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Kadoorie Farm and Botanic Garden
in collaboration with
Guangxi Forestry Department
Guangxi Institute of Botany
South China Normal University

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Report of Rapid Biodiversity Assessments at Shiwandashan National Nature Reserve and National Forest Park, Southwest Guangxi, China, 2000 and 2001

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Background

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

Citation

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Contents

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 Shiwandashan National Nature Reserve and National Forest Park, Southwest Guangxi, China, 2000 and 2001

Objectives

- The first trip was part of a species-specific survey for White-eared Night Heron *Gorsachius magnificus*, following past reports of the species at Shiwandashan (Zhou, 1996). The aims of the second survey were to collect up-to-date information on the fauna and flora of Shiwandashan National Nature Reserve and National Forest Park, and to use this to help determine conservation priorities within South China.

Methods

- On 31 March 2000 a team of biologists from KFBG (JRF, ML, LKS, Vicky Lam), France (HH), Guangxi (ZF, XZH, XGS) and Guangdong (Wang Ruijiang of South China Institute of Botany) visited Shiwandashan National Nature Reserve as part of a survey for White-eared Night Heron *Gorsachius magnificus* (Fellowes *et al*., 2001).
- On 24 September 2000 a team from KFBG (ML, BH, GS, LKS, NSC, Winky Huen), Beijing (JJM, LYD, LFL), Guangxi (XZH, WFN, TSC, ZSY), Guangdong (XZ) and Henan (LHJ) visited Shiwandashan Nature Reserve. They arrived at Shangsi County Town at 15.45 after a rapid survey in Damingshan National Nature Reserve (Kadoorie Farm and Botanic Garden, 2003).
- On 28 September the team departed Shiwandashan National Forest Park for Nanning.
- On 7 December 2001 a team from KFBG (LKS, NSC), and Beijing (JXH) visited Shiwandashan National Nature Reserve at the invitation of Guangxi Forestry Department. They arrived at Shangsi County Town at 19.00 and met XZH.
- On 15 December at 09.30 they departed Shiwandashan National Forest Park and at 12.15 they were back at Nanning.
- 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 Shiwandashan was inferred largely based on interviews with local people in 1997 (Fellowes & Hau, 1997), 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 and Hill (1992) and Zhang Y. *et al.* (1997). The result is supplemented by additional data of Guangxi Foresty Survey and Planning Institute and Shiwandashan Nature Reserve (2002).
- Vascular plant records were made by LGZ and NSC and edited by NSC, except for orchids, for which records were made by JXH and GS and edited by GS. Mammal records were made by LKS, ML, JRF or BH. Records of birds were made or verified by LKS, ZF, HH or ML, reptiles and amphibians by ML, fish by BC and CXL, ants by JRF or ZS, dragonflies by KW, ML or GTR and butterflies by ML or GTR.
- 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); Vogel & Turner (1992);
  - Mammals (Mammalia): D.E. Wilson & Cole (2000);
  - Birds (Aves): Inskipp *et al*. (1996);
  - Reptiles and Amphibians (Reptilia and Amphibia): Zhao E.-M. and Adler (1993); Zhao E. *et al.* (2000);

– Fish (Actinopterygii): Nelson (1994); Wu *et al.* (1999);
– Ants (Insecta: Hymenoptera: Formicidae): named species according to Bolton (1995); unnamed species with reference numbers according to the collection currently held by KFBG.
– Dragonflies (Insecta: Odonata): Schorr *et al.* (2001a, 2001b);
– Butterflies (Insecta: Lepidoptera): Bascombe (1995).

- Information on the global status of species is from IUCN publications, notably IUCN (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 and Yan (1993) for animals, and State Forestry Administration & Ministry of Agriculture (1999) for plants.

Location and management

- Shiwandashan National Nature Reserve is at the intersection of Shangsi, Fangcheng and Qinzhou Counties, southwest Guangxi, at 21°40'03"-22°04'18"N by 107°29'59"-108°13'11"E. The size of the nature reserve has been cited as 1,745 km^2 (MacKinnon *et al*., 1996; Zhang W., 1998) but a figure of 583 km^2 is given by Guangxi Forestry Survey and Planning Institute (2002).
- The reserve has a relatively gentle mountainous landscape, with 82 peaks over 1,000 m. Altitude in the reserve ranges from below 300 m to 1,462 m at the summit of Shuliangling (also known as Jigongling). The geology is dominated by sandy shale, shale, conglomerate and granite (Guangxi Foresty Survey and Planning Institute and Shiwandashan Nature Reserve Management Station, 2002).
- The area has a tropical monsoon climate. The mean annual temperature is around 21°C. Mean monthly temperature ranges from around 13°C in January to 28°C in July. Annual precipitation in the reserve reaches 2,700 mm (Guangxi Forestry Survey and Planning Institute, 2002). Streams on the northern slopes drain to the Ming Jiang, a tributary of the Xi Jiang in the Zhujiang drainage system; streams on the southern slopes flow directly into the Gulf of Tonkin, which is also known as Beibu Wan (Zhao and Zhang, 2001).
- Shiwandashan National Nature Reserve established a reserve station in Shangsi County with 10 staff; two forestry police stations with 13 forestry police; and seven management stations with 80 staff. The area is densely populated with 11 villages and over 220,000 residents, of whom three-quarters live in Fangcheng County (Guangxi Foresty Survey and Planning Institute & Shiwandashan Nature Reserve Management Station, 2002).
- Shiwandashan was designated a provincial nature reserve in 1982 to protect its water catchment forest (MacKinnon *et al.*, 1996). It is classified as a Forest Ecosystem nature reserve (Zhang W., 1998). The nature reserve was upgraded to National-level in 2002 (Su Y., Guangxi Forestry Department, pers. comm., March 2003).

Results

Vegetation

- The zonal vegetation of the Shiwandashan region should be northern tropical monsoon rainforest. Major vegetation types in the region included monsoon rainforest, ravine rainforest, montane evergreen forest, montane drawf forest, young secondary pine forest, and shrubland and grassland. Plantations of *Illicium verum* (Star Anise), *Pinus* spp., and *Cunninghamia lanceolata* (China fir) are also important landscape features of Shiwandashan (Forestry Department of Guangxi Zhuang Autonomous Region, 1993; Guangxi Foresty Survey and Planning Institute & Shiwandashan Nature Reserve, 2002).
- The present surveys visited only a limited area of the whole reserve. The vegetation of the surveyed area are mainly fragmented secondary forest in a matrix of degraded hillside shrubland, grassland, plantation and lowland agricultural land. The present surveys found extensive but fragmented cover of evergreen forest at Shiwandashan National Forest Park, Pinglongshan, Taiping and Sanliao Sidui.
- At Sanliao Sidui, the survey team visited secondary forest up to 15-25 m tall, and with trees up to 40 cm dbh. Such forest are very diverse and co-dominated largely by *Castanopsis* spp., *Lithocarpus* spp.,

Engelhardtia roxburghiana, *Eberhardtia aurata*, *Madhuca pasquieri*, *Pygeum topengii*, *Sarcosperma laurinum*, *Helicia longipetiolata*, *Elaeocarpus* spp. and *Artocarpus styracifolius*.

- At Taiping, lowland areas are mainly young secondary or remnant forests about 10-30 m tall, with trees less than 50 cm dbh, and dominated largely by *Castanopsis* spp., *Engelhardtia roxburghiana*, *Schima bambusifolia*, *Liquidambar formosana*, *Garcinia multiflora*, *Cylindrokelupha kerrii* and *Cryptocarya chingii*. Montane forest up to 10-15 m tall, with trees less than 50 cm dbh, was found at higher altitude. The forest was dominated by *Exbucklandia tonkinensis*, *Castanopsis carlesii*, *Lithocarpus* spp., *Rhododendron haofui*, *Hartia villosa*, *Diplopanax stachyanthus* and *Dendropanax hainanensis*.
- At Shiwandashan National Forest Park, secondary forest about 15-20 m tall, with trees up to 40 cm dbh, was found. The lowland forest was largely dominated by *Engelhardtia roxburghiana*, *Cryptocarya concinna*, *Cylindrokelupha tonkinensis*, *Pithecellobium clypearia*, *Macaranga sampsoni* and *M. henryi*. At higher altitude, the hillside forest was dominated by *Engelhardtia roxburghiana*, *Castanopsis fissa*, *C. hystrix*, *Mytilaria laosensis*, *Acronychia pedunculata*, *Litsea lancilimba* and *Michelia foveolata*.
- At Pinglongshan, secondary tropical lowland forest up to 10-30 m tall and with trees up to 50 cm dbh was found. The forest is largely dominated by *Castanopsis carlesii*, *Schima superba*, *Lithocarpus fenestrata*, *Helicia longipetiolata*, *Eberhardtia aurata*, *Cinnamomum porrectum*, and *Meliosma rigida*, and *Hopea chinensis*. The understorey is dominated by *Urophyllum chinensis*, *Pinanga discolor* and *Caryota monostachys*.

Flora

- The present surveys recorded 517 vascular plant species, including 59 fern species in 29 families, six gymnosperms in four families, and 452 flowering plant species in 95 families (Tables 1and 2). This is a moderately high figure in altogether 9 days of fieldwork suggesting that the area had a diverse flora. The recorded flora is especially rich in tropical families and genera and hence is rather distinct from other forest vegetation in Guangxi.
- A number of new records of Guangxi were also found in the present surveys, including:
  - *Mecodium excertum*; a few colonies of this species were found at Shiwandashan National Forest Park.
  - *Euonymus mitratus* was locally common at Taiping and a few plants were also seen at Shiwandashan National Forest Park. It was previously recorded from South Yunnan, Vietnam and Cambodia.
  - *Vaccinium chunii* has only been recorded in Hainan, but a single plant was noticed.
  - *Carex tenuispicula* was previously known from Fujian and Guangdong. A small colony was found.
  - *Microgonium beccarianum* is a new record for China mainland and had only been recorded in Taiwan and some Pacific islands. A small colony was noticed but it is likely to have been overlooked elsewhere given its small size.
  - *Litosanthes biflora* is a new record for China mainland and had only been recorded in Hainan, Taiwan and the Philippines.
  - *Bulbophyllum* sp.1 may be new to science. Further morphological study is needed to confirm its identity.
  - *Eria rosea* has only been recorded in Hong Kong and Hainan.
  - *Eria thao* has only been recorded in Hainan and Vietnam.
  - *Dendrobim terminale* has only been recorded in southern Yunnan within China.
  - *Liparis cespitosa* has only been recorded in Yunnan and Taiwan within China.
- Among the plant species recorded, there are a number of species of conservation importance.
  - The orchids *Anoectochilus roxburghii*, *Cymbidium ensifolium* and *C. goeringii* are endangered in China due to over-collection, for medicinal and ornamental purposes.
  - *Hopea chinensis* is considered Critically Endangered globally and is also under Class I National Protection. It is endemic to South Guangxi but it is also likely to occur in North Vietnam. Large populations with abundant fruiting trees and saplings were found in the present surveys. One single large tree was also seen.
  - *Madhuca pasquieri* is Vulnerable globally and is under Class II National Protection. It is often the dominant species in northern subtropical lowland evergreen forest of South China. It was found to be locally abundant.

– *Diplopanax stachyanthus* is Vulnerable globally and is under Class II National Protection. A large population with more than 10 reproductive trees was found in evergreen forest at high altitude.
– *Ixonanthes chinensis* is considered Vulnerable globally although it is abundant in northern tropical evergreen forest of South China.
– *Semiliquidambar cathayensis* is under Class II National Protection and is considered to be Near-Threatened globally.
– *Gymnosphaera hancockii* and *G. podophylla* belong to the tree fern family, which is under Class II National Protection. Both species have a widespread distribution in South China but the latter is common in most forest whereas the former is rare and restricted to the well-protected forest. A small population of *G. hancockii* with about 8-10 plants was seen.
– *Brainea insignis* and *Cibotium barometz* are under Class II National Protection in China, although both species are widespread and abundant in relatively degraded landscape in South China.
– *Phlegmariurus shangsiensis* is endemic to South Guangxi. Only a few individuals were seen.
– *Fissistigma cupreonitens* is endemic to South Guangxi. It is locally abundant at two locations, and a few individuals were seen at two other locations.
– *Fissistigma shangtzeense* is endemic to South Guangxi. A few individuals were seen.
– *Castanopsis amabilis* is endemic to South Guangxi. It is found to be locally common and co-dominate in one of the lowland forests.
– *Ardisia filiformis* is endemic to South Guangxi. It is locally common in one of the hillside forests at high altitude.
– *Calamus austro-guangxiensis* is endemic to South Guangxi.
– *Itea chingiana* is endemic to Guangxi but previous records were restricted to North Guangxi. Only a few individuals were seen.
– *Lithocarpus attenuatus* is endemic to South Guangxi and South Guangdong. A few fruiting trees were seen in the 2000 survey.
– *Ardisia pubivenula* is endemic to South Guangxi and Hainan. It is locally common one location.
– *Olea tetragonoclada* is endemic to Guangxi.
– *Ormosia sericeolucida* is endemic to South Guangxi and Southwest Guangdong. It is fairly common in the areas surveyed as a whole and was seen at a few other locations.
– *Urophyllum chinense* is restricted to Southwest Guangdong, South Guangxi, Southeast Yunnan, and North Vietnam, and is only found in relatively well-preserved lowland forest. It is locally common at two locations.
– *Xanthophytum kwangtungense* is restricted to South Guangxi, South Yunnan and North Vietnam. It is locally common at one location.
– *Rhododendron emarginatum* is rare in China and had been recorded from South Guangxi, Guizhou, Southeast Yunnan and Vietnam. A small population was found.
– *Horsfieldia glabra* is rare in China and is restricted to forest in tropical region (South Yunnan, South Guangxi and South Guangdong). It is locally common at one location.
– The population of *Vanilla* sp. recorded in the 2000 survey is the largest wild population found in KFBG surveys.
– All orchid species recorded are listed in CITES Appendix II.

• Of the 55 orchid species recorded, 20 (36%) were terrestrial and 35 (64%) were epiphytic. The occurrence of tropical genera (e.g. *Vanilla*) and the high proportion of epiphytic orchids indicate Shiwandashan's forest has tropical characteristics.

Table 1. Vascular plants of Shiwandashan National Nature Reserve recorded in the present surveys (excluding Orchidaceae)t. 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	Sep 2000	Dec 2001	Remarks
Pteridophyta				
Adiantaceae	*Adiantum flabellulatum* L.		✓	
Aspidiaceae	*Hemigramma decurrens* (Hook.) Copel.		✓	
	Pleocnemia wintii Holtt.		✓	
	Tectaria phaeocaulis (Rosenst.) C. Chr.		✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
Aspleniaceae	*Asplenium neolaserpitiifolium* Tardieu & Ching		✓	
	Asplenium normale D. Don		✓	
	Asplenium prolongatum Hook.		✓	
	Neottopteris nidus (L.) J. Sm.		✓	
	Neottopteris phyllitidis (D. Don) J. Sm.		✓	
Athyriaceae	*Diplazium donianum* (Mett.) Tardieu		✓	
Blechnaceae	*Blechnum orientale* L.		✓	
	Brainea insignis (Hook.) J. Sm.		✓	Protected II
	Chieniopteris harlandii (Hook.) Ching		✓	
	Woodwardia japonica (L.f.) Sm.		✓	
	Woodwardia orientalis Sw.	✓	✓	
Bolbitidaceae	*Bolbitis heteroclita* (C. Presl) Ching		✓	
	Bolbitis subcordata (Copel.) Ching		✓	
Cyatheaceae	*Gymnosphaera hancockii* (Copel.) Ching		✓	Protected II
	Gymnosphaera podophylla (Hook.) Copel.	✓	✓	Protected II
Davalliaceae	*Humata repens* (L.f.) Diels		✓	
Dennstaedtiaceae	*Microlepia hookeriana* (Wall. ex Hook.) C. Presl.		✓	
Dicksoniaceae	*Cibotium barometz* (L.) J. Sm.		✓	Protected II
Dryopteridaceae	*Arachniodes sphaerosora* (Ching) Ching	✓	✓	
Elaphoglossaceae	*Elaphoglossum yoshinagae* (Yatabe) Makino		✓	
Gleicheniaceae	*Dicranopteris pedata* (Houtt.) Nakaike		✓	
	Diplopterygium chinensis (Rosenst.) DeVol		✓	
Grammitidaceae	*Grammitis dorsipila* (Christ) C. Chr. & Tardieu		✓	
	Prosaptia khasyana (Hook.) C. Chr. & Tardieu	✓	✓	
Huperziaceae	*Huperzia serrata* (Thunb.) Trevis.		✓	
	Phlegmariurus shangsiensis C. Y. Yang		✓	endemic to S. Guangxi
Hymenophyllaceae	*Mecodium badium* (Hook. & Grev.) Ching		✓	
	Mecodium excertum (Wall.) Copel.		✓	new record for Guangxi
	Mecodium microsorum (Bosch) Ching		✓	
	Mecodium osmundoides (Bosch) Ching		✓	
	Meringium denticulatum (Sw.) Copel.		✓	
	Microgonium beccarianum (Cesati) Copel		✓	new record for China mainland
Lindsaeaceae	*Lindsaea heterophylla* Dryand.		✓	
	Lindsaea orbiculata (Lam.) Mett. ex Kuhn		✓	
	Stenoloma chusanum (L.) Ching		✓	
Loxogrammaceae	*Loxogramme salicifolia* (Makino) Makino		✓	
Lycopodiaceae	*Lycopodiastrum casuarinoides* (Spring) Holub		✓	
	Palhinhaea cernua (L.) Franco & Vasc.		✓	
Lygodiaceae	*Lygodium japonicum* (Thunb.) Sw.	✓		
Marattiaceae	*Angiopteris* sp.		✓	
Nephrolepidiaceae	*Nephrolepis auriculata* (L.) Trimea		✓	
Osmundaceae	*Osmunda vachellii* Hook.	✓	✓	
Polypodiaceae	*Colysis ellipitica* (Thunb.) Ching var. *pothifolia* Ching		✓	
	Colysis wrightii (Hook.) Ching		✓	
	Lepidogrammits rostrata (Bedd.) Ching		✓	
	Lepidomicrosorum buergerianum (Miq.) Bosman		✓	
	Microsorium fortunei (T. Moore) Ching		✓	
	Pyrrosis lingua (Thunb.) Farw		✓	
Pteridaceae	*Histiolopteris incisa* (Thunb.) J. Sm.		✓	
	Pteris semipinnata L.		✓	
	Pteridium aquilinum (L.) Kuhn var. *latiusculum* (Desv.) Underw. ex A. Heller		✓	
Selaginellaceae	*Selaginella delicatula* (Desv. ex Poir.) Alston		✓	
Thelypteridaceae	*Pronephrium simplex* (Hook.) Holttum		✓	
Thelypteridaceae	*Pronephrium triphyllum* (Sw.) Hollttum		✓	
Vittariaceae	*Vittaria flexuosa* Fée		✓	
Gymnospermae				
Gnetaceae	*Gnetum luofuense* C. Y. Cheng		✓	
	Gnetum montanum Markgr.	✓		
	Gnetum parvifolium (Warb.) Chun		✓	
Pinaceae	*Pinus massoniana* Lamb.	✓	✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
Podocarpaceae	*Podocarpus neriifolius* D. Don	✓	✓	
Taxodiaceae	*Cunninghamia lanceolata* (Lamb.) Hook.		✓	cultivated
Angiospermae Dicotyledoneae				
Aceraceae	*Acer davidii* Franch.		✓	
Actinidiaceae	*Actinidia glaucophylla* F. Chun		✓	
	Actinidia latifolia (Gardner & Champ.) Merr.	✓	✓	
	Actinidia liangguangensis C.F. Liang	✓		
	Saurauia tristyla DC.	✓	✓	
Anacardiaceae	*Choerospondias axillaris* (Roxb.) B.L. Burtt & A.W. Hill		✓	
	Rhus chinensis Mill.	✓	✓	
	Toxicodendron succedaneum (L.) Kuntze.	✓	✓	
Annonaceae	*Artabotrys hongkongensis* Hance		✓	
	Desmos chinensis Lour.		✓	
	Fissistigma cupreonitens Merr. & Chun	✓	✓	endemic to S. Guangxi
	Fissistigma glaucescens (Hance) Merr.		✓	
	Fissistigma maclurei Merr.		✓	
	Fissistigma oldhamii (Hemsl.) Merr.		✓	
	Fissistigma shangtzeense Tsiang & P.T. Li	✓	✓	endemic to S. Guangxi
	Goniothalamus chinensis Merr.et Chun	✓		
	Uvaria boniana Finet & Gagnep.		✓	
	Uvaria microcarpa Champ. ex Benth.	✓	✓	
	Uvaria tonkinensis Finet & Gagnep.		✓	
Apocynaceae	*Chonemorpha eriostylis* Pit.		✓	
	Melodinus suaveolens Champ. ex Benth.		✓	
Aquifoliaceae	*Ilex ficoidea* Hemsl.		✓	
	Ilex hainanensis Merr.	✓		
	Ilex rotunda Thunb.	✓		
	Ilex viridis Champ. ex Benth.		✓	
Araliaceae	*Aralia armata* (Wall.) Seem.	✓	✓	
	Dendropanax hainanensis (Merr. & Chun) Merr. & Chun		✓	
	Dendropanax proteus Benth.		✓	
	Diplopanax stachyanthus Hand.-Mazz.		✓	Vulnerable, Protected II
	Heteropanax fragrans (D. Don) Seem.	✓	✓	
	Schefflera leucantha R. Vig.		✓	
	Schefflera octophylla (Lour.) Harms	✓	✓	
Asclepiadaceae	*Graphistemma pictum* (Champ. ex Benth.) Benth. & Hook. f. ex Maxim.		✓	
	Hoya fusca Wall.		✓	
	Streptocaulon juventas (Lour.) Merr.	✓	✓	
Asteraceae	*Ageratum houstonianum* Mill.		✓	exotics from S. America
	Ainsliaea trinervis Y.Q. Tseng	✓		
	Blumea riparia DC.		✓	
	Senecio scandens Buch.-Ham.		✓	
	Vernonia arborea Buch.-Ham.		✓	
	Vernonia cumingiana Benth.		✓	
	Vernonia solanifolia Benth.		✓	
Balanophoraceae	*Balanophora spicata* Hayata		✓	
Begoniaceae	*Begonia crassirostris* Irmsch.		✓	
	Begonia palmata D. Don		✓	
Burseraceae	*Canarium album* (Lour.) Raeusch.	✓	✓	
Caesalpiniaceae	*Caesalpinia crista* L.	✓	✓	
	Pterolobium punctatum Hemsl.	✓		
Campanulaceae	*Pentaphragma spicatum* Merr.	✓		
Caprifoliaceae	*Viburnum fordiae* Hance		✓	
	Viburnum odoratissimum Ker Gawl.		✓	
Celastraceae	*Celastrus monospermus* Roxb.	✓	✓	
	Euonymus hederaceus Champ. ex Benth.		✓	
	Euonymus mitratus Pierre		✓	new record for Guangxi

Family	Scientific name	Sep 2000	Dec 2001	Remarks
Chloranthaceae	*Sarcandra glabra* (Thunb.) Nakai		✓	
Clethraceae	*Clethra faberi* Hance		✓	
Clusiaceae	*Calophyllum membranaceum* Gardner & Champ.		✓	
	Cratoxylum cochinchinense (Lour.) Blume		✓	
	Cratoxylum formosum (Jack) Dyer	✓		
	Cratoxylum formosum (Jack) Dyer subsp. *pruniflorum* (Kurz) Gogelin	✓		
	Garcinia multiflora Champ. ex Benth.	✓	✓	
	Garcinia oblongifolia Champ. ex Benth.		✓	
Connaraceae	*Rourea microphylla* (Hook. & Arn.) Planch.		✓	
Convolvulaceae	*Merremia umbellata* (L.) Hallier. f.		✓	
Cornaceae	*Aucuba chinensis* Benth.		✓	
Cucurbitaceae	*Trichosanthes pedata* Merr. & Chun	✓		
Daphniphyllaceae	*Daphniphyllum calycinum* Benth	✓	✓	
	Daphniphyllum oldhami (Hemsl.) Rosenth.	✓	✓	
	Daphniphyllum sp.	✓	✓	
Dilleniaceae	*Dillenia turbinata* Finet & Gagnep.	✓	✓	
	Tetracera asiatica (Lour.) Hoog.	✓	✓	
Dipterocarpaceae	*Hopea chinensis* Hand.-Mazz.	✓	✓	endemic to S. Guangxi, Critically Endangered, Protected I
Ebenaceae	*Diospyros morrisiana* Hance ex. Walpers	✓	✓	
Elaeocarpaceae	*Elaeocarpus chinensis* (Gardner & Champ.) Hook. f. ex Benth.		✓	
	Elaeocarpus nitentifolius Merr. & Chun		✓	
	Elaeocarpus sylvestris (Lour.) Poir.	✓	✓	
	Elaeocarpus varunua Buch.-Ham.	✓		
	Sloanea sinensis (Hance) Hemsl.	✓		
Ericaceae	*Craibiodendron kwangtungense* S. Y. Hu		✓	
	Enkianthus quinqueflorus Lour.		✓	
	Gaultheria leucocarpa Blume var. *crenulata* (Kurz) T.Z. Hsu	✓		
	Lyonia ovalifolia (Wall.) Drude		✓	
	Rhododendron emarginatum Hemsl. & E.H. Wilson		✓	
	Rhododendron haofui Chun & W.P. Fang		✓	
	Rhododendron moulmainense Hook. f.		✓	
	Rhododendron simsii Planch.		✓	
	Vaccinium chunii Merr. ex Sleumer			new record of Guangxi
Erythroxylaceae	*Erythroxylum sinense Y. C. Wu*			
Escalloniaceae	*Itea chinensis* Hook. & Arn	✓	✓	
	Itea chingiana S.Y. Jin		✓	endemic to Guangxi
Euphorbiaceae	*Alchornea trewioide*s (Benth.) Muell.-Arg.		✓	
	Antidesma fordii Hemsl.	✓	✓	
	Antidesma japonicum Siebold & Zucc.	✓		
	Aporosa dioica (Roxb.) Müll. Arg.		✓	
	Bischofia javanica Blume		✓	
	Breynia fruticosa (L.) Hook. f.		✓	
	Bridelia insulana Hance (*B. balansae* Tutch.)		✓	
	Endospermum chinense Benth.	✓	✓	
	Glochidion eriocarpum Champ. ex Benth.		✓	
	Glochidion wrightii Benth.		✓	
	Macaranga adenantha Gagnep.	✓		
	Macaranga auriculata (Merr.) Airy Shaw		✓	
	Macaranga sampsoni Hance	✓	✓	
	Macaranga henryi (Pax & K. Hoffm.) Rehder	✓	✓	
	Macaranga kurzii (Kuntze) Pax & K. Hoffm.		✓	
	Mallotus hookerianus (Seem.) Müll. Arg.		✓	
	Mallotus oblongifolius (Miq.) Müll. Arg.		✓	
	Mallotus paniculatus (Lam.) Müll.-Arg.	✓	✓	
	Mallotus philippinensis (Lam.) Mull. Arg.		✓	
	Microdesmis caseariifolia Planch.		✓	
	Sapium discolor (Champ. ex Benth.) Müll.-Arg.	✓	✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
	Vernicia montana Lour.		✓	
Fagaceae	*Castanopsis amabilis* W.C. Cheng & C.S. Chao		✓	endemic to S. Guangxi
	Castanopsis carlesii (Hemsl.) Hayata	✓	✓	
	Castanopsis eyrei (Champ. ex Benth.) Tutcher		✓	
	Castanopsis fissa (Champ. ex Benth.) Rehder & E. H. Wilson	✓	✓	
	Castanopsis hystrix Miq.		✓	
	Castanopsis tibetana Hance		✓	
	Cyclobalanopsis delicatula (Chun & Tsiang) Y.C. Hsu & H.Wei Jen		✓	
	Cyclobalanopsis neglecta Schottky		✓	
	Cyclobalanopsis patelliformis (Chun) Y.C. Hsu & H.W. Jen	✓		
	Lithocarpus attenuatus (Skan) Rehder	✓		endemic to S. Guangxi & S. Guangdong
	Lithocarpus corneus (Lour.) Rehder	✓		
	Lithocarpus cyrtocarpus (Drake) A. Camus	✓	✓	
	Lithocarpus elizabethae (Tutcher) Rehder	✓	✓	
	Lithocarpus fenestratus (Roxb.) Rehder			
	Lithocarpus hancei (Benth.) Rehder	✓		
	Lithocarpus longipedicellatus (Hickel & A. Camus) A. Camus	✓		
	Lithocarpus uvariifolius (Hance) Rehder		✓	
Flacourtiaceae	*Bennettiodendron brevipes* Merr.	✓		
	Bennettiodendron leprosipes (Clos) Merr.		✓	
	Casearia balansae Gagnep.		✓	
Gentianaceae	*Canscora andrographioides* Griffith ex C.B. Clarke	✓	✓	
Gesnariaceae	*Aeschynanthus acuminatus* Wall. ex A. DC.		✓	
	Lysionotus pauciflorus Maxim.		✓	
	Rhynchotechum ellipticum (Wal. ex D. Dietr.) A. DC.	✓		
Haloragidaceae	*Haloragis micrantha* (Thunb.) R. Br.		✓	
Hamamelidaceae	*Altingia chinensis* (Champ. ex Benth.) Oliv. ex Hance	✓	✓	
	Corylopsis multiflora Hance		✓	
	Distylium myricoides Hemsl.	✓		
	Exbucklandia tonkinensis (Lecomte) Steenis	✓		
	Liquidambar formosana Hance		✓	
	Mytilaria laosensis Lecomte	✓	✓	
	Semiliquidambar cathayensis H. T. Chang		✓	Protected II, Lower risk (nt)
Hydrangeaceae	*Dichroa febrifuga* Lour.		✓	
	Pileostegia viburnoides Hook. f. & Thomson		✓	
Icacinaceae	*Gomphandra tetrandra* (Wall.) Sleum.	✓	✓	
	Mappianthes iodoides Hand.-Mazz.	✓	✓	
Illiciaceae	*Illicium verum* Hook. f.		✓	cultivated
Ixonanthaceae	*Ixonanthes chinensis* Champ.	✓	✓	Vulnerable
Juglandaceae	*Engelhardtia roxburghiana* Wall.	✓	✓	
Lauraceae	*Actinodaphne pilosa* (Lour.) Merr.	✓	✓	
	Beilschmiedia intermedia C.K. Allen	✓		
	Cinnamomum cassia (L.) Presl		✓	cultivated
	Cinnamomum porrectum (Roxb.) Kosterm.	✓	✓	
	Cinnamomum validinerve Hance		✓	
	Cryptocarya chingii W.C. Cheng		✓	
	Cryptocarya concinna Hance		✓	
	Cryptocarya densiflora Blume	✓		
	Lindera caudata (Nees) Hook. f.	✓	✓	
	Lindera kwangtungensis (H. Liu) C.K. Allen	✓		
	Lindera pulcherrima (Nees) Benth. var. *hemsleyana* (Diels) H.B. Cui	✓	✓	
	Litsea cubeba (Lour.) Pers.	✓	✓	
	Litsea elongata (Nees) Benth. & Hook. f.		✓	
	Litsea greenmaniana C.K. Allen	✓	✓	
	Litsea lancilimba Merr.	✓	✓	
	Litsea rotundifolia Hemsl. var. *oblongifolia* (Nees) C. K. Allen		✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
	Litsea variabilis Hemsl. fo. *chinensis* (C.K. Allen) Yen C. Yang & P.H. Huang	✓	✓	
	Litsea verticillata Hance		✓	
	Machilus decursinervis Chun		✓	
	Machilus salicina Hance	✓	✓	
	Machilus velutina Champ. ex Benth.	✓	✓	
	Machilus wangchiana Chun	✓	✓	
	Neolitsea chuii Merr.	✓		
	Neolitsea kwangsiensis H. Liu		✓	
	Neolitsea pulchella (Meissn) Merr	✓	✓	
Loganiaceae	*Gelsemium elegans* (Gardner & Champ.) Benth.		✓	
Loranthaceae	*Scurrula parasitica* L.		✓	
Magnoliaceae	*Magnolia championii* Benth.	✓		
	Magnolia paenetalauma Dandy	✓		
	Manglietia chingii Dandy	✓		
	Manglietia fordiana Oliv.	✓		
	Michelia foveolata Merr. ex Dandy	✓	✓	
	Michelia maudiae Dunn			
Malvaceae	*Urena lobata* L.	✓	✓	pantropical weed
Melastomataceae	*Barthea barthei* (Hance ex Benth.) Krasser		✓	
	Blastus cavaleriei H. Lév. & Vaniot	✓		
	Blastus cochinchinensis Lour.	✓	✓	
	Medinilla septentrionalis (W.W. Sm.) H.L. Li	✓		
	Melastoma candidum D. Don		✓	
	Melastoma dodecandrum Lour.		✓	
	Melastoma sanguineum Sims		✓	
	Memecylon ligustrifolium Champ. ex Benth.	✓	✓	
	Sonerila rivularis Cogn.	✓		
Meliaceae	*Dysoxylum hongkongense* (Tutcher) Merr.	✓		
	Trichilia connaroides (Wight & Arn.) Bentv. var. *microcarpa* (Pierre) Bentv.		✓	
	Trichilia sinensis Bentv.		✓	
Menispermaceae	*Albertisia laurifolia* Yamamoto	✓		
	Hypserpa nitida Miers		✓	
Mimosaceae	*Acacia pennata* (L.) Willd.		✓	
	Albizia corniculata (Lour.) Druce	✓	✓	
	Cylindrokelupha kerrii (Gagnep.) T.L. Wu	✓	✓	
	Cylindrokelupha tonkinensis (I.C. Nielsen) T.L. Wu		✓	
	Cylindrokelupha turgida (Merr.) T.L. Wu	✓		
	Entada phaseoloides (L.) Merr.	✓	✓	
	Pithecellobium clypearia (Jack) Benth.		✓	
	Pithecellobium lucidium Benth.		✓	
Moraceae	*Artocarpus styracifolius* Pierre		✓	
	Ficus abelii Miq.		✓	
	Ficus auriculata Lour.	✓		
	Ficus esquiroliana H. Lév.	✓	✓	
	Ficus fistulosa Reinw. ex Blume	✓	✓	
	Ficus hirta Vahl		✓	
	Ficus hispida L. f.	✓		
	Ficus pyriformis Hook. & Arn.		✓	
	Ficus superba (Miq.) Miq.		✓	
	Ficus variolosa Lindl. ex Benth.	✓	✓	
	Streblus indica (Bureau) Corner	✓	✓	
Myricaceae	*Myrica rubra* (Lour.) Sieb. & Zucc.		✓	
Myristicaceae	*Horsfieldia glabra* (Reinw. ex Blume) Warb.		✓	
Myrsinaceae	*Ardisia filiformis* E. Walker		✓	endemic to S. Guangxi
	Ardisia hanceana Mez	✓	✓	
	Ardisia mamillata Hance		✓	
	Ardisia pubivenula E. Walker	✓		endemic to S. Guangxi & Hainan
	Ardisia quinquegona Blume	✓	✓	
	Ardisia villosa Roxb.		✓	
	Ardisia waitakii C.M. Hu			

Family	Scientific name	Sep 2000	Dec 2001	Remarks
	Embelia laeta (L.) Mez		✓	
	Embelia parviflora Wall. ex A. DC.		✓	
	Embelia ribes Burm. f.		✓	
	Maesa acuminatissima Merr.		✓	
	Maesa japonica (Thunb.) Moritzi & Zoll.	✓	✓	
	Maesa perlarius (Lour.) Merr.		✓	
	Myrsine kwangsiensis (E. Walker) Pipoly & C. Chen	✓		
	Mysine seguinii H. Lév		✓	
Myrtaceae	*Acmena acuminatissima* (Blume) Merr. & L. M. Perry	✓	✓	
	Baeckea frutescens L.		✓	
	Eucalyptus citriodora Hook. f.		✓	cultivated
	Rhodomyrtus tomentosa (Aiton) Hassk.	✓	✓	
	Syzygium araiocladum Merr. & L.M. Perry		✓	
	Syzygium brachyantherum Merr. & L.M. Perry	✓		
	Syzygium buxifolium Hook. & Arn.		✓	
	Syzygium fluviatile (Hemsl.) Merr. & L.M. Perry	✓	✓	
	Syzygium hancei Merr. & L. M. Perry		✓	
	Syzygium imitans Merr. & L.M. Perry	✓	✓	
	Syzygium rehderianum Merr. & L.M. Perry	✓		
Oleaceae	*Chionanthus ramiflorus* Roxb.		✓	
	Jasminum lanceolarium Roxb.		✓	
	Olea tetragonoclada L.C. Chia	✓		endemic to Guangxi
	Osmanthus matsumuranus Hayata	✓	✓	
Opiliaceae	*Urobotrya latisquama* (Gagnep.) Hiepko		✓	
Papilionaceae	*Bowringia callicarpa* Champ. ex Benth.		✓	
	Dalbergia hancei Benth.	✓	✓	
	Dalbergia pinnata (Lour.) Prain	✓		
	Fordia cauliflora Hemsl.	✓		
	Millettia pachyloba Drake		✓	
	Ormosia merrilliana L. Chen	✓		
	Ormosia sericeolucida L. Chen		✓	endemic to S. Guangxi & SW Guangdong
Pentaphylacaceae	*Pentaphylax euryoides* Gardner & Champ.		✓	
Piperaceae	*Piper hongkongense* C. DC.		✓	
Pittosporaceae	*Pittosporum balansae* Aug. DC.		✓	
	Pittosporum balansae Aug. DC. var. *angustifolium* Gagnep.		✓	
Polygalaceae	*Xanthophyllum hainanense* Hu	✓	✓	
Proteaceae	*Helicia cochinchinensis* Lour.		✓	
	Helicia hainanensis Hayata		✓	
	Helicia longipetiolata Merr.& Chun		✓	
	Heliciopsis terminalis (Kurz) Sleumer	✓	✓	
Ranunculaceae	*Clematis crassifolia* Benth.		✓	
Rhizophoraceae	*Carallia longipes* Chun ex W.C. Ko		✓	
Rosaceae	*Eriobotrya fragrans* Champ. ex Benth.		✓	
	Laurocerasus undulata (Buch.-Ham. ex D. Don) Roem.		✓	
	Pygeum topengii Merr.		✓	
	Rhaphiolepis indica (L.) Lindl.	✓	✓	
	Rhaphiolepis lanceolata Hu		✓	
	Rhaphiolepis salicifolia Lindl.		✓	
	Rubus leucanthus Hance		✓	
	Rubus reflexus Ker		✓	
	Sorbus caloneura (Stapf) Rehder	✓		
Rubiaceae	*Adina pilulifera* (Lam.) Franch. ex Drake		✓	
	Canthium dicoccum (Gaertn.) Teysmann & Binnedijk		✓	
	Damnacanthus labordei (H. Lév.) H.S. Lo		✓	
	Diplospora dubia (Lindl.) Masam.		✓	
	Gardenia jasminoides J. Ellis		✓	
	Gardenia stenophylla Merr.	✓	✓	
	Hedyotis hedyotidea (DC.) Merr.		✓	
	Hedyotis platystipula Merr.	✓	✓	
	Ixora henryi H. Lév.		✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
	Lasianthus chinensis (Champ. ex Benth.) Benth.	✓	✓	
	Lasianthus curtisii King & Gamble		✓	
	Lasianthus formosensis Matsum.		✓	
	Lasianthus sikkimensis Hook. f.	✓	✓	
	Lasianthus wallichii (Wight & Arn.) Wight		✓	
	Litosanthes biflora Blume		✓	new record of China mainland
	Metadina trichotoma (Zoll. & Moritzi) Bakh. f.	✓		
	Mussaenda erosa Champ. ex Benth.		✓	
	Pavetta hongkongensis Brem.		✓	
	Psychotria asiatica L.	✓	✓	
	Psychotria serpens L.		✓	
	Psychotria tutcheri Dunn		✓	
	Tarenna mollissima (Hook. & Arn.) B.L. Rob.		✓	
	Uncaria rhynchophylla (Miq.) Miq. ex Havil.		✓	
	Uncaria rhynchophylloides F.C. How	✓	✓	
	Urophyllum chinense Merr. & Chun		✓	restricted to SW Guangdong, S Guangxi, S Yunnan & N Vietnam
	Wendlandia formosana Cowan subsp. *breviflora* F.C. How		✓	
	Wendlandia uvariifolia Hance	✓	✓	
	Xanthophytum kwangtungense (Chun & F.C. How) H.S. Lo	✓	✓	restricted to S Guangxi, S Yunnan & N Vietnam
Rutaceae	*Acronychia pedunculata* (L.) Miq.		✓	
	Evodia lepta (Spreng.) Merr.	✓	✓	
	Skimmia arborescens T. Anderson ex Gamble		✓	
Sabiaceae	*Meliosma angustifolia* Merr.		✓	
	Meliosma rigida Siebold & Zucc.	✓	✓	
	Meliosma squamulata Hance		✓	
	Meliosma thorelii Lecomte		✓	
	Sabia limoniacea Wall. ex Hook. f. & Thomson		✓	
Santalaceae	*Dendrotrophe frutescens* (Champ. ex Benth.) Danser		✓	
Sapotaceae	*Eberhardtia aurata* (Pierre ex Dubard) Lecomte	✓	✓	
	Madhuca pasquieri (Dubard) H.J. Lam	✓	✓	Protected II, Vulnerable
	Sarcosperma laurinum (Benth.) Hook. f.	✓	✓	
	Sinosideroxylon wightianum (Hook. & Arn.) Aubrév.		✓	
Sterculiaceae	*Helicteres angustifolia* L.		✓	
	Pterospermum heterophyllum Hance		✓	
	Reevesia thyrsoidea Lindl	✓		
	Sterculia lanceolata Cav.	✓	✓	
Styracaceae	*Alniphyllum fortunei* (Hemsl.) Makino	✓	✓	
Symplocaceae	*Symplocos adenophylla*Wall. ex G. Don		✓	
	Symplocos adenopus Hance	✓		
	Symplocos cochinchinensis (Lour.) S. Moore		✓	
	Symplocos lancifolia Siebold & Zucc.		✓	
Theaceae	*Adinandra bockiana* E. Pritz var. *acutifolia* (Hand.-Mazz.) Kobuski	✓	✓	
	Adinandra glischroloma Hand.-Mazz. var. jubata (H.L. Li) Kobuski		✓	
	Adinandra millettii (Hook. & Arn.) Benth. & Hook. f. ex Hance		✓	
	Adinandra nitida Merr. ex H.L. Li		✓	
	Camellia assimilis Champ. ex Benth.		✓	
	Camellia caudata Wall.	✓	✓	
	Camellia fluviatilis Hand.-Mazz.		✓	
	Cleyera pachyphylla Chun ex H.T. Chang		✓	
	Eurya groffii Merr.		✓	
	Eurya nitida Korthals		✓	

Family	Scientific name	Sep 2000	Dec 2001	Remarks
	Gordonia axillaris (Roxb. ex Ker Gawl.) Dietr.		✓	
	Hartia villosa (Merr.) Merr.	✓	✓	
	Schima bambusifolia Hu	✓	✓	
	Schima superba Gardn. & Champ.	✓	✓	
	Ternstroemia gymnanthera (Wight & Arn.) Bedd.		✓	
Thymelaeaceae	*Daphne papyracea* Wall. ex Steud.		✓	
	Wikstroemia nutans Champ. ex Benth.		✓	
Ulmaceae	*Gironniera subaequalis* Planch.	✓	✓	
	Trema cannabina Lour. var. *dielsiana* (Hand.-Mazz.) C.J. Chan		✓	
	Trema tomentosa (Roxb.) Hara		✓	
Urticaceae	*Debregeasia longifolia* (Burm. f.) Wedd.	✓		
	Debregeasia squamata King ex Hook. f.	✓		
Verbenaceae	*Clerodendrum cyrtophyllum* Turcz.	✓	✓	
	Clerodendrum fortunatum L.		✓	
	Vitex quinata (Lour.) F.N. Williams			
Vitaceae	*Tetrastigma caudatum* Merr. & Chun	✓		
	Tetrastigma planicaule (Hook. f.) Gagnep.	✓	✓	
Monocotyledoneae				
Amaryllidaceae	*Curculigo capitulata* (Lour.) Kuntze		✓	
Araceae	*Acorus gramineus* Sol.	✓	✓	
	Epipremnum pinnatum (L.) Engl.	✓	✓	
	Pothos chinensis (Raf.) Merr.		✓	
	Rhaphidophora hongkongensis Schott		✓	
Areaceae	*Calamus austro-guangxiensis* S.J. Pei & S.Y.Chen	✓		endemic to S. Guangxi
	Calamus tetradactylus Hance	✓	✓	
	Caryota monostachys Becc.		✓	
	Pinanga discolor Burret	✓	✓	
Commelinaceae	*Amischotolype hispida* (Less. & A. Rich.) D.Y. Hong	✓	✓	
Cyperaceae	*Carex cruciata* Wahlenb.		✓	
	Carex cryptostachys Brongn.		✓	
	Carex perakensis C.B. Clarke		✓	
	Carex scaposa C.B. Clarke		✓	
	Carex tenuispicula T. Tang & S.Y.Liang		✓	new record of Guangxi
	Carex truncatigluma C.B. Clarke		✓	
	Gahnia tristis Nees		✓	
	Hypolytrum nemorum (Vahl) Spreng.		✓	
	Mapania silhetensis C.B. Clarke		✓	
	Scleria harlandii Hance		✓	
	Scleria levis Retz.		✓	
Liliaceae	*Dianella ensifolia* (L.) DC.		✓	
	Ophiopogon platyphyllus Merr. & Chun		✓	
	Smilax lanceifolia Roxb.		✓	
Marantaceae	*Phrynium rheedei* Suresh & Nicolson	✓	✓	
Musaceae	*Musa balbisiana* Colla		✓	
Pandanaceae	*Pandanus austrosinensis* T. L. Wu		✓	
	Pandanus tectorius Parkinson	✓		
Poaceae	*Aristida chinensis* Munro		✓	
	Centotheca lappacea		✓	
	Ischaemum sp.		✓	
	Lophatherum gracile Brongn.		✓	
	Miscanthus floridulus (Labill.) Warb. ex K. Schum & Lauterb.		✓	
	Miscanthus sinensis Andersson		✓	
	Neyraudia arundinacea (L.) Henr.		✓	
	Themeda villosa (Poir.) A. Camus		✓	
	Thysanolaena maxima (Roxb.) Kuntze		✓	
Stemonaceae	*Stemona tuberosa* Lour.		✓	
Zingiberaceae	*Alpinia chinensis* (J. König) Roscoe	✓	✓	
	Alpinia kwangsiensis T.L. Wu & S.J. Chen	✓	✓	
	Alpinia strobiliformis T. L. Wu & S. J. Chen		✓	
	Hedychium villosum Wall.	✓		

Table 2. Orchids recorded in Shiwandashan National Nature reserve and surrounding areas in September 2000 and December 2001.

Scientific name	Habitat	Remarks	Sep 2000	Dec 2000	Dec 2001
					✓
Anoectochilus roxburghii (Wall.) Lindl.	on forest floor with rich humus	terrestrial, Endangered	✓	✓	✓
Anoectochilus (cf. *elwesii*) sp.	on forest floor	terrestrial			✓
Arundina graminifolia (D. Don) Hochr.	on exposed grassy slope and beside steam	terrestrial	✓		✓
Bulbophyllum affine Lindl.	on rock	epiphytic			✓
Bulbophyllum (cf. *pentenveneris*) sp.	on rock in forest	epiphytic		✓	
Bulbophyllum kwangtungense Schltr.	on rock	epiphytic			✓
Bulbophyllum levinei Schltr.	on rock and on tree trunk	epiphytic			✓
Bulbophyllum odoratissimum (Sm.) Lindl.	on rock and on tree trunk beside stream	epiphytic	✓		
Bulbophyllum sp.1	mainly on rock, a few on tree trunk beside stream	epiphytic; may be new to science	✓		
Bulbopyhllum sp.2	on rock in forest	epiphytic; may be new to China		✓	
Bulbophyllum sp.3	on rock beside waterfall	epiphytic		✓	
Bulbophyllum sp.4	on rock	epiphytic			✓
Calanthe clavata Lindl.	on forest floor	terrestrial			✓
Calanthe sp.	on floor beside stream	terrestrial	✓		
Cephalanteropsis calanthoides (Ames) T.S. Liu et H.J. Su	on forest floor	terrestrial			✓
Cephalantheropsis (cf. *gracilis*) sp.	on forest floor with rich humus	terrestrial	✓		
Cheirostylis sp.	on forest floor with rich humus	terrestrial			✓
Cleisostoma paniculatum (Ker Gawl.) Garay	on tree trunk in forest	epiphytic	✓		
Coelogyne fimbriata Lindl.	on rock	epiphytic			✓
Collabium formosanum Hayata	on rough rock surface and floor with rich humus	terrestrial			✓
Collabium (cf. *chinensis*) sp.	on floor beside stream	terrestrial			✓
Cryptostylis arachnites (Blume) Sw.	on forest floor	terrestrial			✓
Cymbidium ensifolium (L.) Sw.	on dense bamboo floor	terrestrial, Endangered			✓
Cymbidium goeringii (Rchb. f.) Rchb. f.	on dense bamboo floor	terrestrial, Endangered			✓
Cymbidium floribundum Lindl.	on rock with rich humus	epiphytic			✓
Cymbidium sp.	on tree trunk	epiphytic			✓
Dendrobium densiflorum Lindl.	on rock	epiphytic			✓
Dendrobium longicornu Lindl.	on rock in forest	epiphytic			✓
Dendrobium terminale Par. et Rchb. f.	on rock beside stream	epiphytic, new to Guangxi			✓
Dendrobium sp.1	on tree trunk	epiphytic			✓
Dendrobium sp.2	on rock	epiphytic			✓
Epigeneium fargesii (Finet) Gagnep.	on rock	epiphytic			✓
Eria corneri Rchb. f.	on rock	epiphytic			✓
Eria pusilla (Griff.) Lindl.	on rock and at base of tree trunk beside stream	epiphytic	✓		✓

Scientific name	Habitat	Remarks	Sep 2000	Dec 2000	Dec 2001
Eria rosea Lindl.	on rock	piphytic, new to Guangxi			✓
Eria thao Gagnep.	on rock and on tree trunk	ɔiphytic, new to Guangxi	✓		✓
Eria sp.	on rock with rich humus	epiphytic, may be new to Guangxi			✓
Gastrochilus sp.	on tree trunk in forest	epiphytic	✓		
Goodyera (cf. *repens*) sp.	on forest floor	terrestrial, may be new to Guangxi			✓
Habenaria tonkinensis Seidenf.	in crevices with rich humus beside the stream	terrestrial	✓		
Hetaeria cristata Blume	on forest floor	terrestrial			✓
Liparis balansae Gagnep.	on rock	epiphytic			✓
Liparis bootanensis Griff.	on rock	epiphytic	✓		✓
Liparis cespitosa (Thou.) Lindl.	on rock in dense bamboo	epiphytic, new to Guangxi			✓
Liparis nervosa (Thunb) Lindl.	on forest floor	terrestrial	✓		✓
Liparis sp.1	on rock in forest	epiphytic			✓
Liparis sp.2	on rock	epiphytic			✓
Mischobulbum cordifolium (Hook. f.) Schltr.	on forest floor	terrestrial	✓		✓
Ornithochilus difformis (Lindl.) Schltr.	on tree trunk	epiphytic			✓
Pholidota chinensis Lindl.	on rock and on tree trunk	epiphytic	✓	✓	✓
Platanthera minor (Miq.) Rchb. F.	on slope beside the road	terrestrial	✓		
Podochilus khasianus Hook. f.	on rock beside the stream	epiphytic			
Vanilla sp.	on rock and on tree trunk in forest	epiphytic	✓		✓
unknown sp.	on tree trunk	epiphytic			✓

Mammals

- In May 1997 forest park staff were interviewed regarding the mammal fauna of Shiwandashan. Status of mammals is inferred based on their responses (Fellowes & Hau, 1997), records in Guangxi Foresty Survey and Planning Institute & Shiwandashan Nature Reserve (2002), and past distribution records from the Shiwandashan area (Wu, 1993; Zhang Y. *et al*., 1997 and references therein), and is listed in Table 3.

Table 3. The inferred status of mammals at Shiwandashan National Nature Reserve, based on interviews with forest park staff (Fellowes & Hau, 1997), on records in Guangxi Foresty Survey and Planning Institute & Shiwandashan Nature Reserve (2002), and on past distribution records, “SS” = “Shangsi”, “FC” = “Fangcheng”, “NM” = “Ningming”, “QZ” = “Qinzhou” (Wu, 1993; Zhang Y. *et al.*, 1997). “__“= “present”, “+” = “rare”, “++” = “common”, “+++” = “abundant”. Sequence follows D.E. Wilson & Cole (2000).

Scientific name	English name	Forest Park staff (May 1997)	Guangxi Forestry Survey (2002)	Wu (1993)	Zhang Y. *et al.* (1997)	Probable Status
Crocidura attenuata	Indochinese Shrew	(not asked)	__		NM, QZ	present
Crocidura (nr. *russula*) sp. (recorded as *C. russula*)	white-toothed shrew	(not asked)	__		NM, QZ	present
Suncus murinus	Asian House Shrew	(not asked)	__		SS, NM	present
Chimarrogale himalayica	Himalayan Water Shrew	(not asked)	__		NM	present
Tupaia belangeri	Northern Tree Shrew	-	__		SS, NM	present
Rhinolophus affinis	Intermediate Horseshoe Bat	(not asked)	__		NM	present
Rhinolophus rouxii	Rufous Horseshoe Bat	(not asked)	__			present
Rhinolophus pusillus (recorded as *R. blythi*)	Least Horseshoe Bat	(not asked)	__		NM	present
Rhinolophus macrotis	Big-eared Horseshoe Bat	(not asked)	__		NM	present
Hipposideros bicolor	Bicoloured Roundleaf Bat	(not asked)	__		NM	present
Hipposideros pomona (recorded as *H. p. sinensis)*	Pomona Roundleaf Bat	(not asked)	__			present
Hipposideros pratti	Pratt’s Roundleaf Bat	(not asked)	__		NM	present
Nyctalus noctula (recorded as *N. velutinus*)	Noctule	(not asked)	__		SS, NM	present
Pipistrellus abramus	Japanese Pipistrelle	(not asked)	__			present
Pipistrellus ceylonicus	Kelaart’s Pipistrelle	(not asked)	__		SS, NM	present
Scotomanes heathi insularis	Greater Asiatic Yellow Bat	(not asked)	__		SS	present
Myotis mystacinus	Whiskered Bat	(not asked)	__			present
Nycticebus coucang	Slow Loris	-		NM	NM	uncertain
Macaca arctoides	Stump-tailed Macaque		__	SS	SS, NM	present
Macaca assamensis	Assam Macaque			NM	SS, NM	uncertain
Macaca mulatta	Rhesus Monkey		__	SS, NM	SS, NM	present
Trachypithecus francoisi	Francois's Leaf Monkey			SS, NM	SS, NM	uncertain
Canis lupus	Grey Wolf			SS, NM	SS, NM	insecure/extirpated
Cuon alpinus	Dhole				SS, NM	insecure/extirpated
Nyctereutes procyonoides	Raccoon Dog	+	__		SS, NM	insecure
Vulpes vulpes	Red Fox		__		SS, NM	insecure
Catopuma temminckii	Asiatic Golden Cat	+	__	SS, FC, NM	SS, NM, FC	insecure
Prionailurus bengalensis	Leopard Cat	+	__		SS, NM	insecure
Neofelis nebulosa	Clouded Leopard	+	__	SS, NM	SS, NM	insecure

Scientific name	English name	Forest Park staff (May 1997)	Guangxi Forestry Survey (2002)	Wu (1993)	Zhang Y. *et al.* (1997)	Probable Status
Panthera pardus	Leopard		—	SS	SS, NM	extirpated
Panthera tigris	Tiger				SS, NM	extirpated
Herpestes javanicus	Small Asian Mongoose		—		SS, NM	present
Herpestes urva	Crab-eating Mongoose	+	—		SS, NM	insecure
Amblonyx cinereus	Oriental Small-clawed Otter	+	—		SS, NM, QZ	insecure
Lutra lutra	Eurasian Otter		—		SS, NM, QZ	insecure
Arctonyx collaris	Hog Badger		—		NM, QZ	insecure
Martes flavigula	Yellow-throated Marten		—		SS, NM	insecure
Meles meles	Eurasian Badger		—		NM, QZ	insecure
Melogale moschata	Chinese Ferret-badger		—		SS, NM	insecure
Mustela kathiah	Yellow-bellied Weasel	+	—		NM	present
Mustela sibirica	Siberian Weasel	+	—		SS, NM	present
Ursus thibetanus	Asiatic Black Bear		—		NM	insecure
Chrotogale owstoni	Owston's Banded Civet			NM	NM	uncertain
Paguma larvata	Masked Palm Civet	++	—		SS, NM	present
Paradoxurus hermaphroditus	Asian Palm Civet	++	—	SS, NM	SS, NM	present
Prionodon pardicolor	Spotted Linsang	++	—		SS, NM	present
Viverra zibetha	Large Indian Civet	+	—		SS, NM	insecure
Viverricula indica	Small Indian Civet	+	—		SS, NM	insecure
Sus scrofa	Wild Boar	++	—		SS, NM, QZ	present
Moschus berezovskii	Chinese Forest Musk Deer		—		SS, YC	insecure
Cervus unicolor	Sambar		—		SS, NM	insecure
Muntiacus muntjak	Indian Muntjac	++	—		SS, NM, QZ	present
Muntiacus reevesii	Reeves's Muntjac	++	—		SS, NM	present
Naemorhedus caudatus	Chinese Goral	+	—			insecure
Naemorhedus sumatraensis	Serow	+	—		SS, NM	insecure
Manis pentadactyla	Chinese Pangolin	+	—		SS, NM	insecure
Callosciurus erythraeus	Pallas's Squirrel	++	—		NM	present
Dremomys pernyi	Perny's Long-nosed Squirrel		—		NM	present
Dremomys rufigenis	Asian Red-cheeked Squirrel		—		SS, NM, FC	present
Ratufa bicolor	Black Giant Squirrel		—	FC	NM	insecure
Tamiops maritimus	Maritime Striped Squirrel		—		SS	present
Trogopterus pearsonii	Hairy-footed Flying Squirrel		—	SS, NM	SS, NM	present

Scientific name	English name	Forest Park staff (May 1997)	Guangxi Forestry Survey (2002)	Wu (1993)	Zhang Y. *et al.* (1997)	Probable Status
Petaurista alborufus	Red and White Flying Squirrel		—		SS, NM	present
Rhizomys pruinosus	Hoary Bamboo Rat	++	—		SS, NM	present
Rhizomys sinensis	Chinese Bamboo Rat		—		SS, NM	present
Hystrix brachyura	Malayan Porcupine	+	—			present
Atherurus macrourus	Asiatic Brush-tailed Porcupine		—		SS, NM, FC	present
Lepus capensis	Brown Hare		—			uncertain
Lepus sinensis	Chinese Hare	++	—		SS, NM	present

- Some of the species suspected to occur are of particular conservation importance:
  - Clouded Leopard *Neofelis nebulosa* is Vulnerable globally and Class I Protected nationally.
  - Stump-tailed Macaque *Macaca arctoides*, Dhole *Cuon alpinus*, Asiatic Golden Cat *Catopuma temminckii*, Eurasian Otter *Lutra lutra*, Asiatic Black Bear *Ursus thibetanus* and Chinese Goral *Naemorhedus caudatus* are Vulnerable globally and Class II Protected nationally.
  - Malayan Porcupine *Hystrix brachyura* is Vulnerable globally.
  - Rhesus Monkey *Macaca mulatta*, Oriental Small-clawed Otter *Amblonyx cinereus*, Chinese Forest Musk Deer *Moschus berezovskii* and Chinese Pangolin *Manis pentadactyla* are at Lower Risk (Near-threatened) globally and Class II Protected nationally.

Serow *Naemorhedus sumatraensis*, Yellow-throated Marten *Martes flavigula* and Black Giant Squirrel *Ratufa bicolor* are Class II Protected nationally.

Birds

- One hundred and eleven bird species were recorded in these surveys (Table 4).
- Among the most frequently encountered species in all three surveys were Light-vented Bulbul *Pycnonotus sinensis*, Chestnut Bulbul *Hypsipetes castanotus*, Black Bulbul *Hypsipetes leucocephalus*, streak-breasted Scimitar Babbler *Pomatorhinus ruficollis*, Rufous-capped Babbler *Stachyris ruficeps* and Grey-cheeked Fulvetta *Alcippe morrisonia*.
- The timing of the three surveys coincided with spring, autumn and winter migrations, explaining the high richness of raptors, warblers, flycatchers and thrushs.

Table 4. Birds recorded in Siwandashan National Nature Reserve and Siwandashan National Forest Park, March and September 2000 and December 2001. Sequence follows Clements (2000).

Scientific name	**English name**
Ardeola bacchus	Chinese Pond Heron
Bubulcus ibis	Cattle Egret
Butorides striatus	Little Heron
Pernis ptilorhynchus	Oriental Honey Buzzard
Spilornis cheela	Crested Serpent Eagle
Milvus migrans	Black Kite
Accipiter trivirgatus	Crested Goshawk
Accipiter badius	Shikra
Accipiter gularis	Japanese Sparrowhawk
Accipiter virgatus	Besra
Falco subbuteo	Eurasian Hobby
Bambusicola thoracica	Chinese Bamboo Partridge
Lophura nycthemera	Silver Pheasant
Turnix suscitator	Barred Buttonquail
Amaurornis phoenicurus	White-breasted Waterhen
Streptopelia chinensis	Spotted Dove
Hierococcyx sparverioides	Large Hawk Cuckoo
Hierococcyx fugax	Hodgson's Hawk Cuckoo
Centropus sinensis	Greater Coucal
Centropus bengalensis	Lesser Coucal
Otus spilocephalus	Mountain Scops Owl
Otus bakkamoena	Collared Scops Owl
Otus sunia	Oriental Scops Owl
Glaucidium cuculoides	Asian Barred Owlet
Hirundapus cochinchinensis	White-vented Needletail
Alcedo atthis	Common Kingfisher
Halcyon smyrnensis	White-throated Kingfisher
Halcyon pileata	Black-capped Kingfisher
Merops philippinus	Blue-tailed Bee-eater
Megalaima virens	Great Barbet
Megalaima oorti	Black-browed Barbet
Megalaima asiatica	Blue-throated Barbet
Picumnus innominatus	Speckled Piculet
Sasia ochracea	White-browed Piculet
Hirundo rustica	Barn Swallow
Hirundo daurica	Red-rumped Swallow
Delichon dasypus	Asian House Martin
Motacilla alba	White Wagtail
Motacilla cinerea	Grey Wagtail
Anthus hodgsoni	Olive-backed Pipit
Pericrocotus flammeus	Scarlet Minivet
Pericrocotus solaris	Grey-chinned Minivet
Hemipus picatus	Bar-winged Flycatcher-shrike
Pycnonotus jocosus	Red-whiskered Bulbul
Pycnonotus sinensis	Light-vented Bulbul
Pycnonotus aurigaster	Sooty-headed Bulbul
Alophoixus pallidus	Puff-throated Bulbul
Hypsipetes castanotus	Chestnut Bulbul
Hypsipetes mcclellandii	Mountain Bulbul
Hypsipetes leucocephalus	Black Bulbul

Scientific name	English name
Myophonus caeruleus	Blue Whistling Thrush
Zoothera citrina	Orange-headed Thrush
Zoothera dauma	Scaly Thrush
Turdus hortulorum	Grey-backed Thrush
Turdus cardis	Japanese Thrush
Turdus pallidus	Pale Thrush
Turdus chrysolaus	Brown-headed Thrush
Brachypteryx leucophrys	Lesser Shortwing
Luscinia sibilans	Rufous-tailed Robin
Tarsiger cyanurus	Orange-flanked Bush Robin
Prinia atrogularis	Hill Prinia
Prinia rufescens	Rufescent Prinia
Prinia flaviventris	Yellow-bellied Prinia
Prinia inornata	Plain Prinia
Cettia fortipes	Brownish-flanked Bush Warbler
Bradypterus seebohmi	Russet Bush Warbler
Orthotomus cuculatus	Mountain Tailorbird
Orthotomus sutorius	Common Tailorbird
Phylloscopus fuscatus	Dusky Warbler
Phylloscopus proregulus	Pallas's Leaf Warbler
Phylloscopus inornatus	Yellow-browed Warbler
Phylloscopus tenellipes	Pale-legged Leaf Warbler
Phylloscopus reguloides	Blyth's Leaf Warbler
Phylloscopus ricketti	Sulphur-breasted Warbler
Seicercus burkii	Golden-spectacled Warbler
Abroscopus albogularis	Rufous-faced Warbler
Muscicapa dauurica	Asian Brown Flycatcher
Niltava davidi	Fujian Niltava
Cyornis hainana	Hainan Blue Flycatcher
Rhipidura albicollis	White-throated Fantail
Copsychus saularis	Oriental Magpie Robin
Phoenicurus auroreus	Daurian Redstart
Rhyacornis fuliginosus	Plumbeous Water Redstart
Enicurus schistaceus	Slaty-backed Forktail
Garrulax maesi	Grey Laughingthrush
Garrulax canorus	Hwamei
Garrulax sannio	White-browed Laughingthrush
Pomatorhinus ruficollis	Streak-breasted Scimitar Babbler
Napothera brevicaudata	Streaked Wren Babbler
Pnoepyga pusilla	Pygmy Wren Babbler
Stachyris ruficeps	Rufous-capped Babbler
Leiothrix lutea	Red-billed Leiothrix
Alcippe morrisonia	Grey-cheeked Fulvetta
Yuhina castaniceps	Striated Yuhina
Yuhina zantholeuca	White-bellied Yuhina
Parus major	Great Tit
Nectarinia jugularis	Olive-backed Sunbird
Aethopyga christinae	Fork-tailed Sunbird
Dicaeum ignipectus	Fire-breasted Flowerpecker
Dicaeum cruentatum	Scarlet-backed Flowerpecker
Dicaeum concolor	Plain Flowerpecker
Zosterops japonicus	Japanese White-eye
Lanius schach	Long-tailed Shrike
Dicrurus macrocercus	Black Drongo
Dicrurus aeneus	Bronzed Drongo
Urocissa whiteheadi	White-winged Magpie
Dendrocitta formosae	Grey Treepie
Passer montanus	Eurasian Tree Sparrow
Lonchura striata	White-rumped Munia
Lonchura punctulata	Scaly-breasted Munia
Melophus lathami	Crested Bunting

- Oriental Honey Buzzard *Pernis ptilorhynchus,* Crested Serpent Eagle *Spilornis cheela*, Black Kite *Milvus migrans*, Crested Goshawk *Accipiter trivirgatus*, Shikra *Accipiter badius*, Japanese Sparrowhawk *Accipiter gularis*, Besra *Accipiter virgatus*, Eurasian Hobby *Falco subbuteo*, Silver

Pheasant *Lophura nycthemera*, Mountain Scops Owl *Otus spilocephalus*, Collared Scops Owl *Otus bakkamoena*, Oriental Scops Owl *Otus sunia* and Asian Barred Owlet *Glaucidium cuculoides* are Class II Protected nationally.

Reptiles and Amphibians

- Twenty-two species of amphibian and fifteen species of reptile (one turtle, six lizards and eight snakes) were recorded at Shiwandashan during these and earlier surveys (Table 5).
- The identity of *Rana spinulosa*, *Tropidophorus hainanus* and *Amphiesma popei* could not be confirmed. Tadpoles belonging to the genera *Megophrys* and *Leptobrachium* were found but they could not be identified to the exact species due to the lack of adult materials.
- Several specimens of *Geoemyda spengleri*, a globally Endangered and National Class II Protected species, were for sale in the stalls at the Forest Park. They were reported to have been collected (illegally) inside the Park.
- Two additional snake species were observed: *Oligodon formosanus* and *Trimeresurus albolabris*.

Table 5. Amphibians and reptiles recorded in Shiwandashan National Nature reserve and surrounding areas in May 1997, March, April and September 2000. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat	May 1997	May 1997	Mar, Apr 2000	Sep 2000
AMPHIBIA					
Megophrys sp.	stream				tadpoles
Leptobrachium sp.	stream				tadpoles
Bufo melanostictus	plantation	✓			
	forest		✓		
	abandoned field				✓
Hyla simplex	pool		✓		
	plantation	✓			
Amolops ricketti	stream		✓		✓
Paa spinosa	stream		✓		
Rana guentheri	plantation	✓			
	marsh		✓		✓
	abandoned field				✓
Rana limnocharis	plantation	✓			
	marsh		✓	✓	
	pool				✓
Rana livida	stream		✓	✓	✓
	forest			✓	
Rana rugulosa	field		✓		
Rana spinulosa ?	forest/stream		✓		
	forest				✓
Rana taipehensis	marsh		✓		
Rana versabilis	riparian forest				✓
	stream				✓
Chirixalus vittatus	pool		✓	✓	
Philautus odontotarsus	forest pool		✓, tadpoles		
Polypedates dennysi	pool		✓		
	forest				✓
Polypedates megacephalus	pool	✓	✓		
Polypedates mutus	pool		✓		
Kalophrynus interlineatus	marsh		✓		
Microhyla butleri	Pool		✓		
	marsh				✓
Microhyla ornata	pool		✓		
Microhyla pulchra	field/pool		✓		
	marsh			✓	
REPTILIA					
Sacalia quadriocellata	stream		✓		
Acanthosaura lepidogaster	forest		✓		✓
Calotes versicolor	plantation	✓			✓
Draco maculatus	fir plantation				✓
Sphenomorphus indicus	forest			✓	✓

Tropidophorus hainanus ?	seepage				✓
Tropidophorus sinicus	forest				✓
	stream				✓
Ahaetulla prasina	forest edge	✓			
Amphiesma popei ?	forest				✓
Calamaria septentrionalis	forest	✓			
Opisthotropis lateralis	stream	✓			
Psammodynastes pulverulentus	forest	✓			
	stream				✓
Ptyas korros	ag. field			✓	
Sinonatrix aequifasciata	stream	✓			✓
Bungarus multicinctus	fir plantation				✓

- Species of conservation concern recorded are:
  – The record of *Leptobrachium* is the first for Guangxi.
  – *Chirixalus vaittatus* has a restricted and fragmented distribution in southern China.
  – *Sacalia quadriocellata* is a globally Endangered species.
- The high diversity of forest and forest stream herpetofauna indicates that some of the forests at Shiwandashan were intact.

Fish

- A total of 18 freshwater fish species were recorded from Shiwandashan National Nature Reserve and Shiwandashan National Forest Park in the September 2000 survey (Table 6).
- Generally, fish abundance was high in the streams visited, especially the forest stream in the Forest Park.
- A number of species are rarely recorded during KFBG's surveys: *Rasbora steineri* is globally restricted to northern Indochina, while *Leiocassis argentivittatus* has so far only been found at Shiwandashan during our surveys.
- Three species could not be identified using existing keys for Chinese freshwater fish; they belong to the Culterinae, Balitoridae and Odontobutidae. They may be of conservation/scientific interest.

Table 6. Freshwater fish recorded from Shiwandashan National Nature Reserve and surrounding area, Southwest Guangxi, 25-27 September 2000. Sequence of families follows Nelson (1994).

Species
Rasbora steineri
Parazacco spilurus spilurus
Zacco platypus
Opsariichthys bidens
Yaoshanicus arcus
Nicholsicypris normalis
Cultrinae sp.
Carassius auratus
Cobitis sinensis
Misgurnus anguillicaudatus
Vanmanenia (cf. *caldwelli*) sp.
Schistura fasciolata
Leiocassis argentivittatus
Silurus asotus
Pterocryptis gilberti
Mastacembelus armatus
Odontobutidae sp.
Micropercops compressocephalus

- A recent detailed fish survey yielded a total of 102 fish species from the Shiwandanshan area (Zhao & Zhang, 2001). Reported species of particular interest are: *Parazacco spilurus fasciatus, Acrossocheilus iridescens, Plecoglossus altivelis, Botia robusta, B. pulchra, Cobitis arenae,*

Pseudohemiculter hainanensis, Rasborinus formosae, Xenocypris microlepis, Cyprinus acutidorsalis, Beaufortia leveretti, Cranoglanis bouderius and *Mastacembelus aculeatus.*

- Together the two surveys recorded over 105 species of freshwater fish from Shiwandashan. This is an exceptionally high figure and the area is of very high conservation value for fish fauna of northern Indochina.

Ants

- Ants were not covered by the present surveys in 2000-2001, but results of an earlier survey of the Forest Park area in May 1997 (Fellowes & Hau, 1997) can be updated here following improved understanding of ant taxonomy (Table 7). At least 65 species were recorded, of which many cannot be firmly identified; most species were recorded inside the National Forest Park.
- The most frequently encountered species included *Crematogaster* sp. 2, *Odontoponera* sp. 1 and *Pheidole smythiesi*.

Table 7. Ant species recorded in and around Shiwandashan National Forest Park, May 1997. "*" = Species with a strong forest association.

Scientific name
Aenictus (*ceylonicus* group) sp. 1
Aenictus binghami *
Aphaenogaster (cf. *beccarii*) sp. 1 *
Aphaenogaster (cf. *hunanensis*) sp. 3 *
Camponotus (cf. *anningensis*) sp. 39 *
Camponotus (cf. *jianghuaensis*) sp. 15
Camponotus (cf. *mitis*) sp. 11
Camponotus (cf. *wasmanni*) sp. 35
Camponotus (nr. *vitreus praerufus*) sp. 32
Camponotus rufoglaucus (recorded as *Camponotus* sp. 22)
Cataulacus granulatus
Cerapachys sulcinodis *
Crematogaster (cf. *biroi*) sp. 4
Crematogaster (cf. *dohrni*) sp. 8
Crematogaster (cf. *travancorensis*) sp. 2
Diacamma (nr. *rugosum*) sp. 1 (previously recorded as *D. pallidum*)
Dolichoderus (cf. *flatidorsus*) sp. 6 (misidentified as *Dolichoderus* sp. 7 and sp. 8)
Dolichoderus (nr. *taprobanae*) sp. 4 (misidentified as *Dolichoderus* (nr. *thoracicus*) sp. 3)
Hypoponera (cf. *excoecata*) sp. 2 *
Lepisiota rothneyi
Leptogenys binghamii *
Leptogenys kitteli *
Leptogenys peuqueti (recorded as *Leptogenys* sp. 13)
Leptogenys (cf. *kraepelini*) sp. 7 *
Myrmicaria (cf. *brunnea*) sp. 2
Odontomachus (cf. *silvestrii*) sp. 2 (misidentified as *O. rixosus*)
Odontomachus monticola *
Odontoponera (cf. *denticulata*) sp. 1
Pachycondyla (cf. *sharpi*) sp. 12
Pachycondyla (*javana* group) sp. 1 *
Pachycondyla leeuwenhoeki *
Pachycondyla (cf. *luteipes*) sp. 2 *
Pachycondyla rufipes
Paratrechina (cf. *bourbonica*) sp. 4
Paratrechina (cf. *opaca*) sp. 26 (includes specimens recorded as *Paratrechina* sp. 27) *
Paratrechina (nr. *indica*) sp. 9 *
Paratrechina longicornis
Paratrechina sauteri
Pheidole (cf. *noda*) sp. 1
Pheidole nodifera
Pheidole (*rinae* group) sp. 9
Pheidole smythiesi
Pheidole sp. 11
Pheidole sp. 13A (previously recorded as *Pheidole* sp. 27) *
Pheidole sp. 28

Scientific name
Pheidologeton sp. 8 *
Polyrhachis (cf. *phalerata*) sp. 2 *
Polyrhachis demangei
Polyrhachis dives
Polyrhachis halidayi
Polyrhachis latona
Polyrhachis tyrannica
Polyrhachis wolfi *
Ponera sp. 5
Prenolepis (cf. *emmae*) sp. 1 *
Pristomyrmex pungens
Pseudolasius sp.
Pyramica dohertyi (recorded as *Smithistruma* sp. 3)
Tapinoma (nr. *indicum*) sp. 2 *
Tapinoma sp. 1
Technomyrmex albipes
Tetramorium sp. 1-group sp. (recorded as *Tetramorium* sp. 14)
Tetramorium (cf. *kraepelini*) sp. 4 *
Tetraponera binghami (misidentified as *T. attenuata*)
Vollenhovia (cf. *emeryi*) sp. 1 *

- *Ponera* sp. 5 is known only from Shiwandashan.
- Excluding the unique species, 36% of species recorded are forest-associated, a figure typical of secondary forest areas. The proportion was higher (47%) in the more natural vegetation inside the Forest Park, and very low (7%) in the plantation forest outside.

Dragonflies

- Only four species were recorded during the September 2000 survey, probably due to the adverse weather and the lateness of the season (Table 8).

Table 8. Dragonfly species recorded at Shiwandashan National Nature Reserve, September 2000. Sequence follows Schorr *et al*. (2001a, 2001b).

Species
Megalestes sp. n.
Planaeschna risi risi
Orthetrum sabina
Trithemis aurora

- *Megalestes* sp. nov. is different to the undescribed *Megalestes* collected in Damingshan in 2000 and Xidamingshan in 1998; to date it has not been found elsewhere. This species and the aeshnid *Planaeschna risi risi* are forest specialists.
- Many more dragonfly species were recorded during the KFBG survey of this reserve conducted in May 1997 (Fellowes & Hau, 1997), including numerous forest-associated species, listed below: *Philoganga robusta robusta, Matrona basilaris basilaris, Euphaea guerini*, *Euphaea decorata*, *Rhinocypha perforata perforata*, *Schmidtiphaea vietnamensis, Gynacantha japonica, Coeliccia cyanomelas*, *Cephalaeshna* sp., *Leptogomphus* sp., *Gomphidia krugeri fukienensis, Macromidia rapida, Macromia clio, Macromia fulgidifrons* (type locality, K.D.P. Wilson, 1998), and *Macromia moorei malayana.*

Butterflies

- Only fourteen butterfly species were encountered during the September 2000 survey (Table 9). This reflects the rainy weather condition encountered that makes the butterflies inactive.
- One species in the genus *Lexias* could not be firmly identified due to the failure to collect a specimen.

Table 9. Butterfly species recorded at Shiwandashan, 25-27 September 2000. Sequence of families follows Bascombe (1995).

Species	Habitat
Lamproptera curia	forest edge
Papilio helenus	forest edge
Papilio paris	forest edge
Papilio polytes	forest edge
Papilio protenor	forest
Troides helena	forest
Eurema hecabe	field
Hebomoia glaucippe	forest edge
Ixias pyrene	forest edge
Abisara echerius	forest edge
Athyma selenophora	forest edge
Cyrestis thyodamus	forest
Euploea mulciber	forest edge
Lexias sp.	forest

- In addition, the following species were recorded during a survey in May 1997 (Fellowes & Hau, 1997): *Abisara neophron, Acytolepis puspa, Aemona amathusia, Amblypodia anita, Appias albina, Appias lalage, Argyreus hyperbius, Artogeia canidia, Artogeia rapae, Astictopterus jama, Athyma opalina, Athyma perius, Atrophaneura varuna, Catopsilia pomona, Charaxes bernardus, Cirrochroa tyche, Danaus genutia*, *Delais pasithoe, Euploea core, Euploea midamus, Eurema blanda, Eurema laeta, Euthalia niepelti, Gerosis phisara, Graphium agamemnon, Halpe* sp., *Heliophorus* sp., *Ideopsis similis, Jamides bochus, Junonia almana, Kankiska canace, Lethe confusa, Lethe lanaris, Lethe naga, Lethe sinorix, Lethe syrcis, Lexias pardalis, Limenitis sulpitia, Melanitis leda, Mooreana trichoneura, Neptis hylas, Pantoporia hordonia, Parantica melanues, Parnara bada, Pathysa antiphates, Polyura eudamippus, Prioneris thestylis, Spindasis syama, Udara albocaerulea* and *Zemeros flegyas.*
- Several forest species were present: *Aemona amathusia, Astictoperus jama, Euthalia niepelti, Lexias pardalis, Limenitis sulpitia* and *Mooreana trichoneura,* indicating some good forests are present in Shiwandashan.

Summary of flora and fauna

- The Shiwandashan area has extensive but fragmented secondary northern tropical monsoon forest in a matrix of degraded vegetation and agricultural land. The present surveys recorded 517 vascular plant species, including nine globally Threatened or nationally Protected species. The presence of a number of tropical genera and species and 14 globally restricted species also suggest that the flora is rather distinct from forest vegetation elsewhere in Guangxi. One orchid found, *Bulbophyllum* sp., is new to China. The large number of new distribution records suggests further surveys may reveal findings of conservation importance.
- While Shiwandashan has apparently lost the largest carnivores (such as Tiger *Panthera tigris*, Leopard *P. pardus* and Grey Wolf *Canis lupus*) this extensive mountain range apparently still supports mammals of conservation importance, including the globally Vulnerable Clouded Leopard, Asiatic Golden Cat and Chinese Goral. Some arboreal mammals dependent on mature forest (e.g. Black Giant Squirrel and flying squirrels) also appear to be present.
- One hundred and eleven bird species have been recorded in the surveys at Shiwandashan, including 13 nationally Protected species (mostly raptors and owls). This rather high total was in part due to the influx of migrants in spring and autumn.
- Twenty-two species of amphibian and fifteen species of reptile were recorded at Shiwandashan, including rare species such as the frogs *Leptobrachium* sp. and *Chirixalus vittatus*, and the globally

Endangered turtle *Sacalia quadriocellata* (and probably *Geoemyda spengleri*). A high proportion of species were forest and forest stream specialists.

- From the survey the fish fauna appeared to be of high diversity and abundance, and this impression was confirmed by the notable results of an in-depth survey by Zhao and Zhang (2001).
- Due to the bad weather, the insect fauna was under-recorded during the present surveys. Nevertheless one undescribed damselfly was found. Previous survey in 1997 showed that Shiwandashan had a rich insect fauna that included a number of rare odonates (Fellowes & Hau, 1997).
- Shiwandashan was considered by MacKinnon *et al.* (1996) to be of national biodiversity significance. The present findings confirm the importance of Shiwandashan, which has also been recognised in the Central Government's approval of national-level nature reserve status.

Threats and problems

- Illegal electrofishing was observed in the streams at two locations, affecting the abundance of fish in these sites. In the Forest Park, fishing in the stream was banned, and at the time of the visits fish abundance was much higher there. However, Zhao *et al*. (2002) reported the severity of electrofishing and its adverse impacts on the fish fauna of Shiwandashan. For example, they noticed a sharp decline of fish diversity and abundance in the Forest Park stream during a re-survey in November 2001. The situation for freshwater biota at Shiwandashan is therefore disturbing.
- Villagers at Nadang also collected the frogs *Paa spinosa* for sale. This further affects the stream community and reduces food available for predatory species such as White-eared Night Heron.
- Hawkers at the Forest Park sold the Protected turtle *Geoemyda spengleri* and various forest products (such as bamboo shoots and large legume seeds) that were supposedly collected inside the Park. This small trade poses a threat to the Endangered *G. spengleri* and sets a very bad example for ecotourism practices.
- At Taiping, villagers living next to a good forest block relied on *Illicium* plantation for income. Although there had been plans to relocate villagers and plantation away from the forested area a few years ago, the villagers moved back to plant *Illicium* as they could not generate enough income elsewhere.

Opportunities

- Shiwandashan has recently been designated a National Nature Reserve. It has a large reserve size and still has rather extensive but fragmented cover of secondary forest, which could support viable populations of most or all of the species that remain if protected from further disturbances.
- To increase the conservation value of this reserve, clearing or logging of any scale and for any purposes should be prohibited in the core area. Any existing plantation and agriculture inside the core area should be abandoned to allow natural regeneration of vegetation. Expansion of agricultural land and plantation should be prohibited in the buffer zone and experimental zone, and livestock grazing and small-scale sustainable logging should be carefully controlled.
- Reforestation using an assembly of plant species native to the region may be necessary for the heavily degraded or grazed areas and for rehabilitating plantations of *Illicium*.
- Continued survival of globally Threatened species, such as Clouded Leopard and White-eared Night Heron, might be ensured but only if enforcement of the hunting and logging ban is treated as a top priority.
- To relieve the very high pressure on land and wildlife, the management should consider recruiting local villagers as reserve wardens and forestry police.
- Given the importance of the fish fauna (Zhao and Zhang, 2001), and the occurrence of globally Endangered White-eared Night Heron in Shangsi County (Fellowes *et al.*, 2001), any riparian forest disturbance and illegal fishing should be avoided. The reserve management might consider banning

fishing in certain zones or periods, to allow for the recovery of fish stock, and provision of undisturbed riparian forest for the rare birds to reproduce and forage.

- One of the best-preserved forests visited in the present surveys was at Shiwandashan National Forest Park. Although outside the Nature Reserve, this is protected with an aim to attract ecotourists. The Forest Park has good facilities (such as boarding, restaurants and nature trails) and attracts a good number of visitors. The potential of developing this forest park into an outdoor environmental education centre should be fully explored by putting more emphasis into education display and programme. Activites in conflict with conservation, such as selling plants and animals collected inside the park or including wildlife on restaurant menus, should be discontinued. Guidelines for various aspects of ecotourism development are available, e.g. Ceballos-Lascuráin (1996) and China National Committee of the Man-and-the-Biosphere (1998).
- It has been suggested to extend Shiwandashan Nature Reserve to cover other forest in the north, and to reforest denuded hills (MacKinnon et al., 1996). These measures would provide further support for biodiversity. Transboundary cooperation to protect forest along the border with Vietnam would ensure a larger, more effective protected-area system in the northern Indochina ecoregion.

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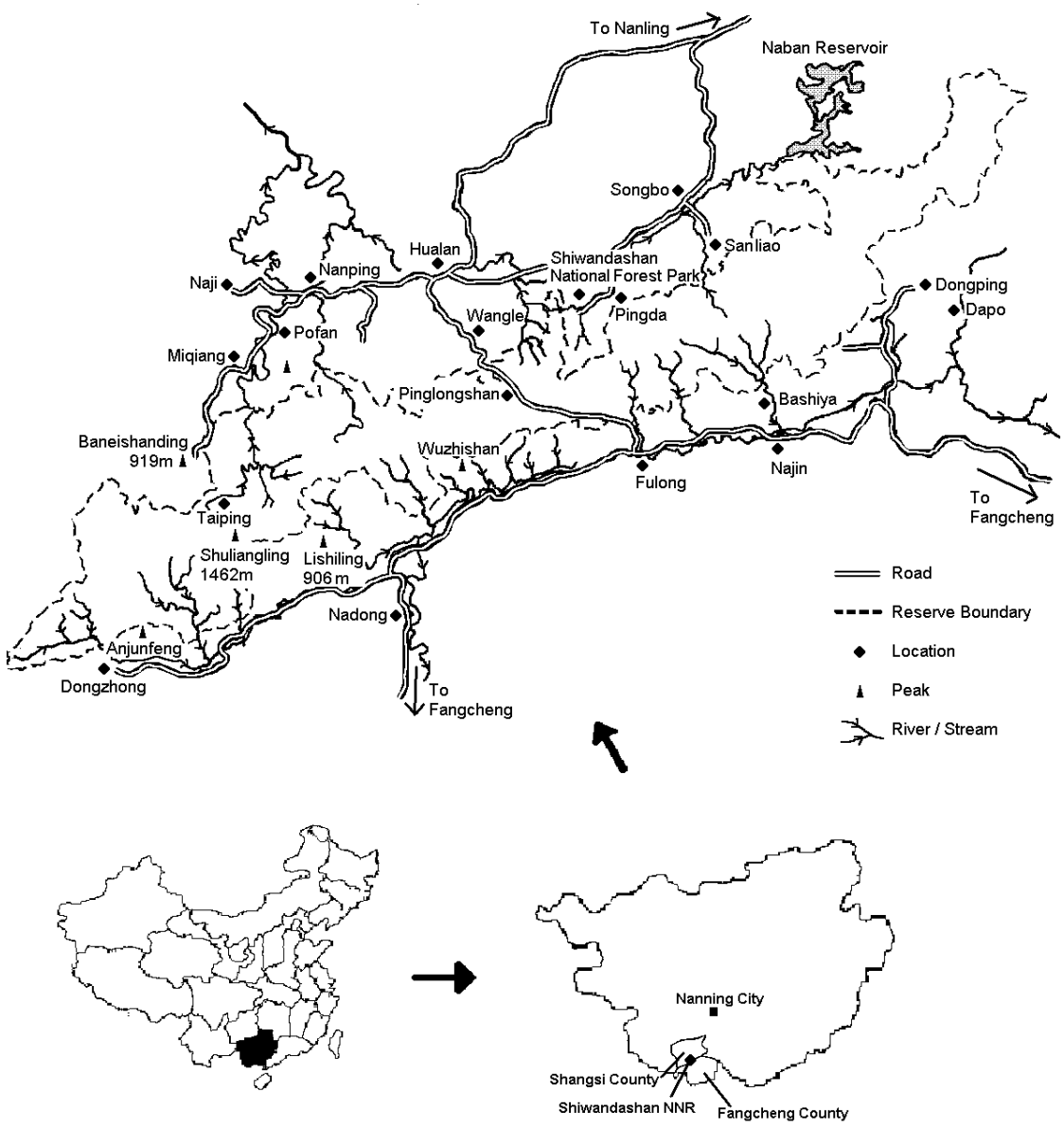

Figure 1. Map showing location of Shiwandashan National Nature Reserve and National Forest Park, Southwest Guangxi, China.