



Report of Rapid Biodiversity Assessments at Cenwanglaoshan Nature Reserve, Northwest Guangxi, China, 1999 and 2002

Kadoorie Farm and Botanic Garden
in collaboration with
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Report of Rapid Biodiversity Assessments at Cenwanglaoshan Nature Reserve, Northwest Guangxi, China, 1999 and 2002

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Background

The present report details the findings of visits to Northwest 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.

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Contents

Objectives	1
Methods	1
Location and management	2
Results	2
<i>Vegetation</i>	2
<i>Flora</i>	3
<i>Mammals</i>	14
<i>Birds</i>	18
<i>Reptiles and Amphibians</i>	20
<i>Fish</i>	22
<i>Ants</i>	23
<i>Dragonflies</i>	24
<i>Butterflies</i>	25
<i>Molluscs</i>	27
Summary of flora and fauna	28
Threats and problems	29
Opportunities	30
Acknowledgements	31
References	31
Figure 1 Map.....	34

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
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

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Objectives

- The aims of the surveys were to collect up-to-date information on the fauna and flora of Cenwanglaoshan Nature Reserve, and to use this to help determine conservation priorities within South China. The second survey, in 2002, was undertaken at the invitation of Guangxi Zhuang Autonomous Region Forestry Department, to provide data relevant to a re-evaluation of the reserve's status.

Methods

- On 30 July to 3 August 1999, a team of biologists from Hong Kong (GS, JRF, ML, LKS, GTR), Guangzhou (LZC, CBH, HXX, WRJ), Xinyang (LHJ), Beijing (ZGQ) and Nanjing (CJS, WSJ) left Nanning for Cenwanglaoshan with XZH of Guangxi Forestry Department conducted a rapid biodiversity survey at Cenwanglaoshan Nature Reserve in Lizhou Xiang.
- On 22-29 May 2002 a team of biologists from Hong Kong (BC, ML, LKS, NSC) were joined by representatives of Guangxi Forestry Department (XZH), Guangxi Forestry Survey & Planning Institute Comprehensive Planning Branch (TWF, HZP), and Guangxi Natural History Museum (MYM, ZTF), for a second survey.
- During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, fish, ants, butterflies and dragonflies was 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 Cenwanglaoshan 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). Additional results were obtained by the camera-trapping survey.
- Vascular plant records were made by CBH or WRJ in the 1999 visit and by NSC in the 2002 visit, and edited by NSC, except for orchids, for which records were made or verified by GS. Mammal records were made by LKS, ML, JRF or BC. Records of birds were made or verified by LKS, ML or JRF, reptiles and amphibians by ML or LZC, fish by BC and CXL, ants by JRF, dragonflies by KW, GTR or ML, butterflies by GTR, ML or RCK and molluscs by CDN.
- 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 (2002);
 - Orchids (Angiospermae: Orchidaceae): Chen (1999); Lang (1999); Tsi (1999);
 - 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 H.L. *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 (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

- Cenwanglaoshan Nature Reserve is at the boundaries of Tianlin and Lingyun counties, Northwest Guangxi, at 24°25′-24°35′N by 106°15′-106°30′E (MacKinnon *et al.*, 1996) or 24°14′-24°24′N by 106°30′-106°40′E (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). The size of the reserve is about 298 km² (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The geology is dominated by sandstone and shale. Limestone dominated karst landscape could be found just outside the Nature Reserve at Langping. The Nature Reserve has a mountainous landscape with altitude range from 400 m in Lizhou valley to 2,062 m at the summit of Cenwanglaoshan (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- Cenwanglaoshan is reported to have a southern subtropical climate. At middle altitude (1,300 m) the mean monthly temperature ranges from 7.3°C in January to 20.6°C in July, with an annual precipitation around 1,300 mm (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). The streams surveyed form part of the Zhujiang (Pearl River) drainage system, flowing northeast and northwest to the Hongshui He (called the Nanpan Jiang further west), which flows east toward the Xi Jiang in Guangdong.
- Cenwanglaoshan was designated a provincial nature reserve in 1982 to protect its monsoon evergreen broadleaf forests and the vertically-stratified forest ecosystems (Forestry Department of Guangxi Zhuang Autonomous Region, 1993), but was subsequently downgraded to a county-level nature reserve. It was classified as a Forest Ecosystem Nature Reserve at the provincial grade by Zhang W. (1998). The Guangxi Forestry Department, together with the reserve management office, was preparing a proposal to upgrade the reserve to National-level in 2002.

Results

Vegetation

- The zonal vegetation of the Cenwanglaoshan region would have been southern subtropical monsoon evergreen broadleaf forest (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). The original forest may have been completely cleared although the present surveys found extensive old-growth secondary forest still remained. Some areas had been cleared for plantations of *Cunninghamia lanceolata* (China Fir), *Illicium verum* (Star Anise), *Vernicia fordii* (Tung-oil Tree) and *Betula lumifera*, while some had been degraded to secondary grassland and tall shrubland.

- Old-growth secondary forest surveyed at Linao Gou, Houzidong, and Jiudong Ping reached more than 30 m in height and 1 m dbh. Co-dominant species in this vegetation type included *Castanopsis carlesii* var. *spinulosa*, *Lithocarpus elizabethia*, *L. megalophyllus*, *Fagus longipetiolatus*, *Liquidambar formosana*, *Rhodoleia parvipetala*, *Toona ciliata* var. *pubescens*, *Trichilia connaroides* var. *microcarpa*, *Machilus leptophylla* and *Beilschmiedia kweichowensis*. The old growth forest at Linao Gou and Jiudong Ping had been selectively logged.
- Younger secondary forest could be found towards the periphery of the older forest and along major streams. It was about 15-20m tall and up to 60cm dbh, and dominated by *Diospyros japonica*, *Alniphyllum fortunei*, *Mallotus japonicus* var. *floccosus*, *Castanopsis hystrix*, *Castanopsis carlesii* var. *spinulosa*, *Rhoiptelea chiliantha*, *Betula luminifera* and *Alnus nepalensis*.
- Montane dwarf forest about 10-15m tall and up to 60cm dbh was found near the summit of Cenwanglaoshan.
- Grassland and shrubland could be found near the main roads and around villages; it resulted from previous clearfelling and former plantations of China fir and *Vernicia fordii*. Such habitat was mainly dominated by *Hypericum patulum*, *Miscanthus sinensis*, *Pteridium aquilinum* var. *latiusculum*, *Woodwardia japonica*, *W. unigemmata*, *Debregeasia orientalis* and *Rubus niveus*.
- The limestone area around Langping had been heavily degraded with relatively gentle hillsides completely deforested and transformed to corn fields and grassland. Some young forest patches however, with trees about 3-10m in height and 10-20cm dbh, could be found behind villages and on steep hillsides. Dominant species of these young limestone forest included *Platycarya strobilacea*, *Sapium rotundifolium*, *Cyclobalanopsis glauca*, *Boniodendron minius*, *Handeliidendron bodinieri*, *Clausena dunniana*, *Murraya paniculata* and *Sophora prazeri* var. *mairei*.

Flora

- The present surveys recorded 573 vascular plant species, including 78 species of ferns in 30 families, three gymnosperm species in three families and 492 flowering plant species in 117 families. This is a relatively high number given the amount of survey effort (altogether 11 days in 1999 and 2002). Thirty-one orchids were recorded (Table 2); all other species are shown in Table 1.
- A number of species (*Carya kweichowensis*, *Pilea squamosa* var. *sparsa*, *Ophiopogon megalanthus*, *Carpinus pubescens*, *Euonymus leclerei*, *Stachyurus oblongifolius*, *Polystichum neolobatum*, *Crepidomanes cystoserioides*, *Cymbidium qiubeiense* and *Pholidota missionariorum*) are recorded from Guangxi for the first time.
- Among the recorded flora, there are a number of species of conservation concern:
 - The orchids *Bletilla formosana* and *Cymbidium qiubeiense* are Endangered in China due to over-collection, for medicinal and ornamental purposes respectively.
 - *Rhoiptelea chiliantha* is under Class II national Protection and is considered Vulnerable globally. It is endemic to southwest Guizhou, northwest Guangxi and southeast Yunnan. Locally it was found to be common in secondary forest.
 - *Camellia crapnelliana* is considered Vulnerable globally. Five fruiting plants in montane dwarf forest in 1999. Six fruiting adults up to 5m tall and 20cm dbh and a few young saplings were seen in the May 2002 visit.
 - *Tapiscia sinensis* is Vulnerable globally but it is widespread in provinces along the Yangtze River. Locally it was found to be fairly common.
 - *Diplopanax stachyanthus* is Vulnerable globally. Seed of this species was seen on the forest

floor but the adult trees were not seen.

- *Fagus longipetiolata* is Vulnerable globally. It is widespread in provinces south of the Yangtze but is restricted to mature forests. It is locally common.
- *Zenia insignis* is under Class II National Protection and considered Near-threatened globally. It was found in the 1999 visit. Trees up to 15m tall and 60cm dbh were seen.
- *Alsophila spinulosa* and *Gymnosphaera hancockii* are tree ferns, which are all under Class II national Protection in China. The former was found to be rare locally with only one plant seen in the present surveys, whereas the latter was locally common.
- *Cibotium barometz* is under Class II national Protection in China, although it is regionally widespread and abundant on relatively degraded sites.
- *Dipentodon sinicus* is under Class II national Protection. It is endemic to Guizhou, Guangxi and south Yunnan. Locally it was found to be fairly common.
- *Toona ciliata* var. *pubescens* is under Class II national Protection, although is fairly widespread in south China. The species was locally abundant and one of the dominant canopy species there.
- *Handeliendron bodinieri* is under Class I National Protection and endemic to south Guizhou and west Guangxi. It was locally abundant in young limestone forest.
- *Acer tonkinense* ssp. *kwangsiense*, *Phyllanthus guangxiensis*, and *Phyllagathis deltoda* are endemic to Guangxi.
- *Calcareoboa coccinea* is endemic to limestone areas of west Guangxi, southeast Yunnan and north Vietnam. A few plants were found in the 1999 visit.
- *Carya kweichowensis* was previously considered endemic to south Guizhou; the present surveys extend its recorded range to northwest Guangxi. A few trees up to 15m tall and 50cm dbh were seen in 2002.
- *Evodia calcicola* is endemic to limestone regions of west Guangxi, southwest Guizhou and southeast Yunnan.
- *Pilea squamosa* var. *sparsa* and *Ophiopogon megalanthus* were previously considered endemic to Yunnan; the present surveys extend their recorded range to northwest Guangxi. Both were locally common.
- *Neottopteris latipes* is endemic to limestone areas of northern Guangxi and southern Guizhou. Only three plants were seen.
- *Pteris austrosinica* is endemic to Guangdong and Guangxi. Three plants were seen.
- *Adinandra megaphylla* is restricted to southeast Yunnan, northwest Guangxi and Vietnam. It was locally fairly common.
- *Cymbidium qiubeiense* and *Pholidota missionariorum* are known only from the region of southeast Yunnan, Guizhou and northwest Guangxi.
- All the orchid species recorded are listed in CITES Appendix II.
- Of the 31 orchid species recorded, 14 (45%) were epiphytic, and one (3%) saprophytic.

Table 1. Vascular plants of Cenwanglaoshan Nature Reserve recorded in the present surveys, July-August 1999 and May 2002, with an index of local abundance: “+” = rare; “++” = common; “+++” = abundant. 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	Species	Notes
PTERIDOPHYTA		
Adiantaceae	<i>Adiantum flabellulatum</i> L.	
Aspidiaceae	<i>Hemigramma decurrens</i> (Hook.) Copel.	
Aspleniaceae	<i>Asplenium ensiforme</i> Wall. ex Hook. & Grev.	
	<i>Asplenium falcatum</i> Lam.	
	<i>Asplenium normale</i> D. Don	
	<i>Asplenium prolongatum</i> Hook.	

Family	Species	Notes
	<i>Asplenium unilaterale</i> Lam. <i>Asplenium unilaterale</i> Lam. var. <i>decurrens</i> (Bedd.) H.S. Kung <i>Neottopteris antrophyoides</i> (H. Christ) Ching <i>Neottopteris latipes</i> Ching ex S.H. Wu	endemic to N. Guangxi & S. Guizhou
Athyriaceae	<i>Acystopteris japonica</i> (Luerss.) Nakai <i>Allantodia dilatata</i> (Blume) Ching <i>Allantodia matthewii</i> (Copel.) Ching <i>Allantodia virescens</i> (Kunze) Ching <i>Diplazium subsinuatum</i> (Wall. ex Hook. & Grev.) Tagawa <i>Diplazium pinfaense</i> Ching	
Blechnaceae	<i>Blechnum orientale</i> L. <i>Woodwardia japonica</i> (L.f.) Sm. <i>Woodwardia unigemmata</i> (Makino) Nakai	
Cyatheaceae	<i>Alsophila spinulosa</i> (Wall. ex Hook.) R.M. Tryon <i>Gymnosphaera hancockii</i> (Copel.) Ching	Protected II Protected II
Davalliaceae	<i>Davallia tyermannii</i> (T. Moore) Hook. & Baker	
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Drynariaceae	<i>Pseudodrynaria coronans</i> (Wall. ex Mett.) Ching	
Dryopteridaceae	<i>Cyrtomium caryotideum</i> (Wall. ex Hook. & Grev.) C. Presl <i>Dryopteris championii</i> (Benth.) C. Chr. <i>Nothoperanema shikokianum</i> (Makino) Ching <i>Polystichum neolobatum</i> Nakai	new Guangxi record
Equisetaceae	<i>Equisetum arvense</i> L.	
Gleicheniaceae	<i>Dicranopteris pedata</i> (Houtt.) Nakaike <i>Dicranopteris splendida</i> (Hand.-Mazz.) Ching <i>Diplopterygium chinensis</i> (Rosenst.) DeVol <i>Diplopterygium glaucum</i> (Thunb. ex Houtt.) Nakai	
Hemionitidaceae	<i>Coniogramme japonica</i> (Thunb.) Diels	
Huperziaceae	<i>Huperzia fargesii</i> (Herter) Holub	
Hymenophyllaceae	<i>Crepidomanes cystoserioides</i> (H. Christ) K. Iwats. <i>Trichomanes auriculatum</i> Blume	new Guangxi record
Lindsaeaceae	<i>Lindsaea orbiculata</i> (Lam.) Mett. ex Kuhn <i>Stenoloma chusanum</i> (L.) Ching	
Loxogrammaceae	<i>Loxogramme salicifolia</i> (Makino) Makino	
Lygodiaceae	<i>Lygodium japonicum</i> (Thunb.) Sw.	
Marattiaceae	<i>Angiopteris fokiensis</i> Hieron.	
Marsileaceae	<i>Marsilea quadrifolia</i> L.	
Nephrolepidaceae	<i>Nephrolepis auriculata</i> (L.) Trimea	
Ophioglossaceae	<i>Ophioglossum vulgatum</i> L.	
Osmundaceae	<i>Osmunda japonica</i> Thunb. <i>Osmunda vachellii</i> Hook.	
Plagiogyriaceae	<i>Plagiogyria euphlebia</i> Mett.	
Polypodiaceae	<i>Colysis elliptica</i> (Thunb.) Ching <i>Colysis hemionitidea</i> (Wall. ex Mett.) C. Presl <i>Colysis hemitoma</i> (Hance) Ching <i>Lepidogrammits rostrata</i> (Bedd.) Ching <i>Lepisorus macrosphaerus</i> (Baker) Ching <i>Lepisorus tosaensis</i> (Makino) H. Itô <i>Microsorium dilatatum</i> (Bedd.) Sledge <i>Microsorium fortunei</i> (T. Moore) Ching <i>Microsorium punctatum</i> (L.) Copel. <i>Microsorium superficiale</i> (Blume) Ching <i>Neolepisorus ovatus</i> (Wall. ex Bedd.) Ching <i>Phymatosorus cuspidatus</i> (D. Don) Pic. Serm. <i>Polypodiastrium mengtzeense</i> (H. Christ) Ching <i>Polypodioides amoena</i> (Wall. ex Mett.) Ching <i>Pyrrosia calvata</i> (Baker) Ching <i>Pyrrosia lingua</i> (Thunb.) Farw <i>Pyrrosia porosa</i> (C. Presl) Hovenkamp	
Pteridaceae	<i>Pteris austrosinica</i> (Ching) Ching <i>Pteris cretica</i> L. <i>nervosa</i> Ching & S.H. Wu	endemic to Guangxi & Guangdong

Family	Species	Notes
	<i>Pteris excelsa</i> Gaud.	
	<i>Pteris insignis</i> Mett. ex Kuhn	
	<i>Pteris semipinnata</i> L.	
	<i>Pteris vittata</i> L.	
	<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i>	
	(Desv.) Underw. ex A. Heller	
Selaginellaceae	<i>Selaginella uncinata</i> (Desv.) Spring	
Sinopteridaceae	<i>Onychium japonicum</i> (Thunb.) Kunze	
Thelypteridaceae	<i>Cyclosorus truncatus</i> (Poir.) Farwell.	
	<i>Dictyocline griffithii</i> Moore	
	<i>Dictyocline wilfordii</i> (Hook.) J. Sm.	
Vittariaceae	<i>Vittaria flexuosa</i> Fée	
GYMNOSPERMAE		
Cupressaceae	<i>Platyclusus orientalis</i> (L.) Franco	
Pinaceae	<i>Pinus massoniana</i> Lamb.	
Taxodiaceae	<i>Cunninghamia lanceolata</i> (Lamb.) Hook.	planted
ANGIOSPERMAE		
Dicotyledonae		
Acanthaceae	<i>Baphicacanthus cusia</i> (Nees) Bremek.	
	<i>Strobilanthes auriculatus</i> (Wall.) Nees	
	<i>Strobilanthes divaricatus</i> (Nees) T. Anderson	
Aceraceae	<i>Acer davidii</i> Franch.	
	<i>Acer fabri</i> Hance	
	<i>Acer tonkinense</i> Lecomte ssp. <i>kwangsiense</i> (W.P. Fang & M.Y. Fang) W.P. Fang	endemic to Guangxi
	<i>Acer tutcheri</i> Duthie	
Actinidiaceae	<i>Actinidia farinosa</i> C.F. Liang	
	<i>Actinidia fulvicoma</i> Hance var. <i>lanata</i> (Hemsl.) C.F. Liang	
Alangiaceae	<i>Alangium chinense</i> (Lour.) Harms.	
	<i>Alangium kurzii</i> Craib	
Amaranthaceae	<i>Achyranthes aspera</i> L.	
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burtt & A.W. Hill	
	<i>Rhus chinensis</i> Mill.	
	<i>Toxicodendron succedaneum</i> (L.) Kuntze.	
Apiaceae	<i>Centella asiatica</i> (L.) Urb.	
	<i>Hydrocotyle nepalensis</i> Hook.	
	<i>Hydrocotyle sibthorpioides</i> Lam.	
	<i>Pternopetalum nudicaule</i> (H. Boissieu) Hand.-Mazz.	
Apocynaceae	<i>Alyxia schlechteri</i> H. Lév.	
	<i>Trachelospermum asiaticum</i> (Siebold & Zucc.) Nakai	
	<i>Trachelospermum axillare</i> Hook. f.	
	<i>Trachelospermum jasminoides</i> (Lindl.) Lem.	
Aquifoliaceae	<i>Ilex chapaensis</i> Merr.	
	<i>Ilex ficoidea</i> Hemsl.	
	<i>Ilex micrococca</i> Maxim.	
	<i>Ilex pubescens</i> Hook. & Arn.	
Araliaceae	<i>Aralia decaisneana</i> Hance	
	<i>Dendropanax hainanensis</i> (Merr. & Chun) Merr. & Chun	
	<i>Diplopanax stachyanthus</i> Hand.-Mazz.	Vulnerable
	<i>Gamblea pseudoevodiifolia</i> (K.M. Feng) C.B. Shang, Lowry & Fordin	
	<i>Hedera nepalensis</i> K. Koch var. <i>sinensis</i> (Tobler) Rehder	
	<i>Panax japonicum</i> C.A. Mey.	
	<i>Schefflera delavayi</i> (Franch.) Harms	
	<i>Schefflera minutistellata</i> Merr. ex H.L. Li	
	<i>Schefflera octophylla</i> (Lour.) Harms	
	<i>Trevesia palmata</i> (DC.) Vis.	
Aristolochiaceae	<i>Aristolochia championii</i> Merr. & Chun	
	<i>Asarum caudigerum</i> Hance	
Asclepiadaceae	<i>Cynanchum auriculatum</i> Royle ex Wight	

Family	Species	Notes	
Asteraceae	<i>Hoya fusca</i> Wall.		
	<i>Tylophora rotundifolia</i> Buch.-Ham. ex Wight		
	<i>Ageratum conyzoides</i> L.	introduced from tropical America	
	<i>Ainsliaea henryi</i> Diels		
	<i>Artemisia japonica</i> Thunb.		
	<i>Bidens biternata</i> (Lour.) Merr. & Sherff.		
	<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	introduced from Africa	
	<i>Eclipta prostrata</i> (L.) L.		
	<i>Elephantopus scaber</i> L.		
	<i>Eupatorium chinense</i> L.		
Balsaminaceae	<i>Eupatorium odoratum</i> L.	introduced from S. America	
	<i>Senecio scandens</i> Buch.-Ham.		
	<i>Solidago decurrens</i> Lour.		
	<i>Taraxacum mongolicum</i> Hand.-Mazz.		
	<i>Impatiens hainanensis</i> Y.L. Chen		
	<i>Impatiens rubrostriata</i> Hook. f.		
	<i>Impatiens lasiophyton</i> Hook. f.		
	Begoniaceae	<i>Begonia pedatifida</i> H. Lév.	
	Berberidaceae	<i>Mahonia bealei</i> (Fortune) Carrière	
	Betulaceae	<i>Alnus nepalensis</i> D. Don	
<i>Betula austrosinensis</i> Chun ex P.C. Li			
Bignoniaceae	<i>Betula luminifera</i> H.J.P. Winkl.		
	<i>Carpinus pubescens</i> Burkill	new Guangxi record	
Boraginaceae	<i>Oroxylum indicum</i> (L.) Kurz		
	<i>Cynoglossum lanceolatum</i> Forssk.		
Burmanniaceae	<i>Ehretia acuminata</i> (DC.) R. Br.		
	<i>Burmannia disticha</i> L.		
Caesalpiniaceae	<i>Bauhinia corymbosa</i> Roxb. ex DC.		
	<i>Bauhinia glauca</i> (Wall. ex Benth.) Benth.		
	<i>Cercis chinensis</i> Bunge		
	<i>Gymnocladus chinensis</i> Baill.		
	<i>Zenia insignis</i> Chun		
	Campanulaceae	<i>Lobelia chinensis</i> Lour.	Lower Risk (nt); Protected II
	Caprifoliaceae	<i>Pratia nummularia</i> (Lam.) A. Br. & Aschers.	
		<i>Lonicera confusa</i> (Sweet) DC.	
	Caryophyllaceae	<i>Lonicera ligustrina</i> Wall.	
		<i>Sambucus chinensis</i> Lindl.	
<i>Viburnum brachybotryum</i> Hemsl.			
<i>Viburnum fordiae</i> Hance			
<i>Viburnum odoratissimum</i> Ker Gawl.			
<i>Drymaria cordata</i> (L.) Willd. ex Roem. & Schult.			
Celastraceae		<i>Celastrus hindsii</i> Benth.	
		<i>Dipentodon sinicus</i> Dunn	Protected II; endemic to Guizhou, Guangxi & S. Yunnan
Chenopodiaceae		<i>Euonymus laxiflorus</i> Champ. ex Benth.	
		<i>Euonymus leclerei</i> H. Lév.	
	<i>Euonymus nitidus</i> Benth.	new Guangxi record	
Chloranthaceae	<i>Chenopodium ambrosioides</i> L.		
Clethraceae	<i>Sarcandra glabra</i> (Thunb.) Nakai		
	<i>Clethra bodinieri</i> H. Lév.		
Clusiaceae	<i>Clethra cavaleriei</i> H. Lév.		
	<i>Clethra faberi</i> Hance		
	<i>Hypericum japonicum</i> Thunb. ex Murray		
Convolvulaceae	<i>Hypericum patulum</i> Thunb.		
	<i>Hypericum sampsonii</i> Hance		
	<i>Erycibe obtusifolia</i> Benth.		
Coriariaceae	<i>Coriaria nepalensis</i> Wall.		
Cornaceae	<i>Cornus</i> sp.		
	<i>Dendrobenthamia hongkongensis</i> (Hemsl.) Hutch.		
Cucurbitaceae	<i>Swida paucinervis</i> (Hance) Soják		
	<i>Gynostemma pentaphylla</i> (Thunb.) Makino		
Dipsacaceae	<i>Trichosanthes ovigera</i> Blume		
Ebenaceae	<i>Dipsacus asperoides</i> C.Y. Cheng & Ai		
Elaeagnaceae	<i>Diospyros japonica</i> Siebold & Zucc.		
	<i>Elaeagnus gonyanthes</i> Benth.		

Family	Species	Notes
Hydrangeaceae	<i>Exbucklandia populnea</i> (R. Brown) R. W. Brown	
	<i>Exbucklandia tonkinensis</i> (Lecomte) Steenis	
	<i>Liquidambar formosana</i> Hance	
	<i>Rhodoleia parvipetala</i> Tong	
	<i>Dichroa febrifuga</i> Lour.	
	<i>Dichroa yaoshanensis</i> Y.C. Wu	
	<i>Hydrangea chinensis</i> Maxim.	
	<i>Hydrangea davidii</i> Franch.	
	<i>Pileostegia viburnoides</i> Hook. f. & Thomson	
	<i>Schizophragma integrifolium</i> Oliv.	
Icacinaceae	<i>Iodes balansae</i> Gagnep.	
Illiciaceae	<i>Illicium majus</i> Hook. f. & Thomson	
	<i>Illicium spathulatum</i> Y.C. Wu	
Juglandaceae	<i>Illicium verum</i> Hook. f.	mainly cultivated
	<i>Carya kweichowensis</i> Kuang & A.M. Lu	new Guangxi record; endemic to S Guizhou & NW Guangxi
Lamiaceae	<i>Cyclocarya paliurus</i> (Batalin) Iljinsk.	
	<i>Engelhardtia colebrookiana</i> Lindl.	
	<i>Engelhardtia roxburghiana</i> Wall.	
	<i>Juglans regia</i> L.	mainly cultivated
	<i>Platycarya strobilacea</i> Siebold & Zucc.	
	<i>Anisomeles indica</i> (L.) Kuntze	
	<i>Clinopodium chinense</i> (Benth.) Kuntze	
	<i>Elsholtzia argyi</i> H. Lévl.	
	<i>Gomphostemma chinense</i> Oliv.	
	<i>Mosla dianthera</i> (Buch.-Ham. ex Roxb.) Maxim.	
Lardizabalaceae	<i>Prunella vulgaris</i> L.	
	<i>Decaisnea insignis</i> (Griff.) Hook. f. & Thomson	
Lauraceae	<i>Beilschmiedia kweichowensis</i> Cheng	
	<i>Cassytha filiformis</i> L.	
	<i>Cinnamomum appelianum</i> Schewe	
	<i>Cinnamomum wilsonii</i> Gamble	
	<i>Lindera caudata</i> (Nees) Hook. f.	
	<i>Lindera communis</i> Hemsl.	
	<i>Lindera metcalfiana</i> C.K. Allen	
	<i>Lindera pulcherrima</i> (Nees) Benth. var. <i>attenuata</i> C.K. Allen	
	<i>Litsea cubeba</i> (Lour.) Pers.	
	<i>Litsea elongata</i> (Nees) Benth. & Hook. f.	
	<i>Litsea pungens</i> Hemsl.	
	<i>Machilus chinensis</i> (Champ. ex Benth.) Hemsl.	
	<i>Machilus leptophylla</i> Hand.-Mazz.	
	<i>Machilus pauhoi</i> Kanehira	
	<i>Machilus thunbergii</i> Siebold & Zucc.	
	<i>Neolitsea chuii</i> Merr.	
	<i>Phoebe neurantha</i> (Hemsl.) Gamble	
	<i>Sassafras tzumu</i> (Hemsl.) Hemsl.	
	<i>Tirpitzia sinensis</i> (Hemsl.) Hallier F.	
	Linaceae	<i>Buddleja officinalis</i> Maxim.
Loganiaceae	<i>Loranthus guizhouensis</i> H.X. Qiu	
Loranthaceae	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	
	<i>Taxillus delavayi</i> (Tiegh.) Danser	
	<i>Taxillus sutchuenensis</i> (Lecomte) Danser	
Lythraceae	<i>Rotala indica</i> (Willd.) Koehne	
Magnoliaceae	<i>Manglietia fordiana</i> Oliv.	
	<i>Michelia foveolata</i> Merr. ex Dandy	
	<i>Michelia maudiae</i> Dunn	
Malvaceae	<i>Urena lobata</i> L.	pantropical weed
Melastomataceae	<i>Blastus cochinchinensis</i> Lour.	
	<i>Blastus dunnianus</i> H. Lévl.	
	<i>Fordiophyton fordii</i> (Oliv.) Krasser	
	<i>Fordiophyton strictum</i> Diels	
	<i>Melastoma dodecandrum</i> Lour.	
	<i>Melastoma normale</i> D. Don	
	<i>Phyllagathis cavaleriei</i> (H. Lévl. & Vaniot) Guillaumin	
<i>Phyllagathis deltoda</i> C. Chen	endemic to Guangxi	

Family	Species	Notes
Meliaceae	<i>Plagiopetalum esquirolii</i> (H. Lév.) Rehder	
	<i>Toona ciliata</i> M. Roem. var. <i>pubescens</i> (Franch.) Hand.-Mazz.	Protected II
	<i>Toona sinensis</i> (Juss.) Roem.	planted
Mimosaceae	<i>Trichilia connaroides</i> (Wight & Arn.) Benth. var. <i>microcarpa</i> (Pierre) Benth.	
	<i>Adenanthera pavonina</i> L. var. <i>microsperma</i> (Teijsm. et Binnend.) I. C. Nielsen	
Moraceae	<i>Albizia lebbbeck</i> (L.) Benth.	
	<i>Broussonetia kazinoki</i> Siebold & Zucc.	
	<i>Broussonetia papyrifera</i> (L.) L'Hér. ex Vent.	
	<i>Cudrania cochinchinensis</i> (Lour.) Kudo & Masam.	
	<i>Ficus abelii</i> Miq.	
	<i>Ficus erecta</i> Thunb.	
	<i>Ficus henryi</i> Warb.	
	<i>Ficus hirta</i> Vahl	
	<i>Ficus pandurata</i> Hance	
	<i>Ficus pumila</i> L.	
	<i>Ficus sarmentosa</i> Buch.-Ham. ex Sm. var. <i>henryi</i> (King ex Oliv.) Corner	
	<i>Ficus sarmentosa</i> Buch.-Ham. ex Sm. var. <i>thunbergii</i> (Maxim.) Corner	
	Myricaceae	<i>Myrica rubra</i> (Lour.) Sieb. & Zucc.
Myrsinaceae	<i>Ardisia crispa</i> (Thunb.) A. DC.	
	<i>Ardisia ensifolia</i> E. Walker	
Myrtaceae	<i>Embelia vestita</i> Roxb.	
	<i>Maesa japonica</i> (Thunb.) Moritzi & Zoll.	
	<i>Myrsine faberi</i> (Mez) Pipoly & C. Chen	
Nyssaceae	<i>Rhodomyrtus tomentosa</i> (Aiton) Hassk.	
Oleaceae	<i>Camptotheca acuminata</i> Decne.	
Oxalidaceae	<i>Jasminum lanceolarium</i> Roxb.	
Papilionaceae	<i>Oxalis corniculata</i> L.	
	<i>Oxalis griffithii</i> Edgew. & Hook. f.	
	<i>Dalbergia hancei</i> Benth.	
	<i>Indigofera tinctoria</i> L.	cultivated
	<i>Kummerowia striata</i> (Thunb.) Schindl.	
	<i>Millettia nitida</i> Benth.	
	<i>Millettia pachycarpa</i> Benth.	
	<i>Millettia sericosema</i> Hance	
	<i>Sophora prazeri</i> Prain var. <i>mairei</i> (Pamp.) Tsoong	
	<i>Pentaphylax euryoides</i> Gardner & Champ.	
Piperaceae	<i>Piper austrosinense</i> Y.C. Tseng	
	<i>Piper kadsura</i> (Choisy) Ohwi	
	<i>Piper wallichii</i> (Miq.) Hand.-Mazz.	
Pittosporaceae	<i>Pittosporum glabratum</i> Lindl.	
Plantaginaceae	<i>Plantago major</i> L.	introduced
Polygonaceae	<i>Antenoron filiforme</i> (Thunb.) Roberty & Vautier	
	<i>Polygonum multiflorum</i> Thunb. ex Murray	
	<i>Reynoutria japonica</i> Houtt.	
	<i>Rumex dentatus</i> L.	
Primulaceae	<i>Lysimachia congestiflora</i> Hemsl.	
	<i>Lysimachia decurrens</i> G. Forst.	
	<i>Lysimachia foenum-graecum</i> Hance	planted
Proteaceae	<i>Helicia cochinchinensis</i> Lour.	
	<i>Helicia formosana</i> Hemsl.	
Ranunculaceae	<i>Anemone hupehensis</i> (Lemoine) Lemoine	
	<i>Clematis crassifolia</i> Benth.	
	<i>Clematis montana</i> Buch.-Ham. ex DC.	
	<i>Ranunculus cantoniensis</i> DC.	
	<i>Thalictrum acutifolium</i> (Hand.-Mazz.) B. Boivin	
Rhamnaceae	<i>Berchemia floribunda</i> (Wall.) Brongn.	
	<i>Hovenia acerba</i> Lindl.	
	<i>Rhamnella martinii</i> (H. Lév.) C.K. Schneid.	
	<i>Sageretia hamosa</i> (Wall.) Brongn.	

Family	Species	Notes
Rhoipteleaceae	<i>Rhoiptelea chiliantha</i> Diels & Hand.-Mazz.	Protected II; Vulnerable; endemic to SW Guizhou, NW Guangxi & SE Yunnan
Rosaceae	<i>Cotoneaster glaucophyllus</i> Franch. <i>Laurocerasus australis</i> T.T. Yu & L.T. Lu <i>Laurocerasus phaeosticta</i> (Hance) C. K. Schneid. <i>Laurocerasus spinulosa</i> (Siebold & Zucc.) C.K. Schneid. <i>Laurocerasus undulata</i> (Buch.-Ham. ex D. Don) Roem. <i>Pygeum topengii</i> Merr. <i>Pyracantha atalantioides</i> (Hance) Stapf <i>Pyrus pyrifolia</i> (Burm. f.) Nakai <i>Rubus alceaefolius</i> Poir. <i>Rubus columllaris</i> Tutcher <i>Rubus dolichophyllus</i> Hand.-Mazz. <i>Rubus malifolius</i> Focke <i>Rubus multibracteatus</i> H. Lév. & Vaniot <i>Rubus niveus</i> Thunb. <i>Rubus parvifolius</i> L. <i>Rubus pinfaensis</i> H. Lév. & Vaniot <i>Rubus swinhoei</i> Hance <i>Spiraea japonica</i> L. f. var. <i>acuminata</i> Franch. <i>Spiraea martinii</i> H. Lév.	
Rubiaceae	<i>Aidia cochinchinensis</i> Lour. <i>Chasalia curviflora</i> Thwaites <i>Diplospora fruticosa</i> Hemsl. <i>Emmenopterys henryi</i> Oliv. <i>Hedyotis tenelliflora</i> Blume <i>Lasianthus longicaudus</i> Hook. f. <i>Mussaenda esquirolii</i> H. Lév. <i>Mussaenda pubescens</i> W. T. Aiton <i>Neanotis hirsuta</i> (L. f.) W.H. Lewis <i>Paederia scandens</i> (Lour.) Merr. <i>Rubia wallichiana</i> Decne. <i>Tarenna attenuata</i> (Voigt) Hutch. <i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil. <i>Wendlandia uvariifolia</i> Hance	
Rutaceae	<i>Clausena dunniana</i> H. Lév. <i>Evodia calcicola</i> Chun ex C.C. Huang <i>Evodia lepta</i> (Spreng.) Merr. <i>Evodia ruticarpa</i> (A. Juss.) Benth. <i>Evodia trichotoma</i> (Lour.) Pierre <i>Murraya paniculata</i> (L.) Jack <i>Toddalia asiatica</i> (L.) Lam. <i>Zanthoxylum ailanthoides</i> Siebold & Zucc. <i>Zanthoxylum myriacanthum</i> Wall. ex Hook. f. <i>Zanthoxylum ovalifolium</i> Wight <i>Zanthoxylum scandens</i> Blume	endemic to W Guangxi, SW Guizhou and SE Yunnan
Sabiaceae	<i>Meliosma squamulata</i> Hance	
Sapindaceae	<i>Sabia fasciculata</i> Lecomte ex L. Chen <i>Boniodendron minius</i> (Hemsl.) T.C. Chen <i>Handelioidendron bodinieri</i> (H. Lév.) Rehder	Protected I; endemic to S Guizhou & W Guangxi
Sapotaceae	<i>Sinosideroxylon pedunculatum</i> (Hemsl.) H. Chuang	
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>Brandisia hancei</i> Hook. f. <i>Paulownia fortunei</i> (Seem.) Hemsl. <i>Torenia fournieri</i> Linden ex E. Fourn.	
Solanaceae	<i>Lycianthes biflora</i> (Lour.) Bitter <i>Lycianthes lysimachioides</i> (Wall.) Bitter <i>caulorhiza</i> (Dunal) Bitter <i>Physalis angulata</i> L.	

Family	Species	Notes
Stachyuraceae	<i>Stachyurus himalaicus</i> Hook. f. & Thomson ex Benth.	
	<i>Stachyurus oblongifolius</i> F.T. Wang & Ts. Tang	new record to Guangxi
Staphyleaceae	<i>Euscaphis japonica</i> (Thunb.) Kanitz	
	<i>Tapiscia sinensis</i> Oliv.	Vulnerable
	<i>Turpinia cochinchinensis</i> (Lour.) Merr.	
	<i>Turpinia montana</i> (Blume) Kurz	
Styracaceae	<i>Alniphyllum fortunei</i> (Hemsl.) Makino	
	<i>Huodendron biaristatum</i> (W.W. Sm.) Rehder	
	<i>Huodendron tibeticum</i> (J. Anthony) Rehder	
	<i>Rehderodendron kwangtungense</i> Chun	
	<i>Rehderodendron kweichowense</i> Hu	
	<i>Styrax confusus</i> Hemsl.	
Symplocaceae	<i>Symplocos adenopus</i> Hance	
	<i>Symplocos groffii</i> Merr.	
	<i>Symplocos pseudobarberina</i> Gontsch.	
Theaceae	<i>Adinandra megaphylla</i> Hu	restricted to SE Yunnan & NW Guangxi, also recorded at Vietnam
	<i>Adinandra millettii</i> (Hook. & Arn.) Benth. & Hook. f. ex Hance	
	<i>Anneslea fragrans</i> Wall.	
	<i>Camellia crapnelliana</i> Tutcher	Vulnerable
	<i>Camellia oleifera</i> Abel	
	<i>Camellia sinensis</i> (L.) Kuntze	
	<i>Eurya distichophylla</i> Hemsl.	
	<i>Eurya groffii</i> Merr.	
	<i>Eurya impressinervis</i> Kobuski	
	<i>Eurya kweichowensis</i> Hu & L.K. Ling	
	<i>Eurya loquaiana</i> Dunn	
	<i>Eurya macartheyi</i> Champ.	
	<i>Hartia villosa</i> (Merr.) Merr.	
	<i>Schima argentea</i> E. Pritz.	
	<i>Schima wallichii</i> (DC.) Choisy	
	<i>Ternstroemia gymnanthera</i> (Wight & Arn.) Bedd.	
Thymelaeaceae	<i>Wikstroemia micrantha</i> Hemsl. var. <i>paniculata</i> (H.L. Li) S.C. Huang	
Ulmaceae	<i>Aphananthe aspera</i> (Thunb.) Planch.	
Ulmaceae	<i>Celtis tetrandra</i> Roxb. subsp. <i>sinensis</i> (Pers.) Y.C. Tang	
	<i>Ulmus castaneifolia</i> Hemsl.	
Urticaceae	<i>Debregeasia orientalis</i> C.J. Chen	
	<i>Elatostema balansae</i> Gagnep.	
	<i>Laportea bulbifera</i> (Siebold & Zucc.) Wedd.	
	<i>Oreocnide obovata</i> (C.H. Wright) Merr. var. <i>paradoxa</i> (Gagnep.) C.J. Chen	
	<i>Pilea plataniflora</i> C.H. Wright	
	<i>Pilea squamosa</i> C.J. Chen var. <i>sparsa</i> C.J. Chen	new Guangxi record, previously considered endemic to Yunnan
Valerianaceae	<i>Patrinia villosa</i> (Thunb.) Juss.	
Verbenaceae	<i>Callicarpa longipes</i> Dunn	
	<i>Callicarpa macrophylla</i> Vahl	
	<i>Callicarpa rubella</i> Lindl.	
	<i>Clerodendrum japonicum</i> (Thunb.) Sweet	
	<i>Clerodendrum mandarinorum</i> Diels	
	<i>Verbena officinalis</i> L.	
	<i>Vitex negundo</i> L.	
Vitaceae	<i>Ampelopsis chaffanjonii</i> (H. Lév.) Rehder	
	<i>Cayratia japonica</i> (Thunb.) Gagnep.	
	<i>Parthenocissus feddei</i> (Levl.) C.L. Li	
	<i>Tetrastigma hemsleyanum</i> Diels & Gilg	
Monocotyledonae		
Amaryllidaceae	<i>Curculigo capitulata</i> (Lour.) Kuntze	
Araceae	<i>Acorus tatarinowii</i> Schott	
	<i>Alocasia macrorrhiza</i> (L.) Schott	

Family	Species	Notes
	<i>Amorphophallus rivieri</i> Durieu ex Carrière	
	<i>Arisaema erubescens</i> (Wall.) Schott	
	<i>Arisaema franchetianum</i> Engl.	
	<i>Arisaema penicillatum</i> N.E. Br.	
Areaceae	<i>Rhapis excelsa</i> (Thunb.) A. Henry ex Rehder	
	<i>Trachycarpus fortunei</i> (Hook.) H. Wendl.	
Commelinaceae	<i>Commelina paludosa</i> Blume	
	<i>Pollia miranda</i> (H. Lév.) H. Hara	
	<i>Pollia secundiflora</i> (Blume) Bakh. f.	
Cyperaceae	<i>Carex baccans</i> Nees	
	<i>Carex doniana</i> Spreng.	
	<i>Carex ligulata</i> Nees ex Wight	
	<i>Carex nemostachys</i> Steud.	
	<i>Carex pocilliformis</i> Boott	
	<i>Carex scaposa</i> C.B. Clarke	
	<i>Carex sclerocarpa</i> Franch.	
	<i>Cyperus compressus</i> L.	
	<i>Cyperus pilosus</i> Vahl	
	<i>Hypolytrum nemorum</i> (Vahl) Spreng.	
	<i>Kyllinga brevifolia</i> Rottb.	
	<i>Pycreus sanguinolentus</i> (Vahl) Nees	
	<i>Rhynchospora rubra</i> (Lour.) Makino	
	<i>Scirpus ternatanus</i> Reinw. ex Miq.	
Dioscoreaceae	<i>Dioscorea bulbifera</i> L.	
Iridaceae	<i>Belamcanda chinensis</i> (L.) DC.	
Juncaceae	<i>Juncus setchuensis</i> Buchenau	
Liliaceae	<i>Campylandra wattii</i> C.B. Clarke	
	<i>Cardiocrinum giganteum</i> (Wall.) Makino var.	
	<i>yunnanense</i> (Leichtlin ex Elwes) Stearn	
	<i>Lilium brownii</i> F.E. Brown ex Mieliez	
	<i>Ophiopogon chingii</i> F.T. Wang & Ts. Tang	
	<i>Ophiopogon japonicus</i> (L. f.) Ker Gawl.	
	<i>Ophiopogon megalanthus</i> F.T. Wang & L.K. Dai	new Guangxi record, previously considered endemic to Yunnan
	<i>Paris fargesii</i> Franch.	
	<i>Peliosanthes macrostegia</i> Hance	
	<i>Reineckea carnea</i> (Andrews) Kunth	
	<i>Smilax aberrans</i> Gagnep.	
	<i>Smilax astrosperma</i> F.T. Wang & Ts. Tang	
	<i>Smilax china</i> L.	
	<i>Smilax lanceifolia</i> Roxb.	
	<i>Smilax ocreata</i> A. DC.	
Orchidaceae	(see Table 2)	
Poaceae	<i>Arthraxon hispidus</i> (Thunb.) Makino	
	<i>Arundinella nepalensis</i> Trin.	
	<i>Bambusa vulgaris</i> Schrad. ex J.C. Wendl.	
	<i>Capillipedium assimile</i> (Steud. ex Zoll.) A. Camus	
	<i>Digitaria sanguinalis</i> (L.) Scop.	
	<i>Eleusine indica</i> (L.) Gaertn.	
	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	
	<i>Isachne albens</i> Trin.	
	<i>Lophatherum gracile</i> Brongn.	
	<i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum & Lauterb.	
	<i>Miscanthus sinensis</i> Andersson	
	<i>Neyraudia arundinacea</i> (L.) Henr.	
	<i>Paspalum thunbergii</i> Kunth ex Steud.	
	<i>Pogonatherum crinitum</i> (Thunb.) Kunth	
	<i>Setaria palmifolia</i> (J. Koenig) Stapf	
	<i>Sporobolus fertilis</i> (Steud.) Clayton	
	<i>Thysanolaena maxima</i> (Roxb.) Kuntze	
Pontederiaceae	<i>Monochoria vaginalis</i> (Burm. f.) C. Presl	
Potamogetonaceae	<i>Potamogeton distinctus</i> A. Benn.	
Stemonaceae	<i>Stemona tuberosa</i> Lour.	

Family	Species	Notes
Zingiberaceae	<i>Alpinia japonica</i> (Thunb.) Miq. <i>Alpinia stachyoides</i> Hance <i>Hedychium flavum</i> Roxb.	

Table 2. Orchids recorded of Cenwanglashan Nature Reserve and neighbouring areas from 31 July to 3 August 2002 and May 2002 in Guangxi Province.

Species	Habitat	Remarks
<i>Anoectochilus elwesii</i> (Clarke ex Hook. f.) King & Pantl.	on forest floor with rich humus	terrestrial
<i>Bletilla formosana</i> (Rolfe) Schltr.	on grassy and shrubby slope beside agricultural terraces	terrestrial; Endangered
<i>Bletilla</i> sp.	on grassy and shrubby slope beside agricultural terraces	terrestrial,
<i>Bulbophyllum andersonii</i> (Hook. f.) J.J. Sm.	on rock in forest	epiphytic
<i>Bulbophyllum</i> sp.1	on tree trunk in forest beside a stream	epiphytic
<i>Bulbophyllum</i> (cf. <i>odoratissimum</i>) sp. 2	on rock with humus in forest	epiphytic
<i>Calanthe reflexa</i> (Kuntze) Maxim.	on forest and bamboo-wood floor with rich humus	terrestrial
<i>Calanthe</i> (cf. <i>triplicata</i>) sp.	on forest floor beside stream	terrestrial
<i>Calanthe</i> sp. 1	on bamboo floor with rich humus	terrestrial
<i>Calanthe</i> sp. 2	beside a tree with rich humus	terrestrial
<i>Collabium formosanum</i> Hayata.	on forest and bamboo floors, and on rock with rich humus	terrestrial
<i>Cymbidium cyperifolium</i> Wall. ex Lindl.	on forest floor with rich humus	terrestrial
<i>Cymbidium floribundum</i> Lindl.	on live and fallen tree trunks, and on rock in forest	epiphytic
<i>Cymbidium lancifolium</i> Hook.	on forest floor with rich humus	terrestrial
<i>Cymbidium qiubeiense</i> K.M. Feng et H. Li	on forest floor with rich humus	terrestrial; Endangered; endemic to SE Yunnan & SW Guizhou area: new record for Guangxi
<i>Cymbidium</i> (cf. <i>aloifolium</i>) sp.	on rock	epiphytic
<i>Cymbidium</i> sp.	on tree trunk in forest	epiphytic
<i>Dendrobium moniliforme</i> (L.) Sw.	on tree trunk in forest	epiphytic
<i>Dendrobium</i> sp.	on rock	epiphytic;
<i>Galeola lindleyana</i> (Hook. f. et Thoms.) Rchb. f.	on forest floor with rich humus	saprophytic;
<i>Goodyera foliosa</i> (Lindl.) Benth. ex Clarke	on forest floor and rock beside a stream	terrestrial
<i>Goodyera</i> (cf. <i>bomiensis</i>) sp.	on forest floor with rich humus	terrestrial
<i>Habenaria fordii</i> Rolfe	on forest floor with rich humus	terrestrial
<i>Liparis balansae</i> Gagnep.	on rock in forest	epiphytic
<i>Liparis nervosa</i> (Thunb. ex Murray) Lindl.	on grassy slope beside the main road and on forest floor with rich humus	terrestrial
<i>Liparis</i> (cf. <i>bootanensis</i>) sp.	on rock in forest	epiphytic
<i>Peristylus</i> sp.	beside agricultural terraces with short shrubs	terrestrial
<i>Pholidota missionariorum</i> Gagnep.	on cliff and on rock	epiphytic; endemic to SE Yunnan and Guizhou area: new to Guangxi
<i>Pholidota yunnanensis</i> Rolfe	on rock	epiphytic
<i>Spathoglottis pubescens</i> Lindl.	on grassy slope beside the main road	terrestrial
unknown (cf. <i>Pleione</i>) sp.	on rock in forest	epiphytic

Mammals

- In 1999, many *Tamias maritimus* (over 15 individuals) were seen at Linao Gou around dusk. The species was observed regularly throughout the Reserve during the 2002 survey.
- In 1999 one *Ratufa bicolor* and one *Callosciurus erythraeus* were also observed at Linao Gou around dusk. Another *C. erythraeus* was seen at the same locality at 16.15 on 23 May 2002.

- On 22 May 2002, a young Yellow-bellied Weasel *Mustela kathiah* was caught by a villager between Houzidong and Laoshan substation. The species was also photographed by an infra-red camera in June 2002.
- On 25 May 2002, a Northern Tree Shrew *Tupaia belangeri* was seen near Houzidong.
- In May-June 2002 several other species were recorded using infra-red cameras: Spotted Linsang *Prionodon pardicolor*, Leopard Cat *Prionailurus bengalensis*, Red-cheeked Squirrel *Dremomys rufigenis* and Hoary Bamboo Rat *Rhizomys pruinosus*.
- Several different rat species were also photographed by the infra-red cameras in 2002. These have not yet been identified; one belongs to the genus *Niviventer*.
- Many Wild Boar *Sus scrofa* diggings were present near Cenwanglaoshan.
- A cluster of droppings found in 1999 at Houzidong could not be firmly identified, but were suspected to be from Tufted Deer *Elaphodus cephalophus*. Some larger scat, near Cenwanglaoshan may have been from Chinese Goral *Naemorhedus caudatus*.
- On 2 August 1999 a civet scat, probably from Small Indian Civet *Viverricula indica*, and another small carnivore scat were found at Cenwanglaoshan. Another civet scat was found.
- A scat believed to be of Leopard Cat was seen near Dawangmiao in 2002.
- In 1999 many *Camellia crapnelliana* fruits were seen near Cenwanglaoshan. The fruits were chewed open and judging from the teeth marks, the seeds were probably eaten by squirrels.
- The status of mammals was inferred (Table 3) based on direct findings, on interviews with wardens and residents of Cenwanglaoshan Nature Reserve, and on recorded distributions, including past records from Tianlin, Leye and Lingyun counties (Wang *et al.*, 1962; Wu M.C., 1983, 1993; Wei & Wu M.C., 1985; Shen *et al.*, 1988; Liang, 1993; Zhang Y. *et al.* 1997). No records are available on the bat fauna of the region.

Table 3. The inferred status of mammals at Cenwanglaoshan Nature Reserve, based on infra-red camera traps, on interviewing staff and residents of the Nature Reserve, and on past distribution records. “+” = rare, “++” = quite common, “+++” = abundant, “n” = not asked. Sequence follows Wilson & Cole (2000).

Scientific name	English name	Past records	Mr Yang (1999)	Mr Wu (2002)	Camera traps (2002)	Probable status
<i>Tupaia belangeri</i>	Northern Tree Shrew	(Tianlin, Leye)	+++	?		present (confirmed – see text)
<i>Macaca arctoides</i>	Stump-tailed Macaque	(Lingyun)	-	-		extirpated or absent
<i>Macaca assamensis</i>	Assam Macaque	(Tianlin, Lingyun)	-	-		extirpated or absent
<i>Macaca mulatta</i>	Rhesus Monkey	(Tianlin, Lingyun, Leye)	+++	++		present (confirmed)
<i>Macaca thibetana</i>	Pere David’s Macaque	Cenwanglaoshan (Tianlin, Lingyun)	-	-		extirpated or insecure
<i>Canis lupus</i>	Grey Wolf	(Tianlin, Leye)	-	-		extirpated
<i>Cuon alpinus</i>	Dhole	(Tianlin)	-	+		insecure or extirpated
<i>Catopuma temminckii</i> (recorded as <i>Felis temmincki</i>)	Asiatic Golden Cat	(Tianlin, Lingyun, Leye)	-	+ (one seen by our driver in 2001)		insecure
<i>Prionailurus bengalensis</i> (recorded as <i>Felis bengalensis</i>)	Leopard Cat	(Tianlin)	+++	++	✓	present (confirmed)
<i>Neofelis nebulosa</i>	Clouded Leopard	(Tianlin, Lingyun, Leye)	+	+		insecure
<i>Panthera pardus</i>	Leopard	Cenwanglaoshan (Tianlin, Lingyun)	+	-		insecure or extirpated

Scientific name	English name	Past records	Mr Yang (1999)	Mr Wu (2002)	Camera traps (2002)	Probable status
<i>Herpestes urva</i>	Crab-eating Mongoose		+	-		unknown
<i>Arctonyx collaris</i>	Hog Badger	(Tianlin)	-	-		insecure or extirpated
<i>Meles meles</i>	Eurasian Badger	(Tianlin)	-	-		insecure or extirpated
<i>Melogale moschata</i>	Chinese Ferret-badger		+++	++		present
<i>Mustela kathiah</i>	Yellow-bellied Weasel		+	-	✓	present (confirmed)
<i>Mustela strigidorsa</i>	Black-striped Weasel	(Tianlin, Lingyun, Leye)	?	?		unknown
<i>Ursus thibetanus</i> (recorded as <i>Selenarctos thibetanus</i>)	Asiatic Black Bear	(Tianlin, Lingyun, Leye)	+	+		insecure
<i>Paguma larvata</i>	Masked Palm Civet	(Tianlin)	+++	++		present
<i>Prionodon pardicolor</i>	Spotted Linsang	Cenwanglaoshan (Tianlin)	-	+		present (confirmed)
<i>Viverra zibetha</i>	Large-spotted Civet	(Tianlin, Lingyun, Leye)	n	n		unknown
<i>Viverra zibetha</i>	Large Indian Civet	(Tianlin)	-	-		insecure, extirpated or absent
<i>Viverricula indica</i>	Small Indian Civet	(Tianlin)	+++	?		insecure
<i>Sus scrofa</i>	Wild Boar	Cenwanglaoshan (Tianlin, Lingyun)	+++	++		present (confirmed – see text)
<i>Moschus berezovskii</i>	Chinese Forest Musk Deer	(Tianlin, Leye)	++	+(only in limestone hills of Langping) ¹		insecure
<i>Cervus nippon</i>	Sika Deer		?	+		insecure or extirpated
<i>Cervus unicolor</i>	Sambar		-	+		insecure
<i>Elaphodus cephalophus</i>	Tufted Deer	(Tianlin, Lingyun, Leye)	-	-		insecure, extirpated or absent (but see text)
<i>Muntiacus reevesi</i>	Reeves's Muntjac		+++	?		present
<i>Naemorhedus caudatus</i> (recorded as <i>N. goral</i>)	Chinese Goral		+	+		insecure
<i>Naemorhedus sumatraensis</i>	Serow	(Tianlin, Leye)		+		insecure
<i>Manis pentadactyla</i>	Chinese Pangolin	(Tianlin)	+	+		insecure
<i>Callosciurus erythraeus</i>	Pallas's Squirrel	(Tianlin)	+++	?		present (confirmed – see text)
<i>Dremomys pernyi</i>	Perny's Long-nosed Squirrel	(Lingyun, Leye, Tianlin)	+	?		insecure
<i>Dremomys rufigenis</i>	Red-cheeked Squirrel	(Leye, Tianlin)	+++	??	—	present (confirmed)
<i>Ratufa bicolor</i>	Black Giant Squirrel		+	?		insecure (confirmed)

¹ According to former hunter Mr. Wu, a pair of Sika Deer *Cervus nippon* survived near Cenwanglaoshan in the 1980s.

Scientific name	English name	Past records	Mr Yang (1999)	Mr Wu (2002)	Camera traps (2002)	Probable status
<i>Tamias maritimus</i> (recorded as <i>T. swinhoei</i>)	Maritime Striped Squirrel	(Tianlin, Leye)	+++	?		present (confirmed)
<i>Trogopterus xanthipes</i>	Complex-toothed Flying Squirrel	__Cenwanglaoshan (Tianlin)	n	n		unknown
<i>Petaurista alborufus</i>	Red and White Giant Flying Squirrel	(Leye, Tianlin)	-	++		present
<i>Petaurista philippensis</i> (recorded as <i>P. petaurista</i>)	Indian Giant Flying Squirrel	__Cenwanglaoshan (Tianlin)	+++	++		present
<i>Apodemus peninsulae</i>	Korean Field Mouse	(Leye)	n	n		unknown
<i>Bandicota indica</i>	Greater Bandicoot Rat	(Tianlin)	n	n		unknown
<i>Leopoldamys edwardsi</i> (recorded as <i>Rattus edwardsi</i>)	Edwards's Long-tailed Giant Rat	(Tianlin)	n	n		unknown
<i>Micromys minutus</i>	Harvest Mouse	(Leye)	n	n		unknown
<i>Mus caroli</i>	Ryukyu Mouse	(Lingyun, Tianlin)	n	n		unknown
<i>Mus musculus</i>	House Mouse	(Tianlin)	n	n		unknown
<i>Mus pahari</i>	Gairdner's Shrewmouse	(Leye, Lingyun)	n	n		unknown
<i>Niviventer confucianus</i> (recorded as <i>Rattus niviventer</i>)	Chinese White-bellied Rat	(Tianlin)	n	n		unknown
<i>Niviventer fulvescens</i> (recorded as <i>Rattus fulvescens</i>)	Chestnut White-bellied Rat	(Tianlin)	n	n		unknown
<i>Rattus norvegicus</i>	Brown Rat	(Tianlin)	n	n		unknown
<i>Rattus tanezumi</i> (recorded as <i>R. flavipectus</i>)	Tanezumi Rat	(Tianlin)	n	n		unknown
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat		?	?	✓	present (confirmed)
<i>Rhizomys sinensis</i>	Chinese Bamboo Rat	(Tianlin)	+++	?		unknown
<i>Hystrix brachyura</i> (recorded as <i>H. hodgsoni</i>)	Malayan Porcupine	(Tianlin)	++	+		insecure
<i>Lepus sinensis</i>	Chinese Hare	(Tianlin, Lingyun)	+++	++		present

- A number of species suspected to occur are of particular conservation concern:
 - Clouded Leopard *Neofelis nebulosa* is listed as globally Vulnerable by IUCN, and Class I Protected in China.
 - Asiatic Black Bear *Ursus thibetanus* and Chinese Goral *Naemorhedus caudatus* are globally Vulnerable, and Class II Protected in China.
 - Malayan Porcupine *Hystrix brachyura* is globally Vulnerable.
 - Chinese Pangolin *Manis pentadactyla*, Rhesus Monkey *Macaca mulatta* and Chinese Forest Musk Deer *Moschus berezovskii* are globally Near-threatened, and Class II Protected in China.
 - Leopard *Panthera pardus* is Class I Protected in China.
 - Small Indian Civet *Viverricula indica* and Indian Giant Flying Squirrel *Petaurista philippensis* are Class II Protected in China.

Birds

- One hundred and twenty-three species of birds were recorded in Cenwanglaoshan Nature Reserve during the two surveys (Table 4). This is a very high figure for an upland reserve in South China.
- The most frequently encountered species included Brown-breasted Bulbul *Pycnonotus xanthorrhous*, Mountain Bulbul *Hypsipetes mccllellandii*, Grey-bellied Tesia *Tesia cyaniventer*, Grey Bushchat *Saxicola ferrea*, Streak-breasted Scimitar Babbler *Pomatorhinus ruficollis*, Pygmy Wren Babbler *Pnoepyga pusilla*, Grey-cheeked Fulvetta *Alcippe morrisonia*, Striated Yuhina *Yuhina castaneiceps* and Black-chinned Yuhina *Yuhina nigrimenta*.
- New records for Guangxi included:
 - Jerdon's Baza *Aviceda jerdoni*, previously known in China only from Yunnan and Hainan.
 - Rufous-winged Fulvetta *Alcippe castaneiceps*, previously known in China from Tibet and Yunnan.
 - White-collared Yuhina *Yuhina diademata*, previously known in China from Gansu, Shaanxi, Sichuan, Hubei, Guizhou and Yunnan.
 - Broad-billed Warbler *Tickellia hodgsoni*, previously known in China from Tibet and Yunnan.
 - Large Niltava *Niltava grandis*, previously known in China from Tibet and Yunnan.
 - White-bellied Redstart *Hodgsonius phaenicuroides*, previously known in China from Qinghai, Gansu, Ningxia, Shaanxi, Sichuan, Hubei, Hebei, Guizhou and Yunnan.
 - Blue-fronted Redstart *Phoenicurus frontalis*, previously known in China from Qinghai, Gansu, Ningxia, Shaanxi, Sichuan, Guizhou and Yunnan.
 - Long-tailed Minivet *Pericrocotus ethologus*, previously known in China from Hebei, Henan, Shanxi, Shaanxi, Gansu, Qinghai, Sichuan, Guizhou and Yunnan.
 - Blue-throated Barbet *Megalaima asiatica*, previously known in China from Yunnan.
 - Long-tailed Wren Babbler *Spelaeornis chocolatinus*, previously known in China from Sichuan and Yunnan.
 - Godlewski's Bunting *Emberiza godlewskii*, previously known in China from Heilongjiang, Xinjiang, Tibet, Qinghai, Gansu, Ningxia, Sichuan, and Yunnan.

Table 4. Birds recorded in and around Cenwanglaoshan Nature Reserve, July-August 1999 and May 2002. Sequence follows Clements (2000).

English name	Scientific name
Jerdon's Baza	<i>Aviceda jerdoni</i>
Oriental Honey Buzzard	<i>Pernis ptilorhynchus</i>
Crested Serpent Eagle	<i>Spilornis cheela</i>
Crested Goshawk	<i>Accipiter trivirgatus</i>
Grey-faced Buzzard	<i>Butastur indicus</i>
Common Kestrel	<i>Falco tinnunculus</i>
Oriental Hobby	<i>Falco severus</i>
Chinese Bamboo Partridge	<i>Bambusicola thoracica</i>
Silver Pheasant	<i>Lophura nycthemera</i>
Oriental Turtle Dove	<i>Streptopelia orientalis</i>
Large Hawk Cuckoo	<i>Hierococcyx sparverioides</i>
Hodgson's Hawk Cuckoo	<i>Hierococcyx fugax</i>
Indian Cuckoo	<i>Cuculus micropterus</i>
Common Cuckoo	<i>Cuculus canorus</i>
Oriental Cuckoo	<i>Cuculus saturatus</i>
Lesser Cuckoo	<i>Cuculus poliocephalus</i>
Asian Emerald Cuckoo	<i>Chrysococcyx maculatus</i>
Drongo Cuckoo	<i>Surniculus lugubris</i>
Asian Koel	<i>Eudynamys scolopacea</i>
Greater Coucal	<i>Centropus sinensis</i>
Collared Scops Owl	<i>Otus bakkamoena</i>

English name	Scientific name
Oriental Scops Owl	<i>Otus sunia</i>
Collared Owlet	<i>Glaucidium brodiei</i>
Fork-tailed Swift	<i>Apus pacificus</i>
House Swift	<i>Apus affinis</i>
Great Barbet	<i>Megalaima virens</i>
Black-browed Barbet	<i>Megalaima oorti</i>
Blue-throated Barbet	<i>Megalaima asiatica</i>
Grey-capped Pygmy Woodpecker	<i>Dendrocopos canicapillus</i>
Great Spotted Woodpecker	<i>Dendrocopus major</i>
Bay Woodpecker	<i>Blythipicus pyrrhotis</i>
Grey-headed Woodpecker	<i>Picus canus</i>
Long-tailed Broadbill	<i>Psarisomus dalhousiae</i>
Barn Swallow	<i>Hirundo rustica</i>
Red-rumped Swallow	<i>Hirundo daurica</i>
Asian House Martin	<i>Delichon dasypus</i>
Asian House Martin	<i>Delichon dasypus</i>
White Wagtail	<i>Motacilla alba</i>
Long-tailed Minivet	<i>Pericrocotus ethologus</i>
Scarlet Minivet	<i>Pericrocotus flammeus</i>
Bar-winged Flycatcher Shrike	<i>Hemipus picatus</i>
Collared Finchbill	<i>Spizixos semitorques</i>
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>
Brown-breasted Bulbul	<i>Pycnonotus xanthorrhous</i>
Chestnut Bulbul	<i>Hemixos castanonotus</i>
Mountain Bulbul	<i>Hypsipetes mccllellandii</i>
Black Bulbul	<i>Hypsipetes leucocephalus</i>
Chestnut-bellied Rock Thrush	<i>Monticola rufiventris</i>
Blue Rock Thrush	<i>Monticola solitarius</i>
Blue Whistling Thrush	<i>Myophonus caeruleus</i>
Black-breasted Thrush	<i>Turdus dissimilis</i>
Lesser Shortwing	<i>Brachypteryx leucophrys</i>
Hill Prinia	<i>Prinia atrogularis</i>
Grey-breasted Prinia	<i>Prinia hodgsonii</i>
Plain Prinia	<i>Prinia inornata</i>
Slaty-bellied Tesia	<i>Tesia olivea</i>
Grey-bellied Tesia	<i>Tesia cyaniventer</i>
Yellowish-bellied Bush Warbler	<i>Cettia acanthizoides</i>
Brownish-flanked Bush Warbler	<i>Cettia fortipes</i>
Brown Bush Warbler	<i>Bradypterus luteoventris</i>
Russet Bush Warbler	<i>Bradypterus seebohmi</i>
Mountain Tailorbird	<i>Orthotomus cuculatus</i>
Common Tailorbird	<i>Orthotomus sutorius</i>
Blyth's Leaf Warbler	<i>Phylloscopus reguloides</i>
Sulphur-breasted Warbler	<i>Phylloscopus ricketti</i>
Chestnut-crowned Warbler	<i>Seicercus castaniceps</i>
Rufous-faced Warbler	<i>Abroscopus albogularis</i>
Broad-billed Warbler	<i>Tickellia hodgsoni</i>
Brown-chested Jungle Flycatcher	<i>Rhinomyias brunneata</i>
Brown-breasted Flycatcher	<i>Muscicapa muttui</i>
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>
Verditer Flycatcher	<i>Eumyias thalassina</i>
Large Niltava	<i>Niltava grandis</i>
Small Niltava	<i>Niltava macgrigoriae</i>
Hainan Blue Flycatcher	<i>Cyornis hainanus</i>
Blue-throated Flycatcher	<i>Cyornis rubeculoides</i>
Grey-headed Canary Flycatcher	<i>Culicicapa ceylonensis</i>
Blue-fronted Redstart	<i>Phoenicurus frontalis</i>
Plumbeous Water Redstart	<i>Rhyacornis fuliginosus</i>
White-bellied Redstart	<i>Hodgsonius phaenicuroides</i>
White-tailed Robin	<i>Myiomela leucura</i>
Slaty-backed Forktail	<i>Enicurus schistaceus</i>
White-crowned Forktail	<i>Enicurus leschenaulti</i>
Common Stonechat	<i>Saxicola torquata</i>
Grey Bushchat	<i>Saxicola ferrea</i>
Hwamei	<i>Garrulax canorus</i>
White-browed Laughingthrush	<i>Garrulax sannio</i>

English name	Scientific name
Spotted-breasted Scimitar Babbler	<i>Pomatorhinus erythrocnemis</i>
Streak-breasted Scimitar Babbler	<i>Pomatorhinus ruficollis</i>
Pygmy Wren Babbler	<i>Proopyga pusilla</i>
Long-tailed Wren Babbler	<i>Spelaornis chocolatinus</i>
Rufous-capped Babbler	<i>Stachyris ruficeps</i>
Chinese Babax	<i>Babax lanceolatus</i>
Red-billed Leiothrix	<i>Leiothrix lutea</i>
White-browed Shrike Babbler	<i>Pteruthius flaviscapis</i>
Blue-winged Minla	<i>Minla cyanouroptera</i>
Red-tailed Minla	<i>Minla ignotincta</i>
Golden-breasted Fulvetta	<i>Alcippe chrysotis</i>
Rufous-winged Fulvetta	<i>Alcippe castaneiceps</i>
Grey-cheeked Fulvetta	<i>Alcippe morrisonia</i>
Rusty-capped Fulvetta	<i>Alcippe dubia</i>
Striated Yuhina	<i>Yuhina castaniceps</i>
White-collared Yuhina	<i>Yuhina diademata</i>
Black-chinned Yuhina	<i>Yuhina nigrimenta</i>
White-bellied Yuhina	<i>Yuhina zantholeuca</i>
Black-headed Sibia	<i>Heterophasia melanoleuca</i>
Vinous-throated Parrotbill	<i>Paradoxornis webbiana</i>
Black-throated Tit	<i>Aegithalos concinnus</i>
Great Tit	<i>Parus major</i>
Yellow-cheeked Tit	<i>Parus spilonotus</i>
Mrs Gould's Sunbird	<i>Aethopyga gouldiae</i>
Plain Flowerpecker	<i>Dicaeum concolor</i>
Fire-breasted Flowerpecker	<i>Dicaeum ignipectus</i>
Oriental White-eye	<i>Zosterops palpebrosus</i>
Japanese White-eye	<i>Zosterops japonicus</i>
Long-tailed Shrike	<i>Lanius schach</i>
Ashy Drongo	<i>Dicrurus leucophaeus</i>
Spangled Drongo	<i>Dicrurus hottentottus</i>
Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>
Grey Treepie	<i>Dendrocitta formosae</i>
Carrion Crow	<i>Corvus corone</i>
Large-billed Crow	<i>Corvus macrorhynchos</i>
Russet Sparrow	<i>Passer rutilans</i>
Godlewski's Bunting	<i>Emberiza godlewskii</i>

- A number of the species recorded are of particular conservation importance:
 - Brown-chested Jungle Flycatcher is globally Vulnerable.
 - Jerdon's Baza *Aviceda jerdoni*, Oriental Honey Buzzard *Pernis ptilorhynchus*, Crested Serpent Eagle *Spilornis cheela*, Crested Goshawk *Accipiter trivirgatus*, Grey-faced Buzzard *Butastur indicus*, Common Kestrel *Falco tinnunculus*, Oriental Hobby *Falco severus*, Silver Pheasant *Lophura nycthemera*, Greater Coucal *Centropus sinensis*, Collared Scops Owl *Otus bakkamoena*, Oriental Scops Owl *Otus sunia*, Collared Owlet *Glaucidium brodiei* and Long-tailed Broadbill *Psarisomus dalhousiae* are Class II Protected species of China.
- The presence of many forest-dependent species including babblers, flycatchers, barbets and woodpeckers indicated that there are still forests at Cenwanglaoshan with high integrity.

Reptiles and Amphibians

- Twenty species of amphibian, three species of lizard and eight species of snake were recorded (Table 5). One lizard (*Scincella* sp.) is new to China or new to science, while four species (*Megophrys omeimontis*, *Rana hejiangensis*, *Amphiesma venningi* and *Amphiesma bitaeniatum*) are recorded from Guangxi for the first time.
- Some species could not be firmly identified:
 - Eggs probably belonging to *Theلودerma asperum* were found in tree holes.

- A *Scincella* skink found is different from all the known Chinese species and its identity is being studied.
- An unidentified frog in the genus *Leptolalax* resembles *L. alpinus*, but its identity has not yet been confirmed.
- In addition to these, specimens collected by MYM prior to this survey included *Acanthosaura lepidogaster*, *Pareas macularius*, *Sinonatrix percarinata* and *Azemiops feae*.
- The most commonly encountered species included the frogs *Leptolalax* (cf. *alpinus*) sp. and *Vibrissaphora liui*, and the snake *Amphiesma bitaeniatum* and the paddy frog *Rana limnocharis*.

Table 5. Amphibians and reptiles of Cenwangaoshan Nature Reserve. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat	Records
AMPHIBIA		
<i>Andrias davidianus</i>	forest stream	✓
<i>Leptolalax</i> (cf. <i>alpinus</i>) sp.	forest stream	✓, tadpoles
<i>Megophrys minor</i>	forest stream	✓, tadpoles
<i>Megophrys omeimontis</i>	forest	✓
	stream	✓, tadpoles
<i>Vibrissaphora liui</i>	forest stream	tadpoles
<i>Bufo andrewsi</i>	forest	✓
	montane shrubland	✓
<i>Bufo melanostictus</i>	pool	tadpoles
	agricultural field	✓
<i>Amolops ricketti</i>	forest stream	
	stream	
<i>Paa boulengeri</i>	forest stream	✓, tadpoles
<i>Paa exilispinosa</i>	stream	✓, tadpoles
<i>Rana heijiangensis</i>	forest stream	✓, tadpoles
<i>Rana limnocharis</i>	grassland	
	roadside ditch	✓, tadpoles
	agriculture field	✓, eggs
	pond	✓
	paddy field	✓, tadpoles
<i>Rana versabilis</i>	forest stream	✓
<i>Philautus odontotarsus</i>	roadside ditch	✓
	forest pool	✓, tadpoles
<i>Polypedates dennysi</i>	stream pool	tadpoles
<i>Polypedates megacephalus</i>	pond	✓
	paddy field	✓
<i>Theلودerma asperum?</i>	forest	eggs
<i>Microhyla heymonsi</i>	shrubland	✓
<i>Microhyla ornata</i>	stream bank	✓
<i>Microhyla pulchra</i>	pond	tadpoles
REPTILIA		
<i>Platyplacopus kuehnei</i>	forest edge	✓
<i>Scincella</i> sp.	forest	✓, eggs
	forest edge	
<i>Sphenomorphus indicus</i>	forest edge	✓
	village	✓
<i>Achalinus rufescens</i>	forest	✓
<i>Amphiesma bitaeniatum</i>	forest stream	✓
	forest	✓
	plantation edge	✓
	grassland	✓
<i>Amphiesma stolatum</i>	paddy field	✓
<i>Amphiesma venningi</i>	stream	✓
<i>Cyclophiops major</i>	forest	✓
<i>Elaphe porphyracea</i>	montane forest	✓
<i>Elaphe taeniura</i>	karst forest	✓
<i>Sibynophis chinensis</i>	forest edge	✓

- Some species recorded are of particular conservation importance:
 - *Andrias davidianus* is a Class II Protected species in China. Two young individuals caught by villagers were confiscated by the reserve staff and subsequently released back to the stream in May 2002.
 - The *Scincella* skink is different from all the known Chinese species and its identity is being studied.
 - *Megophrys omeimontis* is known only from Cenwanglaoshan and a small number of sites in Sichuan.
 - *Rana hejiangensis* is known only from Cenwanglaoshan and a small number of sites in Sichuan.
 - *Amphiesma venningi* is known only from Cenwanglaoshan, northern Burma and southern Yunnan.
 - *Amphiesma bitaeniatum* was known previously only from Yunnan in China, but has also recently been found in Nanling, north Guangdong (Kadoorie Farm and Botanic Garden, in prep.).
- The presence of many forest species and forest stream specialists, such as *Andrias davidianus*, *Megophrys minor*, *Vibrissaphora liui*, *Paa boulengeri*, *Rana hejiangensis*, *Theلودerma asperum* and *Elaphe porphyracea* indicated that some of the forests and the streams are still ecologically intact.

Fish

- Five freshwater fish species were recorded from Cenwanlaoshan Nature Reserve; an additional 12 species were purchased from fishers in the nearby Tianlin County Town (Table 6). Two species collected do not fit descriptions of any known Chinese species; one in the genus *Discogobio* and is similar to *D. yunnanensis*, and the other is a stream goby in the genus *Rhinogobius*. These are new Guangxi records and may prove to be of conservation/scientific interest.
- The most frequently recorded species were *Discogobio* (cf. *yunnanensis*) sp. and *Schistura fasciolata*.

Table 6. Freshwater fish recorded from Cenwanglaoshan area, 1999 and 2002 (“*” = nomenclature follows Pan, 1991). Sequence of families follows Nelson (1994).

Species
<i>Zacco platypus</i>
<i>Opsariichthys bidens</i>
<i>Discogobio</i> (cf. <i>yunnanensis</i>) sp.
<i>Hemibarbus umbrifer</i>
<i>Pseudorasbora parva</i>
<i>Microphysogobio elongata</i>
<i>Misgurnus anguillicaudatus</i>
<i>Schistura fasciolata</i>
<i>Schistura incerta</i>
<i>Vanmanenia lineata</i>
<i>Silurus asotus</i>
<i>Glyptothorax fukiensis fukiensis</i>
<i>Pareuchiloglanis longicauda</i>
<i>Clarias fuscus</i>
<i>Gambusia affinis</i> *
<i>Rhinogobius duospilus</i>
<i>Rhinogobius</i> sp.

- Some species are of particular conservation importance:
 - *Discogobio* (cf. *yunnanensis*) sp. and *Rhinogobius* sp. have an unknown global range, but

are suspected to be restricted.

– *Hemibarbus umbrifer*, *Microphysogobio elongata*, *Vanmanenia lineata* and *Pareuchiloglanis longicauda* are restricted globally to the Zhujiang (Pearl River) drainage; *V. lineata* appears to be a Guangxi-endemic species.

- The streams at Cenwangaoshan appeared to support rather few fish species, probably due to the altitudinal range and topography of the reserve; the fish fauna became much richer as the streams merged into the river at Lizhou Valley near the County Town. Due to its geographic location, however, some species present are of interest to the zoogeography of the South China region.

Ants

- Fifty species were recorded (Table 7). Many could not be firmly identified.
- A high proportion of species (*Ponera* sp. 8, *Lasius* sp. 5, *Prenolepis* sp. 11, *Vombisidris* sp. 1, *Aphaenogaster* sp. 9, *Pheidole* sp. 46) have not been recorded previously in KFBG surveys.
- Most frequently encountered included *Myrmica* sp. 1, *Pheidole fervida*, *Paratrechina* sp. 9, *Prenolepis* sp. 9 and *Paratrechina* sp. 36.

Table 7. Ant species recorded in and around Cenwangaoshan Nature Reserve, July-August 1999.

* Species with a strong forest association.

Species	Habitat
<i>Aphaenogaster</i> (cf. <i>beccarii</i>) sp. 1 *	broadleaf forest
<i>Aphaenogaster</i> (cf. <i>hunanensis</i>) sp. 3 *	broadleaf forest
<i>Aphaenogaster smythiesi</i>	fern and herbland
<i>Aphaenogaster</i> sp. 9	town (single encounter)
<i>Camponotus</i> (cf. <i>aethiops vitiosus</i>) sp. 21	broadleaf forest
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11	broadleaf forest
<i>Crematogaster</i> (cf. <i>biroi</i>) sp. 4	broadleaf/bamboo
<i>Camponotus</i> sp. 28-group	broadleaf forest
<i>Cryptopone</i> sp. 1 *	broadleaf forest
<i>Cryptopone</i> sp. 3	broadleaf forest
<i>Dolichoderus</i> (cf. <i>flatidorsus</i>) sp. 6	broadleaf forest
<i>Dolichoderus</i> sp. 8 *	broadleaf forest
<i>Formica</i> sp. 1	open vegetation
<i>Hypoponera</i> sp. 3 *	broadleaf forest
<i>Lasius</i> sp. 1 *	forest, shrubland, grassland
<i>Lasius</i> sp. 5	dense fern and herbland
<i>Leptogenys</i> (cf. <i>chinensis</i>) sp. 18 *	broadleaf forest
<i>Leptogenys kitteli</i> *	forest, shrubland, grassland
<i>Leptogenys</i> sp. 22 *	broadleaf forest
<i>Myrmica</i> sp. 1 *	forest, open vegetation
<i>Myrmica</i> sp. 2 *	vegetation
<i>Odontomachus monticola</i> *	broadleaf forest
<i>Pachycondyla</i> (<i>javana</i> group) sp. 1 *	broadleaf forest
<i>Pachycondyla</i> (cf. <i>luteipes</i>) sp. 2 *	broadleaf forest
<i>Pachycondyla</i> (cf. <i>sauteri</i>) sp. 7	broadleaf forest
<i>Paratrechina</i> (cf. <i>bourbonica</i>) sp. 4	shrubland
<i>Paratrechina</i> (nr. <i>indica</i>) sp. 9 *	forest, herbaceous vegetation
<i>Paratrechina</i> (cf. <i>opaca</i>) sp. 26 *	herbaceous/road
<i>Paratrechina</i> sp. 36 *	forest, shrubland, grassland
<i>Pheidole fervida</i> *	tall broadleaf forest
<i>Pheidole</i> (cf. <i>megacephala</i>) sp. 26	broadleaf forest
<i>Pheidole</i> (nr. <i>noda</i>) sp. 1-C	herbaceous vegetation
<i>Pheidole smythiesi</i>	forest, shrubland
<i>Pheidole</i> sp. 11	forest, herbaceous vegetation
<i>Pheidole</i> sp. 13 *	shrubland
<i>Pheidole</i> sp. 29	forest, open vegetation
<i>Pheidole</i> sp. 46	broadleaf forest
<i>Polyrhachis dives</i>	herbaceous/road
<i>Ponera</i> sp. 8	broadleaf+bamboo
<i>Prenolepis</i> (cf. <i>emmae</i>) sp. 1 *	forest, shrubland

Species	Habitat
<i>Prenolepis</i> sp. 8 *	broadleaf forest
<i>Prenolepis</i> sp. 9 *	broadleaf forest
<i>Prenolepis</i> sp. 11	broadleaf/bamboo
<i>Technomyrmex</i> sp. 2 *	broadleaf forest
<i>Tetramorium</i> (<i>bicarinatum</i> group) sp.	broadleaf forest
<i>Tetramorium</i> (cf. <i>shensiense</i>) sp. 6 *	shrubland
<i>Tetramorium</i> sp. 25 *	broadleaf forest
<i>Vollenhovia</i> sp. 8	broadleaf forest
<i>Vollenhovia</i> sp. 9	broadleaf forest
<i>Vombisidris</i> sp. 1	broadleaf/stream

- *Aphaenogaster* sp. 9, *Lasius* sp. 5, *Pheidole* sp. 46, *Ponera* sp. 8, *Prenolepis* sp. 11 and *Vombisidris* sp. 1 are known only from Cenwanglaoshan.
- Excluding these unique species, 57% of species recorded are forest-associated. This is a rather high figure for the South China region, indicating high forest integrity in the areas surveyed. The proportion was extremely high (77%) at Linao Gou, indicating outstanding integrity, quite high (59%) at Houzidong, and moderate (50%) near the Cenwanglaoshan summit.

Dragonflies

- Twenty-three species of odonates were recorded during the two surveys (Table 8).
- Some species could not be firmly identified:
 - The *Rhipidolestes* species is new to science, and to be described as *R. laui* (K.D.P. Wilson, in litt., October 2002).
 - The unidentified *Calicnemia* species is new to science, and to be described as *C. haksik* (K.D.P. Wilson, in litt., October 2002).
 - The *Drepanosticta* sp. is new to science, and to be described as *D. magna* (K.D.P. Wilson, in litt., October 2002).
 - The *Leptogomphus* species is probably *L. perforatus*.
 - The identity of *Sinogomphus* sp. is still being studied.
- The record of *Sinocnemis yangbingi* is the first from Guangxi. It was recently described from Sichuan.
- The most frequently encountered species was *Bayadera brevicauda* (subspecies *continentalis*).

Table 8. Dragonflies recorded in and around Cenwanglaoshan Nature Reserve. Sequence of genera follows Schorr *et al.* (2001a, 2001b).

Species	Habitat
<i>Caliphaea consimilis</i>	stream
<i>Anisopleura qingyuanensis</i>	
<i>Bayadera brevicauda</i>	stream
<i>Bayadera melanopteryx</i>	stream
<i>Bayadera</i> (cf. <i>indica</i>) sp.	pool
<i>Ceriagrion auranticum</i>	marsh
<i>Ceriagrion fallax</i>	pool
<i>Megalestes distans</i>	forest
<i>Priscagrion pinheyi</i>	forest
<i>Rhipidolestes</i> (to be named <i>R. laui</i> K.D.P. Wilson, in litt.) sp.	stream
	ditch
<i>Calicnemia miles</i>	stream
<i>Calicnemia</i> (to be named <i>C. haksik</i> K.D.P. Wilson, in litt.) sp.	stream
	ditch
<i>Coelliccia cyanomelas</i>	stream
<i>Sinocnemis yangbingi</i>	stream
	riparian forest

Species	Habitat
<i>Drepanosticta</i> (to be named <i>D. magna</i> K.D.P. Wilson, in litt.) sp.	bamboo forest
<i>Polycanthagyna erythromelas</i>	pool
<i>Idionyx carinata</i>	waterfall
	forest
<i>Leptogomphus</i> (cf. <i>perforatus</i>) sp.	forest edge
<i>Sinogomphus</i> sp.	stream
<i>Davidius fruhstorferi</i>	stream
<i>Orthetrum pruinosum</i>	pond
	paddy field
<i>Orthetrum glaucum</i>	ditch
	pond
	paddy field
<i>Pantala flavescens</i>	agricultural field
	open area

- Some species recorded are of particular conservation importance:
 - *Calicnemia* sp., *Rhipidolestes* sp. and *Drepanosticta* sp. are all new species known only from Cenwanglaoshan.
 - *Sinocnemis yangbingi* is known only from Cenwanglaoshan and from Sichuan.
- The presence of several forest-dependent damselflies (*Megalestes distans*, *Rhipidolestes* sp. and *Sinocnemis yangbingi*) indicates Cenwanglaoshan still has some high-integrity forest.

Butterflies

- Seventy-four butterfly species were encountered during the two surveys (Table 9). *Cordelia* sp. is new to science. Several species (*Tagiades* sp., *Troides* sp., *Lethe* sp., *Polyura* sp. and *Ypthima* sp.) could not be firmly identified.
- Several distribution records are noteworthy:
 - The record of *Pararge (Orinoma) damaris* is probably the first confirmed one from China.
 - Several records (*Sasakia charonda*, *Lethe violaceopicta*, *Mandarina regalis*, *Neptis soma*, *Dodona adonira*) are apparently new records for Guangxi.
 - *Araschnia prorsoides* and *Mycalesis misenus* have not previously been encountered on KFBG surveys.
- The most frequently encountered species included *Argynnis childreni* and *Parantica sita*.

Table 9. Butterflies at Cenwanglaoshan, 31 July to 3 August 1999. Sequence of families follows Bascombe (1995).

Species	Habitat
<i>Ampittia virgata</i>	shrubland
<i>Choaspes benjaminii</i>	forest
<i>Notocrypta curvifascia</i>	forest
<i>Ochlodes crataeis</i>	forest/stream
<i>Suastus gremius</i>	forest/stream
<i>Tagiades</i> sp.	forest
<i>Atrophaneura aidonea</i>	forest
<i>Graphium (Paranticopsis) macareus</i>	forest/stream
<i>Graphium (Pazala) mandarina</i>	village
<i>Graphium cloanthus</i>	forest
<i>Meandrusa payeni</i>	forest/ stream
<i>Pachliopta aristolochiae</i>	forest/ stream
<i>Papilio (Chilasa) agestor</i>	forest
<i>Papilio bianor</i>	forest/stream
	village
<i>Papilio helenus</i>	forest,
	farmland,
	shrubland

Species	Habitat
<i>Papilio memnon</i>	forest river forest village
<i>Papilio polytes</i>	village
<i>Papilio protenor</i>	forest
<i>Troides</i> sp.	forest river
<i>Dercas nina</i>	forest ditch field marsh
<i>Eurema laeta</i>	field
<i>Hebomoia glaucippe</i>	agricultural field
<i>Pieris (Artogeia) canidia</i>	agric./shrub grassland field
<i>Pieris melete</i>	field
<i>Pieris (Talbotia) naganum</i>	forest
<i>Prioneris thestylis</i>	shrub forest river
<i>Acytolepis puspa</i>	forest stream shrub
<i>Cordelia</i> sp.	forest
<i>Dodona adonira</i>	stream
<i>Heliophorus ila</i>	shrub village
<i>Jamides bochus</i>	forest shrub
<i>Rapala manea</i>	forest
<i>Spindasis syama</i>	shrubland
<i>Stiboges nymphidia</i>	forest/stream riparian
<i>Taraka hamada</i>	forest
<i>Udara albocaerulea</i>	stream
<i>Zizeeria karsandra</i>	village
<i>Zizeeria maha</i>	agric.
<i>Acraea issoria</i>	forest edge village
<i>Aemona amathusia</i>	forest
<i>Araschnia prorsoides</i>	shrub
<i>Argyreus hyperbius</i>	shrub village
<i>Argynnis (Childrena) childreni</i>	grass/shrub village plantation forest
<i>Ariadne ariadne</i>	forest edge village
<i>Cyrestis thyodamas</i>	forest/stream forest edge village
<i>Danaus genutia</i>	agric. shrub
<i>Euthalia monina</i>	forest/stream
<i>Lethe confusa</i>	forest edge
<i>Lethe europa</i>	forest edge
<i>Lethe syrcis</i>	village bamboo forest
<i>Lethe verma</i>	forest
<i>Lethe violaceopicta</i>	stream
<i>Libythea celtis</i>	village forest edge
<i>Mandarinia regalis</i>	riparian forest
<i>Mycalesis francisca</i>	forest edge fir plantation
<i>Mycalesis misenus</i>	forest forest

Species	Habitat
<i>Lethe (Neope) sp.</i>	shrub
<i>Neptis hylas</i>	forest/stream
<i>Neptis soma</i>	forest edge
<i>Parantica melanea</i>	grass/shrub
<i>Parantica sita</i>	forest
	forest edge
	village
<i>Pararge (Orinoma) damaris</i>	forest edge
<i>Penthema adelma</i>	forest
	stream
<i>Polyura athamas</i>	forest
<i>Polyura sp.</i>	forest edge
<i>Precis (Junonia) iphita</i>	abandoned field
<i>Precis (Junonia) orithya</i>	agricultural field
<i>Sasakia charonda</i>	plantation
<i>Tirumala septentrionalis</i>	forest edge
<i>Vanessa cardui</i>	shrub
<i>Vanessa indica</i>	village
<i>Ypthima baldus</i>	agric./shrub
<i>Ypthima chinensis</i>	forest edge
<i>Ypthima sp.</i>	forest

- All daily totals were low in August 1999. These low numbers may be associated with the mid-late summer decline in insect activity.
- Some species are of potential conservation importance:
 - *Cordelia sp.* is known only from Cenwanglaoshan.
 - *Pararge (Orinoma) damaris* is known only from Cenwanglaoshan within China.
 - *Araschnia prorsoides* and *Mycalesis misenus* have not been encountered elsewhere in South China during KFBG surveys.
- Several forest-associated species such as *Meandrusa payeni*, *Lethe verma* and *Stiboges nymphidia* are present.

Molluscs

- Thirty species of molluscs were found at Cenwanglaoshan Nature Reserve and the surrounding area (Table 10). Of these, three species belonging to the genera *Platyrhaphe*, *Ptychopoma* and *Kaliella* could not be positively identified due to inadequate adult specimens.
- The most abundant species included the slug *Macrochlamys angigyra* and the snail *Opeas gracilis*.
- Several new provincial records were made: *Platyrhaphe hunana*, *Chalepotaxis infantilis*, *Girasia hainanensis*, *Opeas gracilis*, *Tortaxis mandarinus* and *Euphaedusa aculus papillacea*.

Table 10. Molluscs of Cenwanglaoshan.

Species	Habitat
<i>Bradybaena similaris similaris</i>	village
<i>Camaena cicatricosa</i>	forest
	roadside
<i>Camaena subgibbera</i>	forest
<i>Camaena vulpis</i>	roadside
<i>Chalepotaxis infantilis</i>	grassland/shrubland
<i>Chamalycaeus plicilabris</i>	forest
<i>Cryptozona menglunensis</i>	forest
<i>Cyclophorus cycloteum</i>	forest
<i>Cyclophorus punctatus</i>	roadside
<i>Diplommatina paxillus</i>	forest

Species	Habitat
<i>Euphaedusa aculus papillacea</i>	forest
<i>Girasia hainanensis</i>	forest
<i>Kaliella pyramidata</i>	forest
	roadside
<i>Kaliella sp.</i>	forest
<i>Macrochlamys angigyra</i>	roadside
	grassland/shrubland
	forest
<i>Macrochlamys discus</i>	forest
<i>Macrochlamys fargesianus</i>	village
	forest
<i>Macrochlamys rejecta</i>	roadside
<i>Macrochlamys spiriplana</i>	limestone hill
	forest
<i>Mirus hartmanni</i>	forest
<i>Opeas gracilis</i>	roadside
	grassland/shrubland
<i>Phaedusa pallidocincta</i>	forest
<i>Platyrrhapha hunana</i>	forest
<i>Platyrrhapha sp.</i>	limestone hill
<i>Plectopylis diptychia</i>	forest
<i>Pseudaspasita platytrochus</i>	forest
<i>Ptychopoma sp.</i>	forest
	limestone hill
<i>Scabrina laciniata</i>	limestone hill
	forest
<i>Tortaxis mandarinus</i>	forest
<i>Xestina filicostata</i>	forest

- Many forest species were present at Cenwangaoshan, including several indicators of high-integrity forests such as *Chamalycaeus plicilabris*, *Cryptozona menglunensis*, *Kaliella pyramidata* and *Macrochlamys spiriplana*.

Summary of flora and fauna

- While the original forest had been cleared, extensive cover of mature secondary forest over 30 m tall could still be found in Cenwangaoshan Nature Reserve. Vegetation in the vicinity of main roads and villages had been degraded to grassland and shrubland, or plantations of tree crops and timber.
- The present surveys recorded 573 vascular plant species in 11 days of survey, suggesting the region has a moderately rich flora. Among this recorded flora were the nationally endangered orchids *Bletilla formosana* and *Cymbidium qiubeiense*, 12 nationally Protected or globally Threatened species and a number of others which are globally restricted. Ten new Guangxi records were made in the present surveys, suggesting the flora is rather distinctive in relation to similar habitats in other parts of Guangxi.
- Evidence showed the mammal fauna was still diverse and relatively abundant. There were reports of many nationally Protected species, and species which are globally or regionally threatened with extinction. Small forest mammals, such as large squirrels and small carnivores, were still in evidence.
- There was a diverse bird fauna, with 123 species recorded during the two surveys, including many that are dependent on high-integrity natural forest, and many which are nationally Protected. One species recorded, Brown-chested Jungle Flycatcher, is globally Vulnerable.
- Over 30 reptiles and amphibians were recorded, including several species with restricted global ranges (*Scincella sp.*, *Megophrys omeimontis*, *Amphiesma venningi*, *Amphiesma bitaeniatum*). Many forest species and forest stream specialists, such as *Andrias davidianus*,

Megophrys minor, *Vibrissaphora liui*, *Paa boulengeri*, *Rana hejiangensis*, *Theلودerma asperum* and *Elaphe porphyracea*, were present.

- Of 17 fish species recorded, two (*Discogobio* (cf. *yunnanensis*) sp. and *Rhinogobius* sp.) are potentially new to science and thought to have a restricted global range. Four other species (*Hemibarbus umbrifer*, *Microphysogobio elongata*, *Vanmanenia lineata* and *Pareuchiloglanis longicauda*) are restricted to the Zhujiang catchment. The fish fauna was richer at Lizhou Valley.
- Of 50 ant species recorded, six (*Aphaenogaster* sp. 9, *Lasius* sp. 5, *Pheidole* sp. 46, *Ponera* sp. 8, *Prenolepis* sp. 11 and *Vombisidris* sp. 1) are currently known only from Cenwanglaoshan. The proportion of forest-associated species was high, especially at Linao Gou, indicating high forest integrity.
- Twenty-three dragonfly species were recorded, including three species (*Calicnemia* sp., *Rhipidolestes* sp. and *Drepanosticta* sp.) currently known only from Cenwanglaoshan, and one other globally restricted species. Several species were specialists of good natural forest.
- Of 74 butterfly species recorded, one (*Cordelia* sp.) is new to science and some others (e.g. *Araschnia prorsoides* and *Mycalesis misenus*) have not previously been encountered on KFBG surveys. Several forest-associated species were present.
- The gastropod fauna was very diverse, with 30 species recorded, including several specialists of good natural forest.
- Cenwanglaoshan was expected to be of local biodiversity importance by MacKinnon *et al.* (1996), based on its “small but intensive” forest, covering about 37% of the reserve. In view of the high diversity of forest biota revealed in these surveys, including that of groups (such as mammals and birds) adversely affected by forest loss and degradation elsewhere in the region, the reserve is here considered of national importance.

Threats and problems

- A considerable area of former forest had been degraded to grassland and shrubland as a result of logging, agriculture, grazing and establishment of timber plantation. Existing forest is also at risk. Clear evidence of large-scale selective logging for timber of *Castanopsis* spp. was seen in the Jiudong Ping forest. Fallen logs and tree stumps were also seen at Houzidong and Linao Gou during the 1999 visit; the rich populations of epiphytic *Cymbidium* orchids were threatened by this logging at Linao Gou. At Jiudong Ping, the survey team saw small-scale forest clearance done by villagers for planting of crops such as *Vernicia fordii* and *Manihot esculenta*. The remaining forests at Cenwanglaoshan are somewhat fragmented by logging and agricultural activities in the past. The vegetation on the lower slopes of Cenwanglaoshan are also affected by grazing and browsing from livestock which hinder natural reforestation.
- Although hunting by firearms appears to have been effectively banned, collection of wild animals remains a serious threat. A large gintrap was found near the summit of Cenwanglaoshan in 1999 and gintraps of various sizes were readily available in the market of Langping in 2002. Illegal collecting of Giant Salamander, stream frogs (mainly *Paa boulengeri*) and fishes seemed quite serious and poses a threat to the stream fauna; fish abundance was very low even deep inside remote forests. Electro-fishing was observed in the large stream draining mature forests by the Laoshan substation in 2002. In addition to being collected as food, residents and staff reported that the fish fauna of Cenwanglaoshan has been greatly depleted when poachers have hunted Giant Salamanders using destructive methods such as liming. The problem was recognised by the reserve staff; during the 2002 visit villagers hunting for Giant Salamander were apprehended and given a serious warning by the warden (Mr Guo).

- Collection of medicinal plants was a major problem in Cenwanglaoshan. In 2002 at Linao Gou the survey team saw many fallen logs of *Cinnamomum wilsonii* with their bark stripped. The bark of this species is often sold as medicine in markets (a villager was reportedly caught by the wardens a few days later for this illegal collection). Many bundles of wild *Dendrobium* orchids, collected for sale, were found in Langping Xiang on 3 August 1999. Over-collection and logging also threatens other orchids such as *Bletilla formosana*, *Cymbidium* spp. and *Anoectochilus elwesii*.
- Although Cenwanglaoshan was previously a provincial nature reserve, no comprehensive survey had been carried out earlier, and it had not been zoned into buffer zone, core area and experimental zone; the limestone area around Langping was excluded from the reserve.
- The forest farm at Cenwanglaoshan will run out of its timber resource in several years. The financial situation of the forest farm and the nature reserve will be quite dire in the near future.

Opportunities

- In 2002 the Guangxi Forestry Department was preparing a proposal to upgrade Cenwanglaoshan to be a national nature reserve. This reflects awareness among officials of the reserve's importance, and the need to finance conservation management. It is hoped that other organisations will give support to these efforts.
- The present survey found Cenwanglaoshan Nature Reserve still has extensive cover of mature forest, especially at Linao Gou, Houzidong, Cenwanglaoshan and Jiudong Ping. These good forests should be protected within one or more core areas, where human disturbance should be prohibited as far as possible. The remaining natural forests cannot currently sustain further clearfelling or large-scale selective logging. To stop illegal harvesting of game and medicinal plants, greater effort is needed in patrolling the forest; even small-scale collection of timber or firewood should be prohibited in the core area and strictly controlled in the future buffer zones or experimental zones.
- The limestone area around Langping, although rather degraded, has a distinctive flora, while several mammal species (e.g. Rhesus Monkey and Chinese Forest Musk Deer) are reportedly restricted to this group of limestone hills in the Cenwanglaoshan area. The nature reserve should include some of the better-forested limestone hills in the vicinity. Logging is now banned on all limestone hills in Langping Xiang (ZJD, pers. comm., 2002).
- Existing forests should be linked and allowed to expand in size through natural regeneration or reforestation using native species. Some degraded land could recover rapidly if human disturbance were reduced, and active afforestation may not be necessary as mature forest and the diverse seed dispersal agents (e.g. frugivorous mammals and birds) nearby would provide a seed source for regeneration. However in degraded limestone areas around Langping natural regeneration would be very slow, and afforestation using native species typical of the local community would facilitate vegetation recovery. The existing patches of young forest in the area should be carefully protected.
- Reserve officials expressed a desire to step up protection of Giant Salamander but had few resources. Capacity building for staff is needed, but in view of the difficulty of patrolling the mountains, the reserve needs to work with residents to ensure the motivation to poach is outweighed by other considerations. A valuable step would be to jointly manage the fishing activities with the local villagers. A no fishing/hunting zone could be established at Houzidong where Giant Salamander occurs, extending upstream to the waterfalls to ensure an adequate food source for the salamander. Fishing might be allowed further downstream but with certain regulations, such as no fishing during the breeding season, and release of all

undersized fish. In the medium to long term, the fish population should recover and the catches would increase.

- Means of sustainable income generation could be investigated, including sustainable agriculture, forestry and perhaps eco-tourism. The reserve managers have begun to plant the logged plantation with *Betula lumifera*, a rather fast growing native species with high quality timber, to replace the existing *Cunninghamia lanceolata* (China Fir), which is losing its market value. Such activities should be sensitively planned to allow the recovery of natural ecosystems.
- In view of the many new records from the present surveys, further investigations are clearly needed to assess the habitats and species of conservation concern. The limestone vegetation around Langping contained some plants previously unknown in Guangxi, and more detailed study may reveal more interesting findings.

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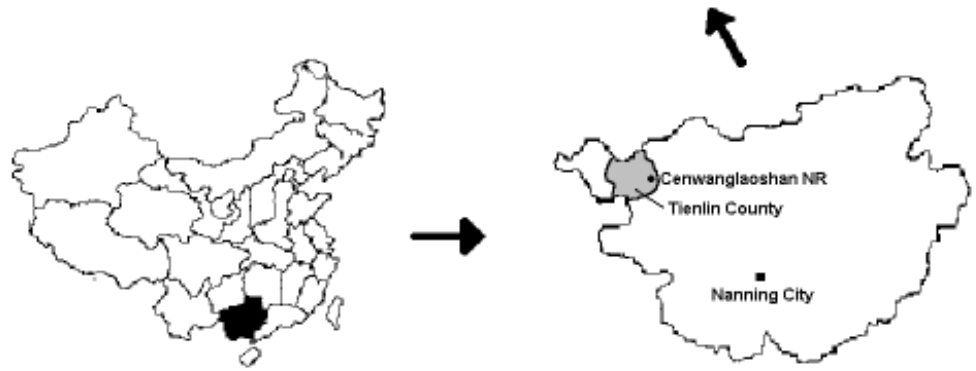
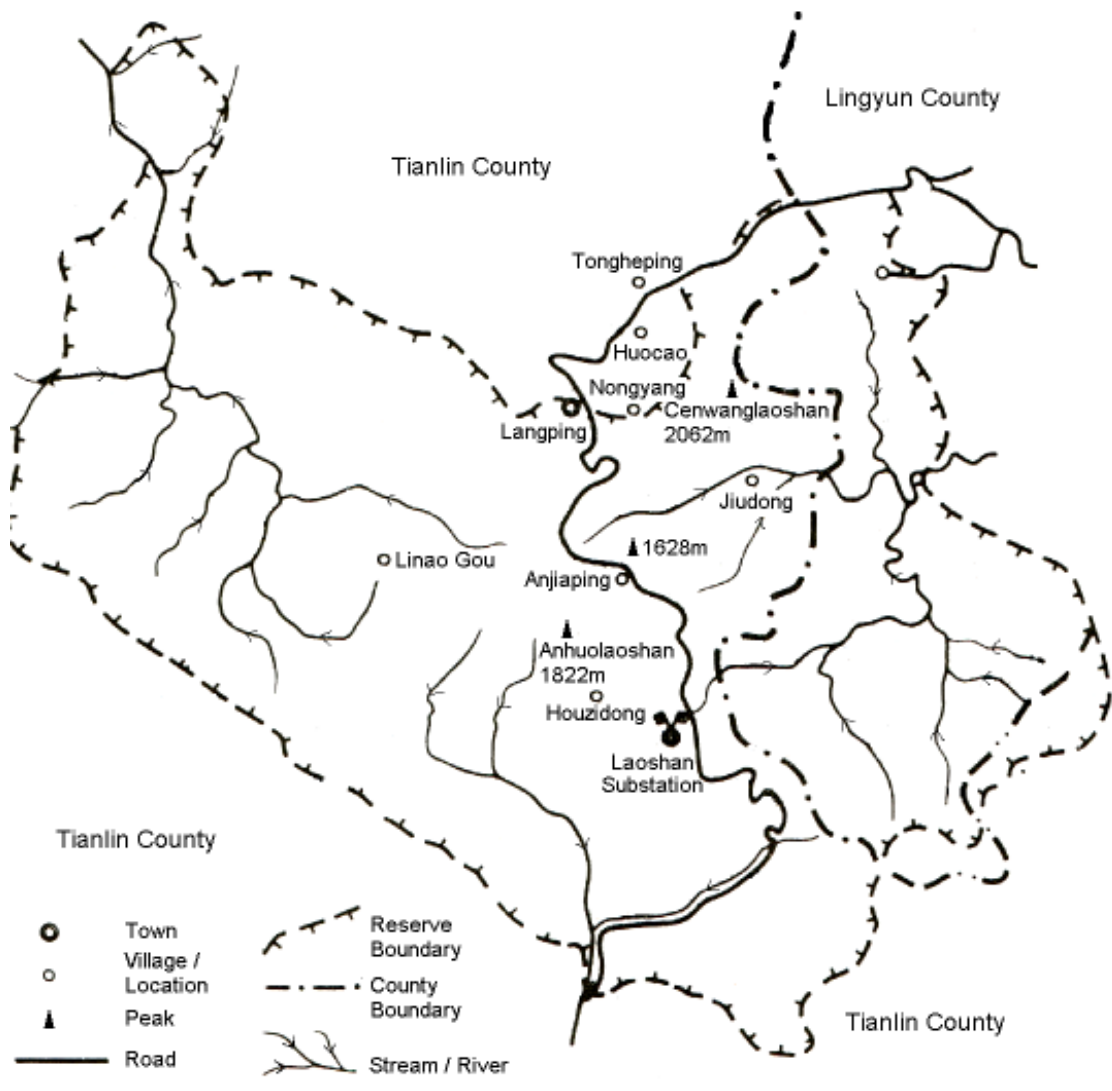


Figure 1. Map showing location of Cenwanglaoshan Nature Reserve, Northwest Guangxi, China.