<i>Miscanthus sinensis</i> Andersson		
	<i>Neyraudia arundinacea</i> (L.) Henr.		
	<i>Paspalum thunbergii</i> Kunth ex Steud.		
	<i>Phyllostachys heterocycla</i> (Carr.) Mitford cv. <i>Pubescens</i>	mainly cultivated	
	<i>Setaria glauca</i> (L.) P. Beauv.		
	<i>Setaria palmifolia</i> (J. Koenig) Stapf		
	<i>Sinobambusa tootsik</i> (Siebold) Makino		
	Zingiberaceae	<i>Alpinia pumila</i> Hook. f.	
		<i>Alpinia japonica</i> (Thunb.) Miq.	
<i>Globba racemosa</i> Sm.			
<i>Zingiber mioga</i> (Thunb.) Roscoe			

Mammals

- Maritime Striped Squirrel *Tamiops maritimus* were commonly seen or heard during the three surveys.
- A skeleton of Wild Boar *Sus scrofa* was shown to the team by WSB on 19 August 2000.
- A fairly fresh pangolin burrow was seen near Egongkeng on 20 August 2000.
- Two Chinese Hare *Lepus sinensis* were seen on 24 July 2001.
- In early 2003 (up to mid-March), Chinese Ferret-badger *Melogale moschata*, Yellow-bellied Weasel *Mustela kathiah*, Wild Boar *Sus scrofa* and Red-hipped Squirrel *Dremomys pyrrhomerus* were photographed by camera traps.
- A number of rat species (probably belonging to the genera *Niviventer* and *Rattus*) were also photographed but they could not be positively identified.
- In 2003, a location at Xiagongtang had many signs of mammals, including numerous droppings and tracks from muntjac *Muntiacus* sp(p), digging and tracks of Wild Boar, and feeding signs on the trees *Alniphyllum fortunei* and *Camptotheca acuminata*, on which the bark was believed to have been stripped by Sambar *Cervus unicolor*.
- The status of mammals was inferred (Table 2) based on various information sources including interviews with reserve staff (especially WSB), Dai *et al.* (2002) and preliminary results from the camera-trap survey.

Table 2. The inferred status of mammals at Jiulianshan Nature Reserve, based on an interview with reserve employee WSB (“+” = rare, “++” = quite common, “+++” = abundant, “n” = not asked), Dai *et al.* (2002) and preliminary infrared camera trap results. Sequence follows Wilson & Cole (2000).

Scientific name	English name	Dai <i>et al.</i> (2002)	WSB	Camera traps (2003)	Probable status
<i>Erinaceus amurensis</i> (recorded as <i>E. europaeus</i>)	Amur Hedgehog	++	n		present
<i>Suncus murinus</i>	Asian House Shrew	+++	n		present
<i>Mogera insularis</i>	Insular Mole	++	n		present
<i>Rhinolophus affinis</i>	Intermediate Horseshoe Bat	++	n		present
<i>Rhinolophus cornutus</i>	Little Japanese Horseshoe Bat	++	n		present
<i>Rhinolophus rouxii</i>	Rufous Horseshoe Bat	++	n		present
<i>Myotis ricketti</i>	Rickett's Big-footed Bat	++	n		present
<i>Nyctalus noctula</i>	Noctule	++	n		present
<i>Pipistrellus javanicus</i>	Javan Pipistrelle	++	n		present
<i>Pipistrellus pipistrellus</i>	Common Pipistrelle	+++	n		present
<i>Canis lupus</i>	Wolf	+			extirpated
<i>Cuon alpinus</i>	Dhole	++	seen in mid-90s		insecure
<i>Nyctereutes procyonoides</i>	Raccoon Dog	++	+		insecure
<i>Vulpes vulpes</i>	Red Fox	++			Insecure or extirpated
<i>Catopuma temminckii</i>	Asiatic Golden Cat	++			Insecure or extirpated
<i>Prionailurus bengalensis</i>	Leopard Cat	+++	+		present
<i>Neofelis nebulosa</i>	Clouded Leopard	++	+		present
<i>Panthera pardus</i>	Leopard	+			Insecure or extirpated
<i>Panthera tigris</i>	Tiger	+			extirpated
<i>Herpestes urva</i>	Crab-eating Mongoose	+++			insecure
<i>Lutra lutra</i>	Eurasian Otter	+	+		insecure
<i>Arctonyx collaris</i>	Hog Badger	++	++		present
<i>Meles meles</i>	Eurasian Badger	++			Insecure or extirpated
<i>Melogale moschata</i>	Chinese Ferret-badger	+++	+++	✓	present (confirmed)
<i>Martes flavigula</i>	Yellow-throated Marten	++	+		insecure
<i>Mustela kathiah</i>	Yellow-bellied Weasel	++	++	✓	present (confirmed)
<i>Mustela sibirica</i>	Siberian Weasel	+++	++		present
<i>Viverra zibetha</i>	Large Indian Civet	+	+		insecure
<i>Paguma larvata</i>	Masked Palm Civet	+++	++		present
<i>Prionodon pardicolor</i>	Spotted Linsang	++	++		present
<i>Viverricula indica</i>	Small Indian Civet	++	+++		present
<i>Sus scrofa</i>	Wild Boar	+++	+++	✓	present

Scientific name	English name	Dai <i>et al.</i> (2002)	WSB	Camera traps (2003)	Probable status
<i>Cervus unicolor</i>	Sambar	+	++		(confirmed) present
<i>Elaphodus cephalophus</i>	Tufted Deer		+		(confirmed) insecure or extirpated
<i>Hydrophotes inermis</i>	Water Deer	+			(confirmed) insecure or extirpated
<i>Muntiacus muntjak</i>	Indian Muntjac	+	?		(confirmed) insecure or extirpated
<i>Muntiacus reevesi</i>	Reeves's Muntjac	+++	++		present
<i>Naemorhedus sumatraensis</i>	Serow		+		insecure
<i>Manis pentadactyla</i>	Chinese Pangolin	+++	+		present (confirmed)
<i>Callosciurus erythraeus</i>	Pallas's Squirrel	++			insecure
<i>Tamiops maritimus</i> (recorded as <i>T. swinhoei</i>)	Maritime Striped Squirrel	+++	+++		present (confirmed)
<i>Dremomys pyrrhomerus</i>	Red-hipped Squirrel			✓	present (confirmed)
<i>Dremomys rufigenis</i>	Red-cheeked Squirrel	+			unknown
<i>Bandicota indica</i>	Greater Bandicoot Rat	+++	n		present
<i>Berylmys bowersi</i> (as <i>Rattus bowersi</i>)	Bower's White-toothed Rat	++	n		present
<i>Leopoldamys edwardsi</i> (as <i>Rattus edwardsi</i>)	Edward's Long-tailed Giant Rat	++	n		present
<i>Mus musculus</i>	House Mouse	+++	n		present
<i>Niviventer confucianus</i>	Chinese White-bellied Rat	+++	n		present
<i>Niviventer coxingi</i> (as <i>Rattus coxingi</i>)	Coxing's White-bellied Rat	++	n		present
<i>Niviventer fulvescens</i>	Chestnut White-bellied Rat	++	n		present
<i>Rattus losea</i>	Lesser Ricefield Rat	+++	n		present
<i>Rattus nitidus</i>	Himalayan Field Rat	+++	n		present
<i>Rattus norvegicus</i>	Brown Rat	+++	n		present
<i>Rattus tanezumi</i> (as <i>R. flavipectus</i>)	Tanezumi Rat	+++	n		present
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat	++	+		insecure
<i>Rhizomys sinensis</i>	Chinese Bamboo Rat	+			Insecure or extirpated
<i>Hystrix brachyura</i>	Malayan Porcupine	++	+		insecure
<i>Lepus sinensis</i>	Chinese Hare	+++	+++		present (confirmed)

- Some of the species reported are of particular conservation importance:
 - Clouded Leopard *Neofelis nebulosa* is Vulnerable globally and Class I Protected nationally;
 - Dhole *Cuon alpinus* and Asiatic Golden Cat *Catopuma temminckii* are Vulnerable globally and Class II Protected nationally;
 - Malayan Porcupine *Hystrix brachyura* is Vulnerable globally;
 - Chinese Pangolin *Manis pentadactyla* is at Lower Risk (Near-threatened) globally and Class II Protected nationally;
 - Little Japanese Horseshoe Bat *Rhinolophus cornutus* and Rickett's Big-footed Bat *Myotis ricketti* are at Lower Risk (Near-threatened) globally;
 - Yellow-throated Marten *Martes flavigula*, Spotted Linsang *Prionodon pardicolor*, Small Indian Civet *Viverricula indica* and Sambar *Cervus unicolor* are Class II Protected nationally.
- The reported mammal fauna at Jiulianshan was quite rich, but primates and flying squirrels seemed to be absent even in the mature forests.

Birds

- Forty-six bird species were recorded at Jiulianshan in the three surveys (Table 3).
- Among the most frequently encountered species on all three visits were Red-billed Blue Magpie *Urocissa erythrorhyncha*, Grey Treepie *Dendrocitta formosae*, Grey-cheeked Fulvetta *Alcippe morrisonia*, Chestnut Bulbul *Hemixos castanonotus* and Grey-chinned Minivet *Pericrocotus solaris*.

- In late January 2003 a dead adult of the globally Engangered White-eared Night Heron *Gorsachius magnificus* was found in the Daqitian area (TPR, *in litt.*, February 2003). Photographs were taken of the dead bird.

Table 3. Birds recorded at Juliashan Nature Reserve, August 2000, July 2001 and January 2003. Sequence follows Clements (2000).

Scientific name	English name
<i>Butorides striatus</i>	Little Heron
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron
<i>Aviceda leuphotes</i>	Black Baza
<i>Spilornis cheela</i>	Crested Serpent Eagle
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge
<i>Lophura nycthemera</i>	Silver Pheasant
<i>Centropus sinensis</i>	Greater Coucal
<i>Otus spilocephalus</i>	Mountain Scops Owl
<i>Ketupa zeylonensis</i>	Brown Fish Owl
<i>Glaucidium brodiei</i>	Collared Owlet
<i>Apus pacificus</i>	Fork-tailed Swift
<i>Harpactes erythrocephalus</i>	Red-headed Trogon
<i>Alcedo hercules</i>	Blyth's Kingfisher
<i>Alcedo atthis</i>	Common Kingfisher
<i>Merops viridis</i>	Blue-throated Bee-eater
<i>Eurystomus orientalis</i>	Dollarbird
<i>Megalaima virens</i>	Great Barbet
<i>Megalaima oorti</i>	Black-browed Barbet
<i>Dendrocopos major</i>	Great Spotted Woodpecker
<i>Picus canus</i>	Grey-headed Woodpecker
<i>Celeus brachyurus</i>	Rufous Woodpecker
<i>Blythipicus pyrrhotis</i>	Bay Woodpecker
<i>Pericrocotus flammeus</i>	Scarlet Minivet
<i>Pericrocotus solaris</i>	Grey-chinned Minivet
<i>Spizixos semitorques</i>	Collared Finchbill
<i>Hemixos castanonotus</i>	Chestnut Bulbul
<i>Hypsipetes mcclllandii</i>	Mountain Bulbul
<i>Cinclus pallasii</i>	Brown Dipper
<i>Rhyacornis fuliginosus</i>	Plumbeous Water Redstart
<i>Prinia atrogularis</i>	Hill Prinia
<i>Turdus pallidus</i>	Pale Thrush
<i>Enicurus schistaceus</i>	Slaty-backed Forktail
<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher
<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler
<i>Alcippe morrisonia</i>	Grey-cheeked Fulvetta
<i>Yuhina castaniceps</i>	Striated Yuhina
<i>Aethopyga christinae</i>	Fork-tailed Sunbird
<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker
<i>Lanius schach</i>	Long-tailed Shrike
<i>Dicrurus aeneus</i>	Bronzed Drongo
<i>Dicrurus hottentottus</i>	Spangled Drongo
<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie
<i>Dendrocitta formosae</i>	Grey Treepie

- Some of the species recorded are of particular conservation importance:
 - White-eared Night Heron is globally Endangered and has not previously been recorded from Jiangxi.
 - Black Baza, Crested Serpent Eagle, Silver Pheasant *Lophura nycthemera*, Greater Coucal *Centropus sinensis*, Mountain Scops Owl *Otus spilocephalus*, Brown Fish Owl *Ketupa zeylonensis* and Collared Owlet *Glaucidium brodiei* are Class II Protected species in China.
 - Brown Fish Owl has not been encountered during KFBG surveys.
 - Blyth's Kingfisher is Near-threatened globally, and known from only three sites in South China.
- Bird surveys from 1989 to 2000 in Juliashan recorded a number of other noteworthy species (Xiao *et al.*, 2002): Mountain Hawk Eagle *Spizaetus nipalensis*, White-necklaced Partridge *Arborophila gingica*, Cabot's Tragopan *Tragopan caboti*, Barred Cuckoo Dove *Macropygia unchall*, Eurasian Eagle Owl *Bubo bubo*, Pale-headed Woodpecker *Gecinulus grantia*, Fairy Pitta *Pitta nympha* and

Swinhoe's Minivet *Pericrocotus cantonensis*.

- A number of forest-dependent species, such as Silver Pheasant, Red-headed Trogon, woodpeckers and barbets were present. The occurrence of White-eared Night Heron, Brown Fish Owl, Blyth's Kingfisher, Brown Dipper and Slaty-backed Forktail also indicates that the forest streams are of high integrity.

Reptiles and Amphibians

- Twelve species of amphibian (one newt and 11 anurans) and ten species of reptile (four lizards and six snakes) were recorded at Jiulianshan during the surveys (Table 4). Of these *Bufo gargarizans*, *Rana livida*, *Sphenomorphus incognitus*, *Dinodon flavozonatum* and *Oligodon chinensis* appear to be new for the reserve.
- In the reserve museum, specimens of *Amphiesma stolatum*, *Opisthotropis kuatunensis*, *Ptyas korros*, *Sinonatrix percarinata* and *Naja atra* were also present.
- In addition, Dai (2002a, 2002b) recorded *Megophrys kuatunensis*, *Hyla chinensis*, *Rana adenopleura*, *Rana guentheri*, *Rana rugulosa* (as *R. tigrina rugulosa*), *Occidozyga lima* (as *Ooeidozyga lima*), *Microhyla heymonsi*, *Microhyla pulchra*, *Platysternon megacephalum*, *Chinemys reevesii*, *Sacalia bealei*, *Pelodiscus sinensis*, *Gekko japonicus*, *Gekko subpalmatus*, *Acanthosaura lepidogaster*, *Takydromus septentrionalis*, *Eumeces elegans*, *Tropidophorus sinicus*, *Ramphotyphlops braminus*, *Xenopeltis hainanensis*, *Python molurus*, *Amphiesma craspedogaster*, *Calamaria septentrionalis*, *Dinodon rufozonatum*, *Elaphe carinata*, *Elaphe taeniura*, *Enhydris chinensis*, *Enhydris plumbea*, *Lycodon ruhstrati*, *Oligodon formosanus*, *Pareas chinensis*, *Ptyas mucosus*, *Rhabdophis tigrinus*, *Sinonatrix aequifasciata*, *Sinonatrix annularis*, *Zaocys dhumnades*, *Calliophis maccllellandi*, *Ophiophagus hannah*, *Deinagkistrodon acutus*, *Trimeresurus albolabris* and *Trimeresurus stejnegeri* from Jiulianshan.

Table 4. Amphibians and reptiles recorded at Jiulianshan Nature Reserve in August 2000, July 2001 and January 2003. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat	
AMPHIBIA		
<i>Pachytriton brevipes</i>	forest stream	✓
<i>Bufo gargarizans</i>	forest	✓
<i>Bufo melanostictus</i>	forest	✓
<i>Amolops ricketti</i>	forest stream	✓
<i>Paa spinosa</i>	forest stream	✓, tadpoles
<i>Rana fujianensis</i>	forest edge pool	tadpoles, eggs
	forest pool	✓
<i>Rana latouchii</i>	forest	✓
	roadside pool	✓
<i>Rana limnocharis</i>	marsh	✓
	shrubland	✓
<i>Rana livida</i>	forest	✓
	stream	✓
<i>Rana schmackeri</i>	forest	✓
	river	✓
<i>Rana versabilis</i>	forest stream	✓
	forest	✓
<i>Polypedates dennysi</i>	forest edge	✓
REPTILIA		
<i>Ateuchosaurus chinensis</i>	forest	✓
<i>Eumeces chinensis</i>	agriculture field	✓
<i>Sphenomorphus incognitus</i>	riparian forest	✓
<i>Sphenomorphus indicus</i>	forest	✓
	forest edge	✓
<i>Cyclophiops major</i>	forest	✓
<i>Dinodon flavozonatum</i>	forest	✓
<i>Oligodon chinensis</i>	forest	✓
<i>Xenochrophis piscator</i>	paddy field	✓
<i>Bungarus multicinctus</i>	grassland	✓
<i>Protobothrops mucrosquamatus</i>	grassland	✓

- *Pachytriton brevipes* is quite rare in South China and it is the first time this species has been recorded in our surveys.
- The rather high diversity of forest and forest stream herpetofauna at Xiagongtang core area indicates it has high integrity.

Fish

- Eleven freshwater fish species were recorded from Jiulianshan Nature Reserve. All sampling was done in the Daqutian River catchment area (Table 5).
- The most frequently encountered species recorded were *Acrossocheilus parallens* at Xiagongtang and *Opsariichthys bidens* at Daqutian.
- One species in the stream goby genus *Rhinogobius* could not be identified using existing keys for Chinese freshwater fish.
- Previous fish surveys recorded a further 26 species from Jiulianshan (Jiulianshan Nature Reserve Management Office, 1987; Ou *et al.*, 2002): *Ctenopharyngodon idellus*, *Rhodeus lighti* (as *Pseudoperilampus lighti*, nomenclature follows Chen Y. *et al.*, 1998), *Onychostoma lini*, *Hemibarbus labeo*, *Pseudogobio vaillanti guilinensis*, *Squalidus argentatus* (as *Gnathopogon argentatus*), *Cyprinus carpio*, *Carassius auratus*, *Pseudorasbora parva*, *Gobiobotia tungi*, *Xenocypris* sp., *Misgurnus anguillicaudatus*, *Pseudogastromyzon fasciatus fasciatus* (as *P. zebroidus*), *P. changtingensis tungpeiensis*, *Vanmanenia lineata* (as *Praeformosania lineata*), *Pseudobagrus albomarginatus* (as *Leiocassis albomarginatus*, nomenclature follows Pan, 1991), *Silurus asotus* (as *Parasilurus asotus*), *Glyptothorax fukiensis* (as *G. fokiensis*), *Clarias fuscus*, *Monopterus albus*, *Mastacembelus armatus*, *Siniperca undulatus*, *Micropercops swinhonis* (as *Hypseleotris swinhonis*), *Macropodus ocellatus* (as *M. chinensis*), *M. opercularis* and *Channa maculata*. Daqutian area had by far the highest number of these fish species. Identifications of some of the listed species may be problematic.

Table 5. Freshwater fish recorded in Daqutian River, Jiulianshan Nature Reserve, South Jiangxi, August 2000 and July 2001. Sequence of families follows Nelson (1994).

Species
<i>Zacco platypus</i>
<i>Opsariichthys bidens</i>
<i>Acrossocheilus parallens</i>
<i>Onychostoma barbatula</i>
<i>Pseudogastromyzon fangi</i>
<i>Schistura fasciolata</i>
<i>Schistura incerta</i>
<i>Pterocryptis</i> sp.
<i>Rhinogobius duospilus</i>
<i>Rhinogobius</i> sp.
<i>Channa asiatica</i>

- The stream catfish *Pterocryptis* sp., recently described with a paratype assigned from Jiulianshan (Ng & Chan, in prep.), is globally restricted and has so far only been found in scattered localities.
- A river at Daqutian supported higher fish abundance at the times of our visits. It flows through the Xiagongtang core area where it has a steeper profile and supports lower fish diversity; however *Pterocryptis* sp. was collected at medium altitude.
- The survey findings do not permit detailed comparison with the fish of nearby parts of the Zhujiang catchment. Several of the genera containing species reported by Ou *et al.* (2002), such as *Squalidus*, *Gobiobotia* and *Xenocypris*, have not been recorded during KFBG surveys.

Dragonflies

- A total of 29 species was recorded during the three-day survey in 2000, of which two (*Vestalis* sp. and *Planaeschna* sp.) remain unidentified.
- In addition, Ding *et al.* (2002) listed *Aeschna ornithocephala*, *Crocothemis servilia*, *Pseudothemis zonata*, *Tramea chinensis*, *Agrion atratum*, *Mnais icteropectera* and *Mnais mneme*.

Table 6. Dragonflies at Jiulianshan, 18-20 August 2000. Sequence of families follows Schorr *et al.* (2001a, 2001b).

Species
<i>Archineura incarnata</i>
<i>Calopteryx melli</i>
<i>Matrona basilaris</i>
<i>Vestalis</i> sp.
<i>Agriocnemis femina</i>
<i>Ceragrion auranticum ryukyuanum</i>
<i>Ischnura senegalensis</i>
<i>Anisopleura qingyuanensis</i>
<i>Bayadera melanopteryx</i>
<i>Euphaea decorata</i>
<i>Coeliccia cyanomelas</i>
<i>Copera ciliata</i>
<i>Planaeschna</i> sp.
<i>Anisogomphus anderi</i>
<i>Leptogomphus divaricus</i>
<i>Ophiogomphus sinicus</i>
<i>Idionyx carinata</i>
<i>Idionyx claudia</i>
<i>Idionyx victor</i>
<i>Neurothemis fulvia</i>
<i>Orthetrum luzonicum</i>
<i>Orthetrum melania</i>
<i>Orthetrum pruinosum neglectum</i>
<i>Orthetrum sabina</i>
<i>Orthetrum</i> sp.
<i>Palpopleura sexmaculata</i>
<i>Pantala flavescens</i>
<i>Sympetrum eroticum</i>
<i>Trithemis aurora</i>

- *Vestalis* sp. and *Planaeschna* sp., as well as three other calopterygids, three euphaeids, and no less than three species of *Idionyx* are forest-dependent taxa, indicating that forest in the study area was of high integrity.

Butterflies

- Thirty-eight species were recorded during the three-day survey in 2000 (Table 7), including two (*Euthalia phemius* and *Zizeeria karsandra*) which are possibly new records for Jiangxi (i.e. not recorded from this province by Chou (1994), Bascombe (1995) or Ding *et al.* (2002)). Two more species (*Curetis acuta* and *Apatura (Rohana) parisatis*) appears to be new to the reserve.
- Ding *et al.* (2002) recorded 219 butterfly species from Jiulianshan. Together with our 2000 survey, a total of 223 species are now known from the reserve.

Table 7. Butterflies at Jiulianshan, 18-20 August 2000. Sequence of families follows Bascombe (1995).

Species
<i>Choaspes benjaminii</i>
<i>Erionota torus</i>
<i>Notocrypta curvifascia</i>
<i>Telicota colon</i>
<i>Graphium sarpedon</i>
<i>Papilio bianor</i>
<i>Papilio helenus</i>
<i>Papilio nephelus</i>
<i>Papilio xuthus</i>
<i>Eurema hecabe</i>
<i>Pieris (Talbotia) naganum</i>
<i>Abisara fylloides</i>
<i>Acytolepis puspā</i>
<i>Curetis acuta</i>
<i>Heliophorus ila</i>
<i>Mahathala ameria</i>
<i>Spindasis lohita</i>

Species

Taraka hamada
Zizeeria karsandra
Apatura (Rohana) parisatis
Athyma jina
Athyma ranga
Athyma selenophora
Cethosia biblis
Charaxes bernardus
Dichorragia nesimachus
Euthalia nara
Euthalia phemius
Hestina assimilis
Kallima inachus
Lethe confusa
Lethe insana?
Mandarinia regalis
Penthema adelma
Polygonia (Kaniska) canace
Precis (Junonia) almana
Stibochiona nicea
Stichopthalma howqua

- Approximately 50% of the species recorded are forest-associated or forest-dependent species, most notably among nymphalids (e.g. *Kallima inachus*, *Mandarinia regalis*, *Penthema adelma*, *Stibochiona nicea* and *Stichopthalma howqua*) and lycaenids (e.g. *Abisara fylloides*, *Mahathala ameria* and *Taraka hamada*). This indicates that good quality forests are still present at Jiulianshan.

Summary of flora and fauna

- The extensive mature forest at Xiagongtang was of high quality, comparable to that of the nearby Chebaling National Nature Reserve in Guangdong. The vegetation of the surveyed parts was mainly tall secondary forest in a matrix of young disturbed forest and plantation. The core area at Xiagongtang was covered in mature forest up to 30 m tall and 100 cm dbh. The section of core area at Daqitian visited in 2000 was more degraded, with fragmented but well-established secondary forest in a matrix of agricultural land and plantation. The present surveys recorded 389 vascular plant species in three days of botanical fieldwork. The recorded flora included eight globally Threatened or nationally Protected species and one other globally restricted species.
- The reported bird fauna is quite rich and includes forest and forest stream species such as the barbets, Red-headed Trogon, White-eared Night Heron, Brown Fish Owl and Blyth's Kingfisher. White-eared Night Heron is globally Endangered and Blyth's Kingfisher is globally Near-threatened.
- Jiulianshan has a rather rich herpetofauna with a number of forest and forest-stream species. The fish fauna sampled was of average diversity and abundance, but a more comprehensive fish survey would surely reveal additional species given the good riparian forest and instream habitat quality, as showed by Ou *et al.* (2002).
- The dragonfly fauna was quite rich with many forest-stream-dependent species. The butterfly fauna was also rather rich in forest-dependent species in general; at Daqitian species-richness was high, in part because it covered more open habitats where common, sun-loving species are more easily observed.
- Jiulianshan was considered of global biodiversity significance by MacKinnon *et al.* (1996), despite its relatively small size. The present surveys support its national significance.

Threats and problems

- According to Yi (2002) the biggest problem in effective management of Jiulianshan Nature Reserve concerns forest ownership; the forest belongs to the local forestry bureau and forestry operations are still ongoing inside the Nature Reserve. There have been constant conflicts between local government, villagers and the reserve management. Egongkeng village inside the core area at Daiqitian was reportedly one area of constant conflict. The reserve authorities wished to relocate the village outside

the core area but lacked the necessary funds.

- The core area at Daqitian was fairly degraded by agricultural activities and the establishment of plantations. Fifteen years ago it reportedly had forest like that at Xiagongtang, but logging and other human disturbance, such as that associated with collection of pine resin, had apparently led to an increase in dominance of the bamboo *Phyllostachys heterocycla* cv. *Pubescens*. The bamboo is of concern as it is highly invasive, and capable of replacing natural forest with a monospecific bamboo stand, with loss of most biodiversity.
- In 2000, logging was seen in the mature secondary forest between Xiagongtang and Xiahu; tall trees over 30 m tall with straight trunks were selectively logged. Loggers said the trees were harvested to make chopping boards.
- In 2001 there were reports of illegal mist-netting along the Daqitian River at Daqitian, despite the reserve management's regular efforts to patrol the stream.
- The team also witnessed illegal collection of seeds of *Michelia chapensis* in 2003. A 30 m tree had been felled for collection of seeds which would probably have been sold to nurseries for rearing ornamental plants.
- The downstream section of Daqitian River near Daqitian Forest Farm received some raw sewage from households and from the commercial civet farm, and signs of organic pollution (e.g. lowered water clarity and algal bloom) were apparent in the summer of 2001.

Opportunities

- Reserve officials at Jiulianshan had a very positive attitude toward conservation management. This included an interest in thorough inventory and monitoring of wildlife. To this end in January 2003 KFBG and Jiulianshan Nature Reserve launched a collaborative six-month mammal survey exercise, using ten auto-triggered infrared cameras. In an attempt to resolve conflicts with the Egongkeng villagers, the reserve management asked for help from the KFBG team during the visit in August 2000. Five months later, KFBG funded Dr. Cai Kui of the Yunnan Institute of Geography to conduct a participatory rural appraisal in the Nature Reserve (Lam, 2001). A report was compiled and presented to the reserve management (Cai, 2000).
- To improve the conservation value of the core area at Daqitian and nearby areas, the management might consider allowing vegetation on the old plantation and abandoned agricultural fields adjacent to the remaining forest to regenerate by natural succession. The adjacent monospecific stands of invasive bamboo should be removed; where it cannot be eliminated it should be regularly harvested to prevent spread. Reforestation with an assemblage of shade-tolerant species may be necessary for heavily degraded sites such as dense plantations of bamboo and China fir. A strategic reforestation scheme to link up patches of secondary forests using mixed native tree flora would speed up the reforestation process.
- Given the importance of the streams to species such as Blyth's Kingfisher and the globally Endangered White-eared Night Heron (Liu Z.Y. and Xiao, 2001; TPR, *in litt.*, February 2003) their integrity should be carefully safeguarded. Disturbance to the stream, such as sewage discharge, fishing and mist-netting, may affect the breeding success of these bird species. Direct discharge of raw sewage should be avoided, and the reserve management might consider a ban on fishing activity in certain zones or at certain periods, to allow recovery of fish stocks and provide undisturbed riparian forest for the rare birds to reproduce and forage. The greatest attention should be paid for potential deterioration of the forested stream valleys in view of its importance for rare stream-associated birds.
- Since the 1980s, Jiulianshan Nature Reserve has attracted many local as well as overseas scientists to conduct forest ecosystem researches, in particular scientists from Japan, with the establishment of a field research station focus on forest ecosystems (Liu X.Z. *et al.*, 2002). There is thus potential for Jiulianshan to become an internationally important field study site for research on the subtropical forest ecosystem and its biota.
- MacKinnon *et al.* (1996) suggested linking Jiulianshan with reserves in Guangdong to form part of Nan Shan Tiger Conservation Unit. The panoramic view at the summit of Huangniushi in 2001 confirmed suitable habitats are still available in all directions. Such an extension of the protected-areas system could help improve the prospects of wide-ranging wild animals, such as Tiger, but coordinated

habitat conservation management is more important than protection on paper.

- Jiulianshan had basic and clean accommodation at Xiagongtang and Gukeng, and the reserve officials had ambitious plans to develop ecotourism, in particular near the Daqiutian area (Liu X.Z. *et al.*, 2002; Yi, 2002), especially if the reserve was upgraded to national level. While the analysis in Yi (2002) on the tourism resources and potential of Jiulianshan was fair and accurate, some of the proposed tourism plans such as wild animal domestication enclosures, and animal and plant specimen museums, have proven problematic in many reserves the KFBG team has visited in the region. These should be avoided in favour of more progressive educational approaches. Zoning, road and accommodation improvements and tourist attractions would need to be carefully planned and controlled in order to minimise adverse impacts on the present quiet, natural setting. Guidelines for various aspects of ecotourism development are available, e.g. Ceballos-Lascuráin (1996) and China National Committee of Man-and-the-Biosphere (1998).

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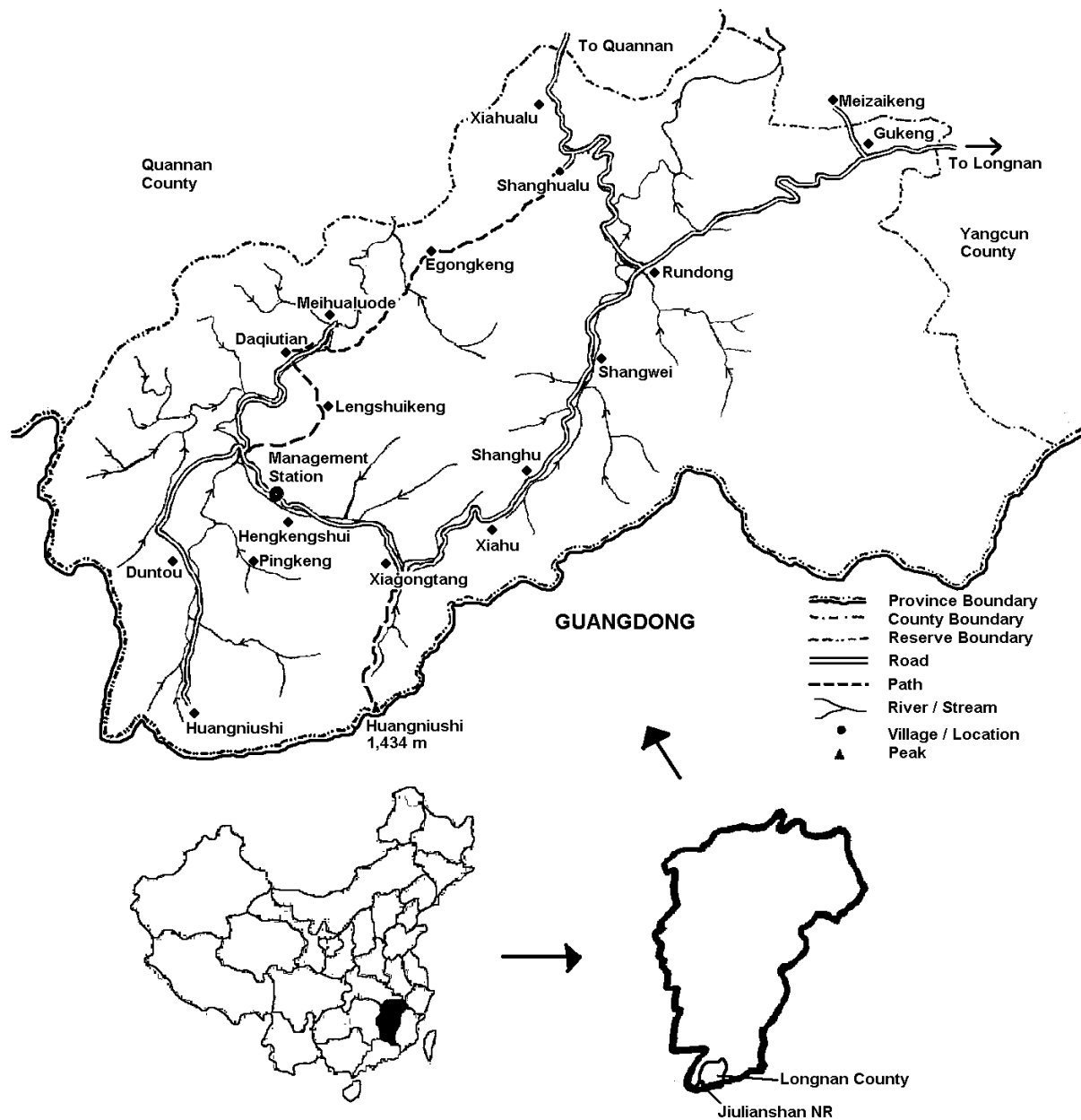


Figure 1. Map showing location of Jiulianshan Nature Reserve, South Jiangxi, China.