



Report of Rapid Biodiversity Assessments at Dayaoshan National Nature Reserve, East Guangxi, China, 1998 and 2001

Kadoorie Farm and Botanic Garden
in collaboration with
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Background

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

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Translation of common Chinese geographical terms

Chinese Romanizations	English meaning
dong	East
nan	South
xi	West
bei	North
shan	mountain
ling	range
feng, ding	peak
keng, gu	valley
dao	island
he, chuan, jiang	river
xi, yong	stream
hu, chi	lake
hai	sea
gang	harbour
wan	bay
kou	outlet
shi	city
xian	county
xiang, cun	village
tun	hamlet
feng shui	the Chinese system of geomancy

Report of Rapid Biodiversity Assessments at Dayaoshan National Nature Reserve, East Guangxi, China, 1998 and 2001

Objectives

- The aims of the surveys were to collect up-to-date information on the fauna and flora of Dayaoshan National Nature Reserve, and to use this to help determine conservation priorities within South China. Emphasis was on groups that have not been extensively studied, including birds, amphibians, reptiles, fish, ants, dragonflies and butterflies. Only selected parts of the reserve could be surveyed in the time available; these included parts reported to have the most extensive accessible natural forest, and/or species of particular concern.

Methods

- On 15-23 September 1998, members of South China Normal University (LZC, LPK), Xinyang Teachers' College (LHJ), Kadoorie Farm and Botanic Garden (BH, BC, JRF, ML, LKS, GTR), Guangxi Forestry Department (XZH), Guangxi Normal University (LLR, ZSY and the driver Mr Chen) and Guangxi Institute of Botany (LGZ and TSC), conducted a rapid biodiversity survey at Dayaoshan National Nature Reserve.
- During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, fish, ants, butterflies and dragonflies was conducted. Frogs and birds were also located by their calls. Plant records were made by field observation, with some specimens collected.
- Status of large and medium-sized mammals (excluding Insectivora, Chiroptera and Muridae) at Dayaoshan 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 *et al.* (1997).
- Vascular plant records in the 1998 visit were made or verified by LGZ, and edited by NSC. Plant records in 2001 were made by NSC. Mammal records were made by LLR, LKS, BH, GTR, ML or JRF. Records of birds were made or verified by LKS, reptiles and amphibians by ML or LZC, fish by CXL and BC, ants by JRF, butterflies by GTR and dragonflies by GTR and KW of Hong Kong.
- Nomenclature in the report is standardised based, unless otherwise stated, on the following references:
 - Flora (Pteridophyta, Gymnospermae and Angiospermae excluding Orchidaceae): Anon. (1959-2001); Anon. (1991); Anon. (1996-2001); Anon. (2002a, 2002b); The Plant Names Project (2002);
 - Mammals (Mammalia): D.E. Wilson & Cole (2000);
 - Birds (Aves): Inskipp *et al.* (1996);
 - Reptiles and Amphibians (Reptilia and Amphibia): Zhao E.-M. & Adler (1993); Zhao E. *et al.* (2000);
 - Fish (Actinopterygii): Nelson (1994); Wu *et al.* (1999);
 - Ants (Insecta: Hymenoptera: Formicidae): named species according to Bolton (1995); unnamed species with reference numbers according to the collection currently held by KFBG.
 - Dragonflies (Insecta: Odonata): Schorr *et al.* (2001a, 2001b);
 - Butterflies (Insecta: Lepidoptera): Bascombe (1995).
- Information on the global status of species is from IUCN publications, notably IUCN Species Survival Commission (2001). Certain taxa, including orchids, reptiles, amphibians, fish and invertebrates, have yet to be properly assessed for global status.

- Protected status in China is based on Hua & Yan (1993) for animals, and State Forestry Administration & Ministry of Agriculture (1999) for plants.

Location and management

- Dayaoshan Nature Reserve is largely within Jinxiu Yao Autonomous County, East-Central Guangxi. The coordinates have been given as 23°40'-24°24'N by 109°50'-110°27'E (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The reserve is 2,022 km² in size (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The geology is mainly sand stone and sandy shale. The region has a mountainous landscape with altitude ranging from 110 m at Luoxiang to 1,979 m at Shengtangshan near the centre of the Reserve (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- At Jinxiu town, the mean monthly temperature ranges from 8.3°C in January to 23.9°C in July. Annual precipitation in Jinxiu County is about 1,400 to 2,700 mm, which mainly occurs from April to September (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The area was designated as a Provincial Nature Reserve in 1982 to protect rare wildlife such as *Shinisaurus crocodilurus* (Crocodile Lizard) and *Cathaya argyrophylla*, as well as headwater forests (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). In April 2000 Dayaoshan was upgraded to a National-level nature reserve (Xu and Jiang, 2001). It is managed by the Guangxi Zhuang Autonomous Region Forestry Department.

Results

Vegetation

- Forestry Department of Guangxi Zhuang Autonomous Region (1993) reported up to 1,173 km² of forested area in the Nature Reserve, including 737 km² of natural forest. However, this forest is mostly degraded and fragmented. In 1998 and 2001, natural forest exceeding 20 m in height could be found only above a certain altitude in the areas visited.
- The zonal vegetation of Dayaoshan is subtropical evergreen broadleaf forest in the north and southern subtropical monsoon evergreen broadleaf forest in the south (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
 - The former vegetation type is dominated by *Castanopsis carlesii*, *C. eyrie*, *C. lamontii*, *Schima superba*, *Sloanea sinensis* and *Gamblea pseudoevodiifolia* and occurs on hillsides in the northern part of the Reserve. During the present surveys, mature subtropical broadleaf evergreen forest was found.
 - The latter type is dominated by *Rhodoleia championii*, *Castanopsis hystrix*, *C. fissa*, *Garcinia multiflora*, *Canarium album*, and *Dysoxylum hongkongense* and is found on hillsides at the southern part of the Reserve (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
 - During the present surveys (1998 and 2001) montane mixed coniferous and broadleaf forest dominated by *Podocarpus wangii*, *Fokienia hodginsii*, *Rhododendron simiarum*, and *Pinus kwangtungensis* could still be found on hillsides. Montane forest was still intact and had not been recently logged.
 - Small patches of mixed coniferous and broadleaf forest of *Cathaya argyrophylla*, *Tsuga longibracteata*, *Pinus kwangtungensis*, *Engelhartia fenzelii*, *Lithocarpus chrysocoma* and *Betula* spp. were also found. There was a small patch of forest dominated by *Podocarpus imbricatus*. Plantation of *Illicium verum* and *Cinnamomum cassia* are extensive and could be found on hillsides.

Flora

- Earlier surveys of the Dayaoshan area recorded 2,335 vascular plant species in 213 families (Appendix pp. 381-428 in Dayaoshan Natural Resources Comprehensive Survey Team, 1988) showing that the area has a rich flora. The most speciose families were Asteraceae, Caesalpinaceae, Rubiaceae, Orchidaceae and Poaceae
- The present rapid surveys recorded 285 vascular plant species in 117 families, including 251 angiosperm species in 83 families, 12 gymnosperm species in 6 families, and 22 fern species in 15 families (Table 1).
- One new record for China mainland, *Diplectria barbata*, was found in the 1998 survey at Luoxiang. This species is known from Hainan, India, Indochina and Malaysia.
- A few new records for the Dayaoshan area were also made in the present surveys. They included *Aspidistra sichuanensis*, *Rhododendron orbiculare*, and *Mallotus tenuifolius* (cf. Appendix of Dayaoshan Natural Resources Comprehensive Survey Team, 1988).
- The flora of the northern and montane areas was dominated by subtropical families, such as Ericaceae, Theaceae, Lauraceae, Fagaceae, Araliaceae, and Rosaceae. Tropical and subtropical families including Euphorbiaceae, Moraceae, Rubiaceae, Areaceae and Araceae increased in richness and importance at lower latitudes and altitudes.
- Among the plants recorded in the present surveys, there are several globally Threatened species.
 - *Bretschneidera sinensis* is globally Endangered and is also a Class I Nationally Protected species. In September 2001, two mature fruiting trees were seen, whereas a few saplings were seen at another location.
 - *Diplopanax stachyanthus*, *Fagus longipetiolata*, *Tapiscia sinensis*, and *Calocedrus macrolepis* are globally Vulnerable. The last two species are also Class II Nationally Protected species. Two mature fruiting trees of *Diplopanax stachyanthus* were seen in September 2001.
 - *Cathaya argyrophylla* is at Lower Risk (Conservation-dependent) and is also a Class I Nationally Protected species. A small population of this species was seen in the September 2001 visit.
 - *Fokienia hodginsii* is Lower Risk (Near-threatened) and is also a Class II Nationally Protected species. It was locally common at high altitude on the September 2001 visit.
 - *Pinus kwangtungensis* and *Alsophila spinulosa* are Class II Nationally Protected species. The former is restricted to montane forest in South China whereas the latter is restricted to good forest and its margins.
 - *Cibotium barometz* is a Class II Nationally Protected species, also listed in CITES Appendix II to prevent over-collection for medicinal use. It is still widespread and abundant in South China, but was locally rare in the present survey.
 - In addition to these officially Threatened and Protected species, *Podocarpus wangii* was locally abundant at a high altitude location. Mature individuals of this species had been extensively collected for ornamental purposes. The species is threatened by collection and is restricted to montane forest.
 - Three regionally restricted species were also recorded in the 1998 visit: *Aspidistra fasciaria* (endemic to Guangxi), *Rhododendron orbiculare* ssp. *cardiobasis* (endemic to Guangxi) and *Rhododendron minutiflorum* (East Guangxi and North Guangdong).
- Fifty-six orchid species were recorded in the earlier surveys, but none were recorded in the present survey even in natural forest. This might reflect over-collection of the taxa for medicinal and ornamental purposes, but they may have been overlooked due to the lack of an orchid specialist in the present field team.

Table 1. Vascular plants recorded in the Dayaoshan area, September 1998 and September 2001. Species which are under National Protection (Class I or II) (State Forestry Administration & Ministry of Agriculture, 1999) or globally Threatened or Lower Risk (IUCN Species Survival Commission, 2002) or endemic are indicated.

Family	Scientific name	Remarks
PTERIDOPHYTA		
Aspleniaceae	<i>Asplenium normale</i> D. Don <i>Asplenium prolongatum</i> Hook.	
Blechnaceae	<i>Blechnum orientale</i> L. <i>Woodwardia japonica</i> (L.f.) Sm. <i>Woodwardia orientalis</i> Sw.	
Cyatheaceae	<i>Alsophila spinulosa</i> (Wall. ex Hook.) R.M.Tryon	Protected II
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Elaphoglossaceae	<i>Elaphoglossum yoshinagae</i> (Yatabe) Makino	
Gleicheniaceae	<i>Dicranopteris pedata</i> (Houtt.) Nakaïke <i>Diplazium chinensis</i> (Rosenst.) DeVol <i>Diplazium laevissimum</i> (H. Christ) Nakai	
Hymenophyllaceae	<i>Mecodium badium</i> (Hook. & Grev.) Ching	
Loxogrammeaceae	<i>Loxogramme salicifolia</i> (Makino) Makino	
Lycopodiaceae	<i>Lycopodium casuarinoides</i> (Spring) Holub <i>Palhinhaea cernua</i> (L.) Franco et Vasc.	
Marattiaceae	<i>Angiopteris fokiensis</i> Hieron.	
Osmundaceae	<i>Osmunda vachellii</i> Hook.	
Polypodiaceae	<i>Microsorium buergerianum</i> (Miq.) Ching <i>Pyrrosia lingua</i> (Thunb.) Farw	
Pteridaceae	<i>Histiopteris incisa</i> (Thunb.) J. Sm.	
Pteridiaceae	<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>latiusculum</i> (Desv.) Underw. ex A. Heller	
Vittariaceae	<i>Vittaria flexuosa</i> Fée	
GYMNOSPERMAE		
Cephalotaxaceae	<i>Cephalotaxus fortunei</i> Hook.	
Cupressaceae	<i>Calocedrus macrolepis</i> Kurz <i>Fokienia hodginsii</i> (Dunn) A. Henry & H. Thomas	Vulnerable, Protected II Lower Risk (nt), Protected II
Gnetaceae	<i>Gnetum montanum</i> Markgr.	
Pinaceae	<i>Cathaya argyrophylla</i> Chun & Kuang <i>Pinus kwangtungensis</i> Chun & Tsiang <i>Pinus massoniana</i> Lamb. <i>Pinus taiwanensis</i> Hayata <i>Tsuga longibracteata</i> W.C. Cheng	Lower Risk (cd), Protected I Protected II
Podocarpaceae	<i>Dacrycarpus imbricatus</i> de Laub. var. <i>patulus</i> de Laub. <i>Podocarpus wangii</i> C.C. Chang	
Taxodiaceae	<i>Cunninghamia lanceolata</i> (Lamb.) Hook.	cultivated
ANGIOSPERMAE		
Dicotyledonae		
Acanthaceae	<i>Asystasiella chinensis</i> (S. Moore) E. Hossain <i>Baphicacanthus cusia</i> (Nees) Bremek. <i>Gymnostachyum polyanthum</i> Wight	
Aceraceae	<i>Acer davidii</i> Franch. <i>Acer oliverianum</i> Pax <i>Acer sinense</i> Pax	
Actinidiaceae	<i>Actinidia glaucophylla</i> F. Chun <i>Actinidia meliana</i> Hand.-Mazz. <i>Saurauia tristyla</i> DC.	
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burtt et. A.W. Hill <i>Rhus chinensis</i> Mill. <i>Toxicodendron sylvestri</i> (Siebold & Zucc.) Kuntze	
Annonaceae	<i>Fissistigma oldhamii</i> (Hemsl.) Merr.	

Family	Scientific name	Remarks
Apiaceae	<i>Oenanthe rosthornii</i> Diels	
Aquifoliaceae	<i>Ilex championii</i> Loes. <i>Ilex ficoidea</i> Hemsl. <i>Ilex litseifolia</i> Hu & T. Tang <i>Ilex purpurea</i> Hassk. <i>Ilex szechwanensis</i> Loes.	
Araliaceae	<i>Acanthopanax evodiifolius</i> Franch. <i>Dendropanax dentigerus</i> (Harms ex Diels) Merr. <i>Dendropanax hainanensis</i> (Merr. & Chun) Merr. & Chun <i>Dendropanax proteus</i> Benth. <i>Diplopanax stachyanthus</i> Hand.-Mazz. <i>Gamblea pseudoevodiifolia</i> (K.M. Feng) C.B. Shang et al. <i>Schefflera delavayi</i> (Franch.) Harms <i>Schefflera minutistellata</i> Merr. ex H.L. Li <i>Schefflera octophylla</i> (Lour.) Harms	Vulnerable
Asclepiadaceae	<i>Hoya villosa</i> Costantin	
Asteraceae	<i>Blainvillea acmella</i> (L.) Philipson <i>Ligularia fischeri</i> (Ledeb.) Turcz.	
Balanophoraceae	<i>Balanophora harlandii</i> Hook. f.	
Balsaminaceae	<i>Impatiens amabilis</i> Hook. f. <i>Impatiens</i> sp.	
Begoniaceae	<i>Begonia leprosa</i> Hance	
Berberidaceae	<i>Berberis julianae</i> C.K. Schneid.	
Betulaceae	<i>Betula luminifera</i> H.J.P. Winkl.	
Bretschneideraceae	<i>Bretschneidera sinensis</i> Hemsl.	Endangered
Bursaceae	<i>Canarium album</i> (Lour.) Raeusch. <i>Canarium pimela</i> Leenhouts	
Caryophyllaceae	<i>Drymaria cordata</i> (L.) Willd. ex Roem. & Schult.	
Celastraceae	<i>Celastrus kusanoi</i> Hayata <i>Euonymus hederaceus</i> Champ. ex Benth.	
Clusiaceae	<i>Garcinia multiflora</i> Champ. ex Benth.	
Convolvulaceae	<i>Ipomoea cairica</i> (L.) Sweet	pantropical weed
Cornaceae	<i>Dendrobenthamia ferruginea</i> (Y.C. Wu) W.P. Fang <i>Dendrobenthamia hongkongensis</i> (Hemsl.) Hutch.	
Cucurbitaceae	<i>Gynostemma pentaphylla</i> (Thunb.) Makino	
Daphniphyllaceae	<i>Daphniphyllum macropodum</i> Miq. <i>Daphniphyllum oldhami</i> (Hemsl.) Rosenth.	
Ebenaceae	<i>Diospyros kaki</i> Thunb. var. <i>silvestris</i> Makino	
Elaeocarpaceae	<i>Elaeocarpus silvestris</i> (Lour.) Poir. <i>Elaeocarpus varunua</i> Buch.-Ham. <i>Sloanea sinensis</i> (Hance) Hemsl.	
Ericaceae	<i>Gaultheria leucocarpa</i> Blume var. <i>crenulata</i> (Kurz) T.Z. Hsu <i>Lyonia ovalifolia</i> (Wall.) Drude var. <i>lanceolata</i> (Wall.) Hand.-Mazz. <i>Rhododendron cavaleriei</i> H. Lév. <i>Rhododendron faithiae</i> Chun <i>Rhododendron farrerae</i> Tate <i>Rhododendron guihainianum</i> G.Z. Li <i>Rhododendron hainanense</i> Merr. <i>Rhododendron kwangsiense</i> Hu ex P.C. Tam <i>Rhododendron kwangtungense</i> Merr. & Chun <i>Rhododendron latoucheae</i> Franch. <i>Rhododendron levinei</i> Merr. <i>Rhododendron liliiflorum</i> H. Lév. <i>Rhododendron mariae</i> Hance ssp. <i>kwangsiense</i> (Hu ex P.C. Tam) Chamb. & Rae <i>Rhododendron minutiflorum</i> Hu <i>Rhododendron mitrifforme</i> P.C. Tam <i>Rhododendron moulmianense</i> Hook. f. (<i>R. westlandii</i> Hemsl.) <i>Rhododendron orbiculare</i> Decne. ssp. <i>cardiobasis</i> (Sleumer)	endemic to Guangxi & N. Guangdong endemic to Guangxi

Family	Scientific name	Remarks
	D.F. Chamb.	
	<i>Rhododendron rivulare</i> Hand.-Mazz.	
	<i>Rhododendron simiarum</i> Hance	
Erythroxylaceae	<i>Erythroxylum sinense</i> Y. C. Wu	
Escalloniaceae	<i>Itea coriacea</i> Y.C. Wu	
Euphorbiaceae	<i>Bischofia javanica</i> Blume	
	<i>Macaranga adenantha</i> Gagnep.	
	<i>Macaranga henryi</i> (Pax & K. Hoffm.) Rehder	
	<i>Mallotus apelta</i> (Lour.) Müll.-Arg.	
	<i>Mallotus barbatus</i> (Wall.) Müll. Arg.	
	<i>Mallotus japonicus</i> (Thunb.) Müll. Arg. var. <i>floccosus</i> (Müll. Arg.) S.M. Hwang	
	<i>Mallotus lianus</i> Croizat	
	<i>Sapium discolor</i> (Champ. ex Benth.) Müll.-Arg.	
	<i>Vernicia fordii</i> (Hemsl.) Airy Shaw	
Fagaceae	<i>Castanopsis carlesii</i> (Hemsl.) Hayata	
	<i>Castanopsis eyrei</i> (Champ. ex Benth.) Tutcher	
	<i>Castanopsis fabri</i> Hance	
	<i>Castanopsis fargesii</i> Franch.	
	<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder et E. H. Wilson	
	<i>Castanopsis fordii</i> Hance	
	<i>Castanopsis lamontii</i> Hance	
	<i>Castanopsis tibetana</i> Hance	
	<i>Fagus longipetiolata</i> Seemen	Vulnerable
	<i>Lithocarpus chrysocomus</i> Chun & Tsiang	
	<i>Lithocarpus corneus</i> (Lour.) Rehder	
	<i>Lithocarpus hancei</i> (Benth.) Rehder	
Gentianaceae	<i>Latouchea fokienensis</i> Franch.	
Gesneriaceae	<i>Chirita pinnatifida</i> (Hand.-Mazz.) B.L. Burt	
	<i>Hemiboea follicularis</i> C.B. Clarke	
	<i>Hemiboea subcapitata</i> C.B. Clarke	
Hamamelidaceae	<i>Altingia chinensis</i> (Champ. ex Benth.) Oliv. ex Hance	
	<i>Exbucklandia populnea</i> (R. Brown) R. W. Brown	
	<i>Exbucklandia tonkinensis</i> (Lecomte) Steenis	
	<i>Liquidambar formosana</i> Hance	
	<i>Rhodoleia championii</i> Hook. f.	
	<i>Sycopsis sinensis</i> Oliv.	
Hernandiaceae	<i>Illigera celebica</i> Miq.	
Hydrangeaceae	<i>Dichroa febrifuga</i> Lour.	
	<i>Hydrangea paniculata</i> Siebold	
	<i>Schizophragma integrifolium</i> Oliv.	
Illiciaceae	<i>Illicium verum</i> Hook. f.	cultivated
Juglandaceae	<i>Engelhardtia fenzelii</i> Merr.	
Lauraceae	<i>Cinnamomum austrosinense</i> H.T. Chang	
	<i>Cinnamomum bejolghota</i> (Buch.-Ham.) Sweet	
	<i>Cinnamomum cassia</i> (L.) Presl	cultivated
	<i>Cinnamomum porrectum</i> (Roxb.) Kosterm.	
	<i>Lindera communis</i> Hemsl.	
	<i>Lindera glauca</i> (Siebold & Zucc.) Blume	
	<i>Litsea cubeba</i> (Lour.) Pers.	
	<i>Litsea elongata</i> (Nees) Benth. et Hook. f.	
	<i>Machilus chinensis</i> (Champ. ex Benth.) Hemsl.	
	<i>Machilus decursinervis</i> Chun	
	<i>Machilus litseifolia</i> S. K. Lee	
	<i>Neolitsea aurata</i> (Hayata) Koidz.	
	<i>Neolitsea cambodiana</i> Lecomte	
Loganiaceae	<i>Gelsemium elegans</i> (Gardner et Champ.) Benth.	
Magnoliaceae	<i>Manglietia chingii</i> Dandy	
	<i>Manglietia fordiana</i> Oliv.	
	<i>Michelia chapensis</i> Dandy	
	<i>Michelia maudiae</i> Dunn	

Family	Scientific name	Remarks
Malvaceae	<i>Abelmoschus manihot</i> (L.) Medik. <i>Hibiscus mutabilis</i> L.	cultivated
Melastomataceae	<i>Blastus cochinchinensis</i> Lour. <i>Diplectria barbata</i> (Triana ex C.B. Clarke) Franken & Roos <i>Melastoma affine</i> D. Don	
Meliaceae	<i>Toona sinensis</i> (Juss.) Roem.	
Mimosaceae	<i>Albizia julibrissin</i> Durazz. <i>Albizia kalkora</i> (Roxb.) Prain <i>Cylindrokelupha kerrii</i> (Gagnep.) T.L. Wu <i>Pithecellobium clypearia</i> (Jack) Benth.	
Moraceae	<i>Cudrania tricuspidata</i> (Carrière) Bureau ex Lavalley <i>Ficus auriculata</i> Lour. <i>Ficus esquiroliana</i> H. Lév. (<i>F. fulva</i> auct. non Reinw. ex Blume) <i>Ficus microcarpa</i> L. f. <i>Ficus variolosa</i> Lindl. ex Benth.	
Myricaceae	<i>Myrica rubra</i> (Lour.) Sieb. et Zucc.	
Myrsinaceae	<i>Embelia laeta</i> (L.) Mez <i>Embelia parviflora</i> Wall. ex A. DC. <i>Mysine seguinii</i> H. Lév	
Myrtaceae	<i>Syzygium buxifolium</i> Hook. et Arn.	
Nyssaceae	<i>Nyssa sinensis</i> Oliv.	
Oleaceae	<i>Jasminum sinense</i> Hemsl. <i>Osmanthus reticulatus</i> P.S. Green	
Papilionaceae	<i>Desmodium sequax</i> Wall.	
Pentaphylacaceae	<i>Pentaphylax euryoides</i> Gardner & Champ.	
Piperaceae	<i>Piper hancei</i> Maxim.	
Proteaceae	<i>Helicia reticulata</i> W. T. Wang	
Rosaceae	<i>Eriobotrya cavaleriei</i> (H. Lév.) Rehder <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>Photinia glabra</i> (Thunb.) Maxim. <i>Prunus campanulata</i> Maxim. <i>Rubus columllaris</i> Tutcher <i>Rubus reflexus</i> Ker <i>Rubus suavissimus</i> S. Lee <i>Sorbus hemsleyi</i> (C.K. Schneid.) Rehder	
Rubiaceae	<i>Aidia canthioides</i> (Champ. ex Benth.) Masam. <i>Lasianthus longicaudus</i> Hook. f. <i>Mussaenda esquirolii</i> H. Lév. <i>Pertusadina hainanensis</i> (F.C. How) Ridsdale <i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil. <i>Wendlandia uvariifolia</i> Hance	
Rutaceae	<i>Skimmia reevesiana</i> (Fortune) Fortune	
Sabiaceae	<i>Meliosma glandulosa</i> Cufod. <i>Meliosma squamulata</i> Hance	
Schisandraceae	<i>Kadsura coccinea</i> (Lem.) A.C. Sm. <i>Schisandra henryi</i> C.B. Clarke	
Scrophulariaceae	<i>Brandisia swinglei</i> Merr. <i>Paulownia fortunei</i> (Seem.) Hemsl. <i>Paulownia kawakamii</i> Ito <i>Scrophularia ningpoensis</i> Hemsl. <i>Torenia asiatica</i> L.	
Solanaceae	<i>Lycianthes yunnanensis</i> (Bitter) C.Y. Wu & S.C. Huang	
Staphyleaceae	<i>Tapiscia sinensis</i> Oliv. <i>Turpinia arguta</i> (Lindl.) Seem.	Vulnerable
Sterculiaceae	<i>Firmiana platanifolia</i> (L.f.) Marsili	
Styracaceae	<i>Alniphyllum fortunei</i> (Hemsl.) Makino <i>Melliodendron xylocarpum</i> Hand.-Mazz. <i>Rehderodendron kwangtungense</i> Chun <i>Styrax faberi</i> Perkins	

Family	Scientific name	Remarks
Symlocaceae	<i>Styrax japonicus</i> Siebold & Zucc.	
	<i>Symplocos anomala</i> Brand	
	<i>Symplocos lancifolia</i> Siebold & Zucc.	
	<i>Symplocos ramosissima</i> Wall. ex G. Don	
	<i>Symplocos</i> sp.	
Theaceae	<i>Adinandra bockiana</i> E. Pritz var. <i>acutifolia</i> (Hand.-Mazz.) Kobuski	
	<i>Adinandra nitida</i> Merr. ex H.L. Li	
	<i>Anneslea fragrans</i> Wall.	
	<i>Camellia caudata</i> Wall.	
	<i>Camellia cordifolia</i> (F.P. Metcalf) Nakai	
	<i>Camellia cuspidata</i> (Kochs) Wright	
	<i>Camellia sinensis</i> (L.) Kuntze	
	<i>Cleyera japonica</i> Thunb.	
	<i>Cleyera pachyphylla</i> Chun ex H.T. Chang	
	<i>Eurya loquaiana</i> Dunn	
	<i>Eurya nitida</i> Korthals	
	<i>Gordonia axillaris</i> (Roxb. ex Ker Gawl.) Dietr.	
	<i>Schima argentea</i> E. Pritz.	
	<i>Schima superba</i> Gardn. et Champ.	
	<i>Ternstroemia gymnanthera</i> (Wight & Arn.) Bedd.	
	<i>Tutcheria hirta</i> (Hand.-Mazz.) H.L. Li	
	Thymelaeaceae	<i>Daphne papyracea</i> Wall. ex Steud.
Urticaceae	<i>Elatostema dissectum</i> Wedd.	
	<i>Elatostema lineolatum</i> Wight var. <i>majus</i> Wedd.	
	<i>Oreocnide frutescens</i> (Thunb.) Miq.	
Verbenaceae	<i>Oreocnide obovata</i> (C.H. Wright) Merr.	
	<i>Callicarpa longifolia</i> Lam.	
	<i>Callicarpa longissima</i> (Hemsl.) Merr.	
Vitaceae	<i>Clerodendrum cyrtophyllum</i> Turcz.	
	<i>Cissus pteroclada</i> Hayata	
Monocotyledonae		
Amaryllidaceae	<i>Curculigo capitulata</i> (Lour.) Kuntze	
	<i>Lycoris radiata</i> (L'Hér.) Herb.	
Araceae	<i>Acorus gramineus</i> Sol.	
	<i>Alocasia macrorrhiza</i> (L.) Schott	
	<i>Epipremnum pinnatum</i> (L.) Engl.	
Areaceae	<i>Calamus rhabdocladus</i> Burret	
	<i>Caryota ochlandra</i> Hance	
	<i>Pinanga discolor</i> Burret	
	<i>Pinanga sinii</i> Burret	
Commelinaceae	<i>Amischotolype hispida</i> (Less. & A. Rich.) D.Y. Hong	
Cyperaceae	<i>Carex baccans</i> Nees	
	<i>Carex cruciata</i> Wahlenb.	
	<i>Carex filicina</i> Nees	
	<i>Carex perakensis</i> C.B. Clarke	
Iridaceae	<i>Iris tectorum</i> Maxim.	
Liliaceae	<i>Aspidistra fasciaria</i> G.Z. Li	endemic to Guangxi
	<i>Aspidistra minutiflora</i> Stapf	
	<i>Aspidistra sichuanensis</i> K.Y. Lang & Z.Y. Zhu	
	<i>Disporum cantoniense</i> (Lour.) Merr.	
	<i>Phrynium rheedei</i> Suresh & Nicolson	
Marantaceae	<i>Musa balbisiana</i> Colla	
Musaceae	<i>Pandanus austrosinensis</i> T. L. Wu	
Pandanaceae	<i>Dendrocalamus minor</i> (McClure) L.C. Chia & H.L. Fung	
Poaceae	<i>Indocalamus longiauritus</i> Hand.-Mazz.	
	<i>Indosasa shibataeoides</i> McClure	
	<i>Miscanthus sinensis</i> Andersson	
	<i>Phyllostachys bambusoides</i> Siebold & Zucc.	
	<i>Alpinia chinensis</i> (J. König) Roscoe	

Family	Scientific name	Remarks
	<i>Amomum austrosinense</i> D. Fang	
	<i>Caulokaempferia coenobialis</i> (Hance) K. Larsen	
	<i>Costus speciosus</i> (J. Koenig) Smith	

Mammals

- A number of giant flying squirrels (probably Indian Giant Flying Squirrel *Petaurista philippensis*) were seen and heard in the evening of 21 September 1998.
- A Red-hipped Squirrel *Dremomys pyrrhomerus* was heard in a forest on 22 September 1998.
- A Malayan Porcupine *Hystrix brachyura* was seen on 19 September 1998.
- A Maritime Striped Squirrel *Tamiops maritimus* was seen on 23 September 1998.
- Species reported to occur by local residents and staff are listed in Table 2.
- Scat of an unidentified small carnivore was found on 21 September 1998.

Table 2. The status of mammals (excluding Insectivora, Chiroptera and Muridae) at Dayaoshan National Nature Reserve, East Guangxi. Based mainly on interviews with farmers and workers. “+” = rare, “++” = quite common, “+++” = abundant. Species names and sequence follow D.E. Wilson & Cole (2000).

Scientific name	English name	Mr. Tan (northern)	worker (southern)	Probable status
<i>Tupaia belangeri</i>	Northern Tree Shrew	-	+++	uncertain
<i>Macaca mulatta</i>	Rhesus Monkey	+++	+	present
<i>Macaca thibetana</i>	Père David's Macaque	-	+++	insecure
<i>Cuon alpinus</i>	Dhole	+	+	insecure
<i>Prionailurus bengalensis</i>	Leopard Cat	?	+	insecure
<i>Neofelis nebulosa</i>	Clouded Leopard	+	-	insecure
<i>Melogale moschata</i>	Chinese Ferret-badger	+++	+++	present
<i>Mustela kathiah</i>	Yellow-bellied Weasel	+++	+++	present
<i>Paguma larvata</i>	Masked Palm Civet	+++	+	present
<i>Viverra zibetha</i>	Large Indian Civet	+	-	insecure
<i>Viverricula indica</i>	Small Indian Civet	+	+	insecure
<i>Sus scrofa</i>	Wild Boar	+++	+++	present
<i>Moschus berezovskii</i>	Chinese Forest Musk Deer	+	+	insecure
<i>Elaphodus cephalophus</i>	Tufted Deer	-	+	insecure
<i>Muntiacus muntjak</i>	Indian Muntjac	-	+++	uncertain
<i>Muntiacus reevesii</i>	Chinese Muntjac	+++	+	present
<i>Muntiacus crinifrons</i>	Black Muntjac	+	-	uncertain
<i>Naemorhedus sumatraensis</i>	Serow	+	+	insecure
<i>Manis pentadactyla</i>	Chinese Pangolin	+	+	insecure
<i>Callosciurus erythraeus</i>	Pallas's Squirrel	-	+++	present
<i>Dremomys pyrrhomerus</i>	Red-hipped Squirrel	+++	++	present
<i>Tamiops maritimus</i> (or <i>T. swinhoei</i>)	Maritime Striped Squirrel (or Swinhoe's Striped Squirrel)	+++	+++	present
<i>Belomys pearsonii</i>	Hairy-footed Flying Squirrel	-	+++	common
<i>Petaurista philippensis</i> (or <i>P. petaurista</i>)	Indian Giant Flying Squirrel (or Red Giant Flying Squirrel)	+	+	insecure
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat	+++	+++	present
<i>Rhizomys sinensis</i>	Chinese Bamboo Rat	+	+	present
<i>Hystrix brachyura</i>	Malayan Porcupine	+	+	insecure
<i>Lepus sinensis</i>	Chinese Hare	++	++	present

- Of the species reported to occur, many are of conservation importance:
 - Black Muntjac *Muntiacus crinifrons* has not been confirmed to occur in Guangxi, but recent evidence suggests it may occur from Myanmar to East China (J.R. MacKinnon, pers. comm., 2002). It is considered a globally Vulnerable species, and Class I protected nationally.

- Dhole *Cuon alpinus*, Clouded Leopard *Neofelis nebulosa*, Serow *Naemorhedus sumatraensis* and Malayan Porcupine *Hystrix brachyura* are Vulnerable globally. Clouded Leopard is Class I Protected nationally. Dhole and Serow are Class II Protected nationally.
- Rhesus Monkey *Macaca mulatta*, Père David’s Macaque *Macaca thibetana*, Chinese Forest Musk Deer *Moschus berezovskii*, Chinese Pangolin *Manis pentadactyla* and Hairy-footed Flying Squirrel *Belomys pearsonii* are at Lower Risk (Near-threatened) globally. The first four species are Class II Protected nationally.
- Large Indian Civet *Viverra zibetha* and Small Indian Civet *Viverricula indica* are Class II Protected nationally.
- Tufted Deer *Elaphodus cephalophus* is Data Deficient globally.

Birds

- One hundred and one species of birds were recorded in the various sections of Dayaoshan National Nature Reserve during this survey (Table 3).
- The most frequently encountered species included Red-billed Leiothrix *Leiothrix lutea*, Grey-cheeked Fulvetta *Alcippe morrisonia*, Yellow-browed Warbler *Phylloscopus inornatus*, Chestnut Bulbul *Hemixos castanonotus*, Sulphur-breasted Warbler *Phylloscopus ricketti*, Grey-headed Canary Flycatcher *Culicicapa ceylonensis*, Pygmy Wren Babbler *Pnoepyga pusilla*, Slaty-backed Forktail *Enicurus schistaceus*, Small Niltava *Niltava macgrigoriae* and Streak-breasted Scimitar Babbler *Pomatorhinus ruficollis*.
- New records for Dayaoshan included Little Heron *Butorides striatus*, Yellow Bittern *Ixobrychus sinensis*, Black-shouldered Kite *Elanus caeruleus*, Peregrine Falcon *Falco peregrinus*, Cabot’s Tragopan *Tragopan caboti*, Slaty-legged Crake *Railluna eurizonoides*, Green-billed Malkoha *Phoenicophaeus tristis*, Oriental Scops Owl *Otus sunia*, Savanna Nightjar *Caprimulgus affinis*, Black-capped Kingfisher *Halcyon pileata*, Forest Wagtail *Dendronanthus indicus*, Rufescent Prinia *Prinia rufescens*, Brown Bush Warbler *Bradypterus luteoventris*, Siberian Blue Robin *Luscinia cyane*, Red-tailed Laughingthrush *Garrulax milnei*, Chestnut-fronted Shrike Babbler *Pteruthius aenobarbus*, Crimson Sunbird *Aethopyga siparaja* and Scarlet-backed Flowerpecker *Dicaeum cruentatum*.

Table 3. Birds recorded in Dayaoshan National Nature Reserve, East Guangxi, 15-20 September 1998. Sequence based on Clements (2000).

Scientific name	English name
<i>Butorides striatus</i>	Little Heron
<i>Ixobrychus sinensis</i>	Yellow Bittern
<i>Elanus caeruleus</i>	Black-shouldered Kite
<i>Spilornis cheela</i>	Crested Serpent Eagle
<i>Accipiter trivirgatus</i>	Crested Goshawk
<i>Accipiter badius</i>	Shikra
<i>Accipiter virgatus</i>	Besra
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge
<i>Tragopan caboti</i>	Cabot’s Tragopan
<i>Lophura nycthemera</i>	Silver Pheasant
<i>Railluna eurizonoides</i>	Slaty-legged Crake
<i>Phaenicophaeus tristis</i>	Green-billed Malkoha
<i>Centropus sinensis</i>	Greater Coucal
<i>Glaucidium brodiei</i>	Collared Owlet
<i>Otus spilocephalus</i>	Mountain Scops Owl
<i>Otus sunia</i>	Oriental Scops Owl
<i>Caprimulgus affinis</i>	Savanna Nightjar

Scientific name	English name
<i>Apus pacificus</i>	Fork-tailed Swift
<i>Apus affinus</i>	House Swift
<i>Alcedo atthis</i>	Common Kingfisher
<i>Halcyon pileata</i>	Black-capped Kingfisher
<i>Eurystomus orientalis</i>	Dollarbird
<i>Megalaima virens</i>	Great Barbet
<i>Megalaima oorti</i>	Black-browed Barbet
<i>Picumnus innominatus</i>	Speckled Piculet
<i>Sasia ochracea</i>	White-browed Piculet
<i>Blythipicus pyrrhotis</i>	Bay Woodpecker
<i>Pitta nympha</i>	Fairy Pitta
<i>Hirundo rustica</i>	Barn Swallow
<i>Delichon dasypus</i>	Asian House Martin
<i>Dendronanthus indicus</i>	Forest Wagtail
<i>Motacilla alba</i>	White Wagtail
<i>Motacilla cinerea</i>	Grey Wagtail
<i>Anthus hodgsoni</i>	Olive-backed Pipit
<i>Pericrocotus solaris</i>	Grey-throated Minivet
<i>Pericrocotus roseus</i>	Rosy Minivet
<i>Pericrocotus flammeus</i>	Scarlet Minivet
<i>Pericrocotus solaris</i>	Grey-chinned Minivet
<i>Spizixos semitorques</i>	Collared Finchbill
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul
<i>Pycnonotus xanthorrhous</i>	Brown-breasted Bulbul
<i>Pycnonotus sinensis</i>	Light-vented Bulbul
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul
<i>Hemixos castanonotus</i>	Chestnut Bulbul
<i>Hypsipetes mcclllandii</i>	Mountain Bulbul
<i>Cinclus pallasii</i>	Brown Dipper
<i>Myophonus caeruleus</i>	Blue Whistling Thrush
<i>Zoothera citrina</i>	Orange-headed Thrush
<i>Prinia atrogularis</i>	Hill Prinia
<i>Prinia rufescens</i>	Rufescent Prinia
<i>Prinia flaviventris</i>	Yellow-bellied Prinia
<i>Prinia inornata</i>	Plain Prinia
<i>Bradypterus luteoventris</i>	Brown Bush Warbler
<i>Orthotomus sutorius</i>	Common Tailorbird
<i>Phylloscopus fuscatus</i>	Dusky Warbler
<i>Phylloscopus inornatus</i>	Yellow-browed Warbler
<i>Phylloscopus borealis</i>	Arctic Warbler
<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler
<i>Phylloscopus ricketti</i>	Sulphur-breasted Warbler
<i>Seicercus burkii</i>	Golden-spectacled Warbler
<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler
<i>Muscicapa sibirica</i>	Dark-sided Flycatcher
<i>Muscicapa dauurica</i>	Asian Brown Flycatcher
<i>Niltava macgrigoriae</i>	Small Niltava
<i>Cyornis hainanus</i>	Hainan Blue Flycatcher
<i>Eumyias thalassina</i>	Verditer Flycatcher
<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher
<i>Luscinia cyane</i>	Siberian Blue Robin
<i>Rhyacornis fuliginosus</i>	Plumbeous Water Redstart
<i>Enicurus scouleri</i>	Little Forktail

Scientific name	English name
<i>Enicurus schistaceus</i>	Slaty-backed Forktail
<i>Enicurus leschenaulti</i>	White-crowned Forktail
<i>Garrulax canorus</i>	Hwamei
<i>Garrulax milnei</i>	Red-tailed Laughingthrush
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler
<i>Pomatorhinus erythrocnemis</i>	Spot-breasted Scimitar Babbler
<i>Pnoepyga pusilla</i>	Pygmy Wren Babbler
<i>Stachyris ruficeps</i>	Rufous-capped Babbler
<i>Leiothrix lutea</i>	Red-billed Leiothrix
<i>Pteruthius flaviscapis</i>	White-browed Shrike Babbler
<i>Pteruthius aenobarbus</i>	Chestnut-fronted Shrike Babbler
<i>Alcippe variegaticeps</i>	Gold-fronted Fulvetta
<i>Alcippe brunnea</i>	Dusky Fulvetta
<i>Alcippe morrisonia</i>	Grey-cheeked Fulvetta
<i>Yuhina castaniceps</i>	Striated Yuhina
<i>Yuhina nigrimenta</i>	Black-chinned Yuhina
<i>Yuhina zantholeuca</i>	White-bellied Yuhina
<i>Parus major</i>	Great Tit
<i>Parus spilonotus</i>	Yellow-cheeked Tit
<i>Aethopyga christinae</i>	Fork-tailed Sunbird
<i>Aethopyga siparaja</i>	Crimson Sunbird
<i>Dicaeum cruentatum</i>	Scarlet-backed Flowerpecker
<i>Lanius schach</i>	Long-tailed Shrike
<i>Dicrurus macrocercus</i>	Black Drongo
<i>Dicrurus hottentottus</i>	Spangled Drongo
<i>Urocissa erythrorhyncha</i>	Red-billed Blue Magpie
<i>Dendrocitta formosae</i>	Grey Treepie
<i>Lonchura striata</i>	White-rumped Munia
<i>Lonchura punctulata</i>	Scaly-breasted Munia
<i>Melophus lathami</i>	Crested Bunting

- In addition to the above species, the following have previously been recorded in Dayaoshan (Dayaoshan Natural Resources Comprehensive Survey Team, 1988; Lewthwaite, 1996): Chinese Pond Heron *Ardeola bacchus*, Cinnamon Bittern *Ixobrychus cinnamomeus*, Black Baza *Aviceda leuphotes*, Grey-faced Buzzard *Butastur indicus*, Mountain Hawk Eagle *Spizaetus nipalensis*, Common Kestrel *Falco tinnunculus*, Chinese Francolin *Francolinus pintadeanus*, Common Pheasant *Phasianus colchicus*, White-breasted Waterhen *Amaurornis phoenicurus*, Eurasian Woodcock *Scolopax rusticola*, Oriental Turtle Dove *Streptopelia orientalis*, Spotted Dove *Streptopelia chinensis*, Large Hawk Cuckoo *Hierococcyx sparveroides*, Hodgson's Hawk Cuckoo *Hierococcyx fugax*, Indian Cuckoo *Cuculus micropterus*, Oriental Cuckoo *Cuculus saturatus*, Drongo Cuckoo *Surniculus lugubris*, Lesser Coucal *Centropus bengalensis*, Brown Wood Owl *Strix leptogrammica*, Asian Barred Owlet *Glaucidium cuculoides*, Grey Nightjar *Caprimulgus indicus*, Silver-backed Needletail *Hirundapus cochinchinensis*, White-throated Kingfisher *Halcyon smyrnensis*, Pied Kingfisher *Ceryle rudis*, Blue-throated Barbet *Megalaima asiatica*, Rufous Woodpecker *Celeus brachyurus*, Grey-headed Woodpecker *Picus canus*, Richard's Pipit *Anthus richardi*, Orange-bellied Leafbird *Chloropsis hardwickii*, Chestnut-bellied Rock Thrush *Monticola rufiventris*, Blue Rock Thrush *Monticola solitarius*, Scaly Thrush *Zoothera dauma*, Grey-backed Thrush *Turdus hortulorum*, Japanese Thrush *Turdus cardis*, Eyebrowed Thrush *Turdus obscurus*, Pale Thrush *Turdus pallidus*, Slaty-bellied Tesia *Tesia olivea*, Brownish-flanked Bush Warbler *Cettia fortipes*, Russet Bush Warbler *Bradypterus seebohmi*, Mountain Tailorbird *Orthotomus cuculatus*, Yellow-streaked Warbler *Phylloscopus armandii*, Rufous-faced Warbler *Abroscopus albogularis*, Brown-chested Jungle

Flycatcher *Rhinomyias brunneata*, Brown-breasted Flycatcher *Muscicapa muttui*, Mugimaki Flycatcher *Ficedula mugimaki*, Blue-and-white Flycatcher *Cyanoptila cyanomelana*, Pale Blue Flycatcher *Cyornis unicolor*, Orange-flanked Bush Robin *Tarsiger cyanurus*, Oriental Magpie Robin *Copsychus saularis*, Daurian Redstart *Phoenicurus auroreus*, White-tailed Robin *Myiomela leucura*, Common Stonechat *Saxicola torquata*, White-capped Water Redstart *Chaimarrornis leucocephalus*, Greater Necklaced Laughingthrush *Garrulax pectoralis*, Black-throated Laughingthrush *Garrulax chinensis*, Eyebrowed Wren Babbler *Napothera epilepidota*, Spot-necked Babbler *Stachyris striolata*, Red-tailed Minla *Minla ignotincta*, Grey-headed Parrotbill *Paradoxornis gularis*, Vinous-throated Parrotbill *Paradoxornis webbianus*, Black-throated Tit *Aegithalos concinnus*, Fire-breasted Flowerpecker *Dicaeum ignipectus*, Japanese White-eye *Zosterops japonicus*, Oriental White-eye *Zosterops palpebrosus*, Black-naped Oriole *Oriolus chinensis*, Tiger Shrike *Lanius tigrinus*, Brown Shrike *Lanius cristatus*, Bronzed Drongo *Dicrurus aeneus*, Black-billed Magpie *Pica pica*, Collared Crow *Corvus torquatus*, Large-billed Crow *Corvus macrorhynchus*, Carrion Crow *Corvus corone*, Crested Myna *Acridotheres cristatellus*, White-shouldered Starling *Sturnus sinensis*, Eurasian Tree Sparrow *Passer montanus*, Grey-capped Greenfinch *Carduelis sinica*, Brambling *Fringilla montifringilla*, Little Bunting *Emberiza pusilla*, Yellow-throated Bunting *Emberiza elegans*, Yellow-breasted Bunting *Emberiza aureola*, Chestnut Bunting *Emberiza rutila* and Black-faced Bunting *Emberiza spodocephala*. Altogether 184 species have been recorded from Dayaoshan.

- A number of species are of particular conservation concern.
 - Cabot’s Tragopan, Fairy Pitta, Brown-chested Jungle Flycatcher and Gold-fronted Fulvetta are globally Vulnerable. Cabot’s Tragopan and Fairy Pitta are also Class II Protected nationally.
 - Black Baza, Black-shouldered Kite, Crested Serpent Eagle, Crested Goshawk, Besra, Shikra, Grey-faced Buzzard, Mountain Hawk Eagle, Common Kestrel, Peregrine Falcon, Silver Pheasant, Greater Coucal, Lesser Coucal, Mountain Scops Owl, Oriental Scops Owl, Brown Wood Owl, Collared Owlet and Asian Barred Owlet are Class II Protected nationally.
- The presence of many forest-dependent species, such as barbets, woodpeckers, minivets, Fairy Pitta, various bulbuls, babblers, flycatchers, warblers and sunbirds indicated that some of the forests surveyed still had high ecological integrity. The forest avifauna was especially rich near Linhai Villa and at Shengtangshan.
- Larger-bodied birds susceptible to hunting, such as pigeons and owls, were generally low in number during the present surveys.

Reptiles and Amphibians

- A total of 20 species of amphibians, seven species of lizards and 15 species of snakes were recorded in and near Dayaoshan Nature Reserve during the rapid survey (Table 4).
- The most frequently encountered species included the frogs *Rana limnocharis*, *Amolops chunganensis*, *Amolops ricketti*, *Rana schmackeri* and *Microhyla heymonsi*, the lizards *Platyplacopus kuehnei* and *Sphenomorphus indicus*, and the snakes *Sinonatrix percarinata* and *Trimeresurus stejnegeri*.
- Some species could not be firmly identified:
 - Two types of tadpoles found in the streams in northern Dayaoshan. They probably belong to *Megophrys minor* and *Paa spinosa*.
 - A large green frog belonging to the *Rana (Odorana)* group, probably a new record or a new species;
 - A tree frog resembling *Polypedates chenfui* (which has not been previously recorded from Guangxi).
 - A tiny rhacophorid tree frog.
 - A small *Scincella* skink resembling *S. rupicola* from Southeast Asia but with scaly eyelids; its identity is still under investigation.

- New records for the reserve included *Leptolalax pelodytoides*, *Amolops chunganensis*, *Rana johnsi*, *Platyplacopus kuehnei*, *Eumeces elegans*, *Scincella* (cf. *rupicola*) sp., *Achalinus ater*, *Elaphe frenata*, *Sibynophis chinensis*, *Sibynophis collaris* and *Calliophis maccllellandi*.

Table 4. Amphibians and reptiles recorded in and around Dayaoshan Nature Reserve, East Guangxi, September 1998. Sequence follows Zhao E.-M. & Adler (1993).

Species	Habitat	Records
AMPHIBIA		
<i>Bombina fortinuptialis</i>	forest	✓
<i>Brachytarsophrys carinensis</i>	stream	✓, eggs
<i>Leptolalax pelodytoides</i>	village	✓
	forest	✓, tadpoles
<i>Vibrissaphora liui</i>	stream	tadpoles
<i>Hyla sanchiangensis</i>	forest/ banana plantation	✓
<i>Microhyla butleri</i>	ditch	tadpoles
<i>Microhyla heymonsi</i>	pool	tadpoles
	forest	✓
	plantation	✓
	agricultural field	✓
	ditch	tadpoles
	container	tadpoles
<i>Microhyla pulchra</i>	pool	✓
<i>Amolops chunganensis</i>	Stream	✓, eggs
	riparian forest	✓
<i>Amolops ricketti</i>	stream	✓
<i>Paa spinosa</i>	stream	✓, tadpoles?
<i>Rana guentheri</i>	plantation	✓
<i>Rana johnsi</i>	stream	✓
<i>Rana limnocharis</i>	forest	✓
	paddy field	✓
	pool	✓
	ditch	✓
	river bank	✓
	stream	✓
<i>Rana schmackeri</i>	stream	✓, tadpoles
	river	✓
<i>Rana</i> sp.	forest	✓
<i>Philautus rhododiscus</i>	container	tadpoles
<i>Polypedates chenfui</i> ?	forest	✓
	forest/ banana plantation	✓
		✓
<i>Polypedates dennysi</i>	stream	✓
<i>Polypedates megacephalus</i>	forest/banana plantation	✓
		✓
Tiny rhacophorid frog	forest	✓
REPTILIA		
<i>Calotes versicolor</i>	agricultural field	✓
	forest edge	✓
<i>Shinisaurus crocodilurus</i>	stream	✓
<i>Platyplacopus kuehnei</i>	village	✓
	forest edge	✓
	plantation	✓
	forest	✓
<i>Eumeces elegans</i>	forest edge	✓
<i>Scincella</i> (cf. <i>rupicola</i>) sp.	forest	✓

Species	Habitat	Records
<i>Sphenomorphus indicus</i>	forest edge	✓
	forest	✓
<i>Tropidophorus sinicus</i>	stream	✓
<i>Achalinus ater</i>	forest edge	✓
<i>Dinodon flavozonatum</i>	paddy field/forest	✓
<i>Elaphe frenata</i>	forest	✓
	forest edge	✓
<i>Elaphe taeniura</i>	village	✓
<i>Lycodon ruhstrati</i>	grassland	✓
<i>Opisthotropis latouchii</i>	stream	✓
<i>Plagiopholis styani</i>	forest	✓
<i>Pseudoxenodon bambusicola</i>	plantation	✓
<i>Ptyas korros</i>	river	✓
	paddy field/ plantation	✓
<i>Sibynophis chinensis</i>	plantation	✓
<i>Sibynophis collaris</i>	forest	✓
	forest edge	✓
<i>Sinonatrix percarinata</i>	stream	✓
	pool	✓
<i>Calliophis macclellandi</i>	paddy field	✓
<i>Protobothrops mucrosquamatus</i>	shrubland	✓
	plantation/shub-land	✓
<i>Trimeresurus stejnegeri</i>	forest edge	✓
	paddy field	✓
	plantation	✓
	forest	✓

- In addition to species listed above, Long & Li (1988) reported the following at Dayaoshan: *Andrias davidianus* (as *Megalobatrachus davidianus*), *Echinotriton asperimus* (as *Tylototriton asperimus*), *Pachytriton brevipes*, *Megophrys minor*, *Bufo gargarizans* (as *Bufo bufo gargarizans*), *Bufo melanostictus*, *Hyla chinensis*, *Hyla simplex*, *Paa boulengeri* (as *Rana boulengeri*), *Rana adenopleura*, *Rana japonica*, *Rana latouchii*, *Rana livida*, *Rana rugulosa*, *Rana taipehensis*, *Rana versabilis*, *Philautus albopunctatus*, *Philautus odontotarsus* (as *P. cavirostris*), *Theloderma leprosa* (as *Rhacophorus leprosus*), *Microhyla ornata*, *Platysternon megacephalum*, *Geoemyda spengleri*, *Acanthosaura lepidogaster*, *Ophisaurus gracilis*, *Takydromus sexlineatus*, *Ahaetulla prasina* (as *Dryophis prasinus*), *Calamaria septentrionalis*, *Eumeces chinensis*, *Amphiesma stolata* (as *Natrix stolata*), *Cyclophiops major* (as *Opheodrys major*), *Elaphe mandarina*, *Elaphe porphyracea*, *Lycodon laoensis*, *Macropisthodon rudis*, *Oligodon ornatus*, *Opisthotropis lateralis*, *Psammodynastes pulverulentus*, *Pseudoxenodon karlschmidti*, *Pareas hamptoni*, *Rhabdophis subminiatus* (as *Natrix subminiata*), *Sinonatrix aequifasciata* (as *Natrix aepuifasciata*), *Xenochrophis piscator* (as *Natrix piscator*), *Zaocys dhumnades*, *Naja atra* (as *Naja naja*), *Ophiophagus hannah* and *Trimeresurus monticola*.
- Villagers at Longan Cun in Dishui reported the occurrence of Chinese Giant Salamander *Andrias davidianus* in a large rocky stream.
- *Shinisaurus crocodilurus* is a National Class I Protected species.
 - *Bombina fortinuptialis* and *Shinisaurus crocodilurus* are highly restricted in global range. The former is known only from the Dayaoshan area. The latter species is thought restricted to East Guangxi and West Guangdong (Li and Xiao, 2002), though a recent report has been received from Northeast Vietnam (Le Khac Quyet, Fauna & Flora International, pers. comm., August 2002).
- The presence of forest species like *Philautus rhododiscus*, *Elaphe frenata*, *Plagiopholis styani* and many forest streams specialists indicated some of the remaining forests and the streams in Dayaoshan had high integrity.

Fish

- At least 36 species of freshwater fish were recorded from various sections of Dayaoshan (Table 5).
- The most widespread species encountered in Dayaoshan were *Oreonectes platycephalus*, *Opsariichthys bidens*, *Acrossocheilus hemispinus*, *Schistura incerta*, and *Pseudogastromyzon fangi*.
- Some of the species (e.g. *Pterocryptis* sp. 1 and species in the suborder Gobioidae) await specialist verification.

Table 5. Freshwater fish species in Dayaoshan, East Guangxi. (“*” = nomenclature follows Pan, 1991)

Species
<i>Zacco platypus</i>
<i>Opsariichthys bidens</i>
<i>Yaoshanicus arcus</i>
<i>Microphysogobio elongata</i>
<i>Puntius semifasciolatus</i> *
<i>Acrossocheilus parallens</i>
<i>Acrossocheilus hemispinus</i> *
<i>Onychostoma barbata</i>
<i>Discogobio tetrabarbatus</i>
<i>Micronemacheilus pulcher</i>
<i>Oreonectes platycephalus</i>
<i>Misgurnus anguillicaudatus</i>
<i>Schistura fasciolata</i>
<i>Schistura incerta</i>
<i>Carassius auratus</i>
<i>Vanmanenia pingchowensis</i>
<i>Protomyzon pachychilus</i>
<i>Protomyzon sinensis</i>
<i>Pseudogastromyzon fangi</i>
<i>Pseudobagrus albomarginatus</i> *
<i>Mystus guttatus</i>
<i>Clarias fuscus</i>
<i>Pterocryptis</i> sp. 1
<i>Pterocryptis gilberti</i>
<i>Glyptothorax fukiensis fukiensis</i>
<i>Mastacembelus armatus</i>
<i>Coreoperca whiteheadi</i>
<i>Odontobutis</i> sp.
<i>Micropercops compressocephalus</i>
<i>Rhinogobius duospilus</i>
<i>Rhinogobius</i> sp. 1 (pointed snout)
<i>Rhinogobius</i> sp. 2 (large, >80mm)
<i>Rhinogobius</i> sp. 3 (spotted face)
<i>Rhinogobius</i> sp. 4
<i>Rhinogobius</i> sp. 5
<i>Channa asiatica</i>

- Some species were of special conservation concern:
 - *Protomyzon sinensis* is endemic to the Xijiang (West River) drainage system while *Protomyzon pachychilus* is endemic to the Dayaoshan area. *P. pachychilus* was only found in one small hillstream during our rapid survey.
 - The unidentified *Pterocryptis* sp. 1 and the Gobioidae species may prove to be of scientific and conservation interest.
- The high species count in this survey for the Dayaoshan area conceals local depletion by very destructive fishing methods, notably with poisons. For example, intensive sampling in

Xianglushan at Fenzhan Cun yielded only two species, even though stream and riparian habitats were in relatively good physical condition.

- The most species-rich area for fish was Luoxiang with at least 21 species.

Ants

- At least 105 ant species were recorded from Dayaoshan (Table 6). Many of the species require further study for firm identification.
- The most frequently encountered species included *Pachycondyla* sp. 17, *Camponotus* sp. 28, *Pheidole smythiesi*, *Pheidole noda*, *Paratrechina* sp. 4, *Paratrechina* sp. 9, *Odontomachus monticola*, *Prenolepis* sp. 1 and *Pachycondyla* sp. 14.

Table 6. Ant species recorded at Dayaoshan Nature Reserve, East Guangxi, September 1998. * Species with a strong forest association.

Species	Habitat
<i>Acanthomyrmex</i> (cf. <i>crassispinus</i>) sp. 1 *	forest, shrubland
<i>Acropyga</i> (cf. <i>acutiventris</i>) sp. *	open broadleaf forest/ shrubland
<i>Aenictus</i> (<i>laeviceps</i> group) sp. 2	open shrub/ grassland
<i>Aphaenogaster smythiesi</i>	open forest, shrubland, grassland
<i>Aphaenogaster</i> sp. 4 *	forest
<i>Aphaenogaster</i> (cf. <i>beccarii</i>) sp. 1 *	closed broadleaf forest
<i>Aphaenogaster</i> (cf. <i>hunanensis</i>) sp. 3 *	forest
<i>Camponotus</i> (cf. <i>jianghuaensis</i>) sp. 15	open shrubland/ herb
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11	open forest dense forest
<i>Camponotus nicobarensis</i>	low open shrubland
<i>Camponotus</i> sp. 28	forest, shrubland
<i>Camponotus</i> (cf. <i>wasmani</i>) sp. 35	open shrubland
<i>Cataulacus granulatus</i>	low open shrubland
<i>Crematogaster</i> (<i>travancorensis</i>) sp. 2	open plantation/ shrubland
<i>Crematogaster</i> (cf. <i>laboriosa</i>) sp. 3	forest, shrubland, grassland
<i>Crematogaster</i> (cf. <i>dohrni</i>) sp. 8	open forest/ grassland
<i>Crematogaster</i> (cf. <i>dohrni</i>) sp. 25	open shrubland
<i>Crematogaster</i> sp. A	paddy
<i>Cryptopone</i> sp. 1 *	forest
<i>Diacamma</i> (nr. <i>rugosum</i>) sp. 1	open forest, shrubland
<i>Dolichoderus</i> sp. 4	open low broadleaf/ shrubland
<i>Dolichoderus</i> sp. 6	forest, shrubland
<i>Dolichoderus</i> sp. 9	closed broadleaf forest
<i>Gnamptogenys binghami</i> *	forest, open shrubland
<i>Gnamptogenys</i> sp. 2 *	dense broadleaf forest
<i>Gnamptogenys</i> (cf. <i>sinensis</i>) sp. 4 *	closed broadleaf & conifer forest
<i>Hypoponera</i> (cf. <i>excoecata</i>) sp. 2 *	broadleaf forest
<i>Hypoponera</i> sp. 3 *	closed broadleaf forest
<i>Lasius</i> sp. 1 *	closed broadleaf forest
<i>Lepisiota rothneyi</i>	open vegetation
<i>Lepisiota</i> (cf. <i>capensis</i>) sp. 3	open bamboo shrubland
<i>Leptogenys kitteli</i> *	forest
<i>Leptogenys</i> (cf. <i>kraepelini</i>) sp. 7 *	open shrubland/ herb
<i>Leptogenys</i> sp. 16 *	open conifer/ bamboo shrubland
<i>Leptogenys</i> (cf. <i>lucidula</i>) sp. 10 *	open broadleaf forest/ herb
<i>Leptothorax</i> (cf. <i>galeatus</i>) sp. 2	forest
<i>Monomorium</i> (cf. <i>latinodoides</i>) sp. 10	farmland
<i>Monomorium pharaonis</i>	town
<i>Monomorium</i> sp. 2 *	open forest
<i>Monomorium</i> sp. 4 *	closed broadleaf forest
<i>Myrmecina</i> (cf. <i>guangxiensis</i>) sp. 3 *	closed broadleaf forest
<i>Myrmica</i> sp. *	forest
<i>Myrmecaria</i> sp.	forest
<i>Odontomachus monticola</i> *	forest, shrubland

Species	Habitat
<i>Odontomachus</i> (cf. <i>silvestrii</i>) sp. 3	open broadleaf forest/ herb forest
<i>Odontomachus</i> sp.	forest
<i>Odontoponera</i> (cf. <i>denticulata</i>) sp. 1	open forest, shrubland, paddy
<i>Oligomyrmex</i> (cf. <i>hunanensis</i>) sp. 3	open broadleaf/ dense shrubland
<i>Oligomyrmex</i> (cf. <i>wheeleri</i>) sp. 1 *	closed broadleaf
<i>Oligomyrmex</i> sp. 4 *	closed low forest
<i>Oligomyrmex</i> sp. 7 *	closed broadleaf
<i>Pachycondyla</i> (cf. <i>astuta</i>) sp. 14 *	forest, shrubland
<i>Pachycondyla</i> (<i>javana</i> group) sp. 1 *	forest, shrubland
<i>Pachycondyla</i> (cf. <i>luteipes</i>) sp. 2 *	forest
<i>Pachycondyla</i> (cf. <i>nigrita</i>) sp. 17 *	forest, shrubland
<i>Paratrechina</i> (cf. <i>bourbonica</i>) sp. 4	forest, shrubland, grassland, paddy
<i>Paratrechina longicornis</i>	low open shrubland
<i>Paratrechina</i> (cf. <i>opaca</i>) sp. 26 *	grassland
<i>Paratrechina sauteri</i>	open broadleaf forest
<i>Paratrechina</i> sp. 38	open broadleaf/ roadside verge
<i>Paratrechina</i> (nr. <i>indica</i>) sp. 9 *	forest
<i>Pheidole megacephala</i>	forest, shrubland
<i>Pheidole noda</i>	forest, shrubland, grassland
<i>Pheidole rinae</i> group	open vegetation
<i>Pheidole smythiesi</i>	forest, shrubland, farmland
<i>Pheidole</i> (cf. <i>yeensis</i>) sp. 40-A	paddy
<i>Pheidole</i> sp. 3-B	shrubland
<i>Pheidole</i> sp. 3-C	shrubland
<i>Pheidole</i> sp. 13-A	forest, shrubland
<i>Pheidole</i> sp. 29 *	broadleaf forest
<i>Pheidole</i> sp. 7 complex *	forest, shrubland
<i>Pheidole</i> sp.	closed broadleaf/ conifer forest
<i>Pheidologeton affinis</i>	open shrubland
<i>Pheidologeton</i> (cf. <i>melasolenus</i>) sp. 8 *	forest
<i>Polyrhachis</i> (cf. <i>armata</i>) sp. 27 *	open broadleaf forest
<i>Polyrhachis</i> (cf. <i>bicolor</i>) sp. 17 *	closed broadleaf forest
<i>Polyrhachis dives</i>	open forest, grassland
<i>Polyrhachis halidayi</i>	open shrubland/ grassland
<i>Polyrhachis</i> sp. 5 *	open forest
<i>Polyrhachis tyrannica</i>	forest, shrubland, grassland
<i>Polyrhachis vigilans</i> *	open forest/ shrubland
<i>Polyrhachis</i> sp. 16	open shrubland
<i>Polyrhachis</i> (<i>Myrma</i>) sp. 22 *	open broadleaf/ shrubland
<i>Ponera</i> sp. 6	open broadleaf/ shrubland
<i>Ponera</i> sp. 7	closed broadleaf forest
<i>Prenolepis</i> (cf. <i>angularis</i>) sp. 7 *	closed forest
<i>Prenolepis</i> (cf. <i>emmae</i>) sp. 1 *	forest, shrubland
<i>Prenolepis magnocula</i> *	forest, shrubland
<i>Pristomyrmex pungens</i>	shrubland
<i>Pseudolasius</i> sp.	open broadleaf/ bamboo shrubland
<i>Pyramica</i> (cf. <i>mitis</i>) sp. 3 *	open broadleaf forest
<i>Pyramica</i> (nr. sp. 3) sp. *	closed broadleaf forest
<i>Recurvidris glabriceps</i>	open forest, shrubland
<i>Rhoptromyrmex</i> (cf. <i>wroughtonii</i>) sp. 1	open forest, shrubland
<i>Strumigenys</i> (cf. <i>lewisii</i>) sp. 5 *	closed broadleaf forest
<i>Strumigenys</i> (cf. <i>minutula</i>) sp. 2 *	open forest
<i>Strumigenys</i> (cf. <i>rallarhina</i>) sp. 1 *	forest
<i>Tapinoma</i> sp. 1	fir plantation, shrubland, paddy
<i>Technomyrmex albipes</i>	low open shrubland
<i>Technomyrmex</i> sp. 2 *	forest, shrubland
<i>Tetramorium</i> (cf. <i>kraepelini</i>) sp. 4 *	forest, shrubland
<i>Tetramorium nipponense</i> *	open shrubland
<i>Tetraoponera modesta</i>	fir plantation
<i>Tetraoponera attenuata</i>	open vegetation
<i>Vollenhovia</i> (cf. <i>emeryi</i>) sp. 1 *	broadleaf forest

- *Gnamptogenys* sp. 4, *Polyrhachis* sp. 22, *Ponera* sp. 6 and *Ponera* sp. 7 have been recorded only from Dayaoshan.
- *Recurvidris glabriceps* was described by Zhou (2001) based on specimens collected on 25 September 1998 during this survey. However it has not yet been possible to compare the specimens with other described species held in overseas collections.
- The following species have been described as new, from specimens collected at Dayaoshan (Zhou, 2001). It has not yet been possible to compare these with those listed above, or with other described species held in overseas collections.
 - *Myrmecina guangxiensis* Zhou (collected 18.ix.98 by JRF; holotype from Huashuichong, Hezhou City, Guangxi collected by ZSY).
 - *Ponera paedericera* (collected 19 September 1998 by ZSY).
- Several species, including *Gnamptogenys* spp. 2 and 4, *Lasius* sp. 1, *Polyrhachis* sp. 17, *Prenolepis* sp. 7, *Strumigenys* spp. 1 and 5, are known only from mature forest.
- The percentage of forest-associated species was about 49%. The figure was relatively high at Longan (67%) and Longjun (71%), indicating higher forest integrity there. If the degraded foothills below Yuyun Villa (850 m) are excluded, the proportion was also high at Shengtangshan (66%).
- *Pheidole megacephala*, an invasive species from Africa, was widespread in the reserve.

Dragonflies

- Thirty-three dragonfly species were recorded from the Dayaoshan area (Table 7). Some of these (e.g. *Planaeschna* spp.) could not be firmly identified. Twelve species were recorded at Fenzhan, seven at Toxian, nine at Linhai, nine at Longan, 12 at Shibajia, seven on the lower slopes at Shengtangshan, two on the mountain at Shengtangshan, one at Longjun and nine at Luoxiang.
- The most frequently encountered species included *Matrona basilaris*, *Orthetrum sabina*, *Orthetrum triangulare* and *Pantala flavescens*.
- The *Megalestes* is an undescribed species.

Table 7. Dragonfly species recorded from the Dayaoshan area, East Guangxi, 15-23 September 1998. Sequence of families follows Schorr *et al.* (2001a, 2001b).

Species	Notes
<i>Archineura incarnata</i>	
<i>Calopteryx melli</i>	
<i>Caliphaea consimilis</i>	
<i>Matrona basilaris basilaris</i>	
<i>Neurobasis c. chinensis</i>	
<i>Vestalis miao</i>	restricted to Guangxi & Hainan
<i>Rhinocypha drusilla</i>	
<i>Rhinocypha p. perforata</i>	
<i>Agriocnemis lacteola</i>	
<i>Ceriagrion fallax fallax</i>	
<i>Pseudagrion microcephalum</i>	
<i>Pseudagrion pruinosum fraseri</i>	
<i>Anisopleura qingyuanensis</i>	
<i>Euphaea decorata</i>	
<i>Megalestes</i> sp.	undescribed species
<i>Coelicerca cyanomelas</i>	
<i>Indocnemis ambigua</i>	
<i>Indocnemis orang</i>	
<i>Boyeria sinensis</i>	restricted to Guangxi & Sichuan
<i>Planaeschna</i> sp. A	female only, identification problematic
<i>Planaeschna</i> sp. B	female only, identification problematic
<i>Chlorogomphus papilio</i>	

Species	Notes
<i>Crocothemis servilia</i>	
<i>Orthetrum glaucum</i>	
<i>Orthetrum pruinosum</i>	
<i>Orthetrum sabina</i>	
<i>Orthetrum triangulare</i>	
<i>Palpopleura sexmaculata</i>	
<i>Pantala flavescens</i>	
<i>Trithemis aurora</i>	
<i>Trithemis festiva</i>	

- Some of the species recorded are of conservation concern:
 - The new species of *Megalestes* is known only from Dayaoshan (Shibajia).
 - *Vestalis miao* is restricted to Guangxi and Hainan, and was described as recently as 2001 (K.D.P. Wilson & Reels, 2001).
 - *Boyeria sinensis* is known only from Shengtangshan and Maoershan in Guangxi (Kadoorie Farm and Botanic Garden, 2002b) and Sichuan.
- Relatively few of the species recorded could be regarded as indicators of good forest.

Butterflies

- One hundred and thirty-five species of butterfly were recorded from the Dayaoshan area during the survey in 1998 (Table 8). A number of these could not be firmly identified. Of the total 22 species were recorded at Fenzhan, 24 at Toxian, 68 at Linhai, 66 at Longan, 35 at Shibajia, 11 on the foothills of Shengtangshan, 29 on Shengtangshan mountain, 14 at Longjun and 39 at Luoxiang. The low total at Fenzhan partly reflects the late start to the fieldwork there on 15 September.
- The most frequently encountered species included *Papilio protenor*, *Heliophorus ila*, *Athyma selenophora*, *Euploea mulciber* and *Ypthima chinensis*.
- *Euthalia irrubescens* and *Dodona ouida* are apparently new provincial records, not reported by Chou (1994) or Bascombe (1995) from Guangxi.

Table 8. Butterflies recorded in various parts of Dayaoshan Nature Reserve, East Guangxi, 15-23 September 1998. "*" = new Guangxi record. Sequence of families follows Bascombe (1995).

Species	Habitat(s)
<i>Abraximorpha davidii</i>	riparian shrub/farmland
<i>Ampittia virgata</i>	riparian shrub
<i>Ancistroides nigrita</i>	forest
<i>Astictopterus jama</i>	riparian forest/shrub
<i>Capila pieridoides</i>	forest
<i>Celaenorrhinus leucocera</i>	forest
<i>Celaenorrhinus</i> sp.	riparian shrub
<i>Choaspes benjaminii</i>	forest
<i>Erionota torus</i>	forest
<i>Gerosis phisara</i>	riparian forest, shrub
<i>Hasora badra</i>	montane forest
<i>Hasora anura</i>	farmland/forest
<i>Mooreana trichoneura</i>	riparian shrub
<i>Notocrypta curvifascia</i>	montane forest
<i>Parnara guttata</i>	riparian shrub/farmland
<i>Pelopidas assamensis</i>	riparian forest
<i>Pelopidas conjunctus</i>	riparian forest/shrub
<i>Pseudocoladenia dan</i>	shrub
<i>Notocrypta curvifascia</i>	riparian shrub/farmland
<i>Tagiades litigiosus</i>	forest, shrub
<i>Atrophaneura aidonea</i>	montane forest
<i>Graphium agamemnon</i>	riparian forest/ shrub

Species	Habitat(s)
<i>Graphium chironides</i>	forest/ shrub
<i>Graphium cloanthus</i>	riparian forest/ shrub/ farmland
<i>Graphium sarpedon</i>	forest/ shrub/ farmland, montane forest
<i>Lamproptera curius</i>	shrub/plantation
<i>Meandrusa payeni</i>	riparian forest/shrub
<i>Papilio bianor</i>	riparian forest/shrub
<i>Papilio helenus</i>	riparian forest/ shrub/ farmland
<i>Papilio memnon</i>	riparian forest/ shrub/ farmland
<i>Papilio nephelus</i>	plantation, forest/ shrub
<i>Papilio paris</i>	farmland/ shrub/ forest, plantation
<i>Papilio protenor</i>	riparian forest/ shrub/ farmland
<i>Pathysa antiphates</i>	riparian shrub
<i>Troides</i> sp.	riparian forest
<i>Appias lycnida</i>	riparian forest/ shrub
<i>Artogeia canidia</i>	farmland/forest
<i>Cepora nerissa</i>	shrub
<i>Eurema blanda</i>	riparian shrub/ forest/ farmland
<i>Eurema hecabe</i>	forest/ shrub
<i>Hebomoia glaucippe</i>	shrub
<i>Ixias pyrene</i>	riparian forest/ shrub
<i>Prioneris thestylis</i>	riparian forest/ shrub
<i>Talbotia naganum</i>	forest
<i>Abisara burnii</i>	farmland, forest
<i>Abisara echerius</i>	shrub/farmland, forest
<i>Abisara fylla</i>	shrub
<i>Abisara neophron</i>	riparian forest/shrub
<i>Acytolepis puspa</i>	riparian shrub, farmland
<i>Allotinus drumila</i>	riparian shrub/farmland
<i>Caleta</i> sp.	montane forest
<i>Curetis acuta</i>	riparian shrub
<i>Dodona eugenes</i>	farmland
<i>Dodona ouida</i> *	montane forest
<i>Heliophorus ila</i>	shrub, forest, farmland
<i>Jamides bochus</i>	riparian forest
<i>Pithecopus corvus</i>	riparian shrub/farmland
<i>Rapala nissa</i>	riparian shrub/wood
<i>Stiboges nymphidia</i>	forest, shrub/farmland
<i>Taraka hamada</i>	riparian shrub/wood
<i>Zemeros flegyas</i>	riparian shrub and forest
<i>Zizeeria maha</i>	riparian shrub
<i>Zizina otis</i>	riparian forest/shrub
<i>Acraea issoria</i>	riparian forest/ shrub
<i>Aemona amathusia</i>	riparian shrub/ farmland
<i>Argyreus hyperbius</i>	riparian forest/ shrub/ farmland
<i>Athyma asura</i>	farmland/forest
<i>Athyma cama</i>	riparian shrub/ road
<i>Athyma jina</i>	forest
<i>Athyma nefte</i>	riparian shrub/wood
<i>Athyma opalina</i>	riparian forest/ shrub
<i>Athyma perius</i>	forest/ shrub
<i>Athyma ranga</i>	riparian forest/ shrub/ farmland
<i>Athyma selenophora</i>	forest/ shrub
<i>Charaxes marmax</i>	riparian forest
<i>Argynnis (Childrena) childreni</i>	forest
<i>Cupha erymanthis</i>	shrub/plantation
<i>Cyrestis thyodamas</i>	riparian shrub/forest
<i>Damora sagana</i>	riparian forest/ shrub
<i>Danaus genutia</i>	forest/ shrub
<i>Dichorragia nesimachus</i>	riparian forest/ shrub
<i>Euploea midamus</i>	riparian shrub/ forest/ farmland
<i>Euploea mulciber</i>	forest

Species	Habitat(s)
<i>Euthalia irrubescens</i> *	riparian shrub/ farmland
<i>Euthalia monina</i>	riparian shrub/ forest/ farmland
<i>Euthalia niepelti</i>	shrub
<i>Hestina assimilis</i>	riparian shrub/farmland
<i>Hypolimnas bolina</i>	forest
<i>Ideopsis similis</i>	shrub
<i>Kallima inachus</i>	riparian forest, shrub
<i>Lethe confusa</i>	riparian forest and shrub
<i>Lethe lanaris</i>	montane forest
<i>Lethe violaceopicta</i>	montane forest
<i>Lethe</i> sp.	riparian forest/shrub
	montane forest
<i>Lethe (Neope) bhadra</i>	montane forest
<i>Limnitis (Bhagadatta) austenia</i>	riparian forest. shrub/ farmland
<i>Limnitis (Parasarpa) dudu</i>	riparian shrub
<i>Limnitis (Parathyma) sulphitia</i>	riparian shrub/road
<i>Melanitis leda</i>	forest/shrub
<i>Melanitis phedima</i>	riparian forest
<i>Mycalesis fransisca</i>	riparian shrub/farmland
<i>Mycalesis gotama</i>	forest
<i>Mycalesis mineus</i>	shrub/ plantation
<i>Mycalesis zonata</i>	riparian forest/shrub
<i>Neptis clinia</i>	forest, shrub
<i>Neptis hylas</i>	shrub
<i>Neptis miah</i>	forest, shrub
<i>Neptis sankara</i>	riparian forest/shrub
<i>Nosea hainanensis</i>	forest, riparian shrub
<i>Pantoporia hordonia</i>	forest/shrub
<i>Parantica melanea</i>	forest, shrub
<i>Parantica sita</i>	forest, riparian shrub
<i>Penthema adelma</i>	forest, shrub
<i>Polygonia (Kaniska) canace</i>	forest, shrub
<i>Polyura athamas</i>	shrub/plantation
<i>Polyura narcea</i>	riparian shrub
<i>Polyura nepenthes</i>	shrub/plantation
<i>Precis (Junonia) almana</i>	forest/shrub
<i>Precis (Junonia) iphita</i>	shrub
<i>Precis (Junonia) orithya</i>	shrub
<i>Ragadia crisilda</i>	riparian shrub/farmland
<i>Sephisa chandra</i>	riparian forest
<i>Stibochiona nicea</i>	forest, riparian vegetation
<i>Stichopthalma howqua</i>	riparian forest and shrub
<i>Stichopthalma neumogeni</i>	montane forest, shrub/ farmland
<i>Symbrenthia hypselis</i>	shrub
<i>Symbrenthia lilaea</i>	shrub
<i>Thaumantis diores</i>	forest/stream
<i>Tirumala limniace</i>	shrub
<i>Tirumala septentrionis</i>	riparian forest/shrub
<i>Vagrans egista</i>	shrub
<i>Vanessa indica</i>	riparian shrub
<i>Ypthima baldus</i>	forest, shrub
<i>Ypthima chinensis</i>	shrub
<i>Ypthima conjuncta</i>	montane forest

- Some of the species recorded are of conservation significance due to rarity or dependence on mature forest:
 - *Euthalia irrubescens* and *Dodona ouida* have not been recorded elsewhere in Guangxi.
 - *Lethe violaceopicta* was recorded in May 1997 at Damingshan, also at high altitude (Fellowes and Hau, 1997) - this was the first record from Guangxi.

- The survey areas also contained *Atrophaneura aidonea*, *Lethe lanaris* and *Stiboges nymphidia*. These are forest indicator species.
- *Mooreana trichoneura*, recorded on 20 September at lower altitude, has previously been found in association with good forest on KFBG surveys (e.g. Kadoorie Farm and Botanic Garden, 2002c).
- *Ancistroides nigrita* is apparently a fairly rare skipper, not previously encountered on KFBG surveys.
- The butterfly fauna recorded was generally unexceptional for a site of mixed habitat. *Nosea hainanensis*, *Stibochiona nicea*, *Abisara burnii*, *Capila pieridoides* and *Hasora anura* (at Toxian) are usually associated with good forest. While some sites were species rich, relatively few of the species recorded could be regarded as indicators of good forest.

Summary of flora and fauna

- Forest cover in Dayaoshan is patchy but some primary forest fragments still exist. Good broadleaf and mixed coniferous-broadleaf forests can still be found at higher altitude where they have been protected from logging by rough terrain.
- Not surprisingly for such a large reserve, Dayaoshan has a rich flora and fauna, including over 2,300 species of vascular plants. The present survey made a number of new records for the reserve, including four vascular plants, 18 birds, eight reptiles, three amphibians and many fish and insect species.
- Ten globally Threatened and Nationally Protected plant species were recorded. Of particular importance were the Endangered *Bretschneidera sinensis* at Shengtangshan and Toxian, and the Vulnerable *Diplopanax stachyanthus*, *Fagus longipetiolata*, *Tapiscia sinensis*, and *Calocedrus macrolepis*.
- The fauna included species known only from the Dayaoshan range, such as the toad *Bombina fortinuptialis* and the fish *Protomyzon pachychilus*. *Shinisaurus crocodilurus* (Crocodile Lizard), the sole member of the lizard family Shinisauridae, was previously known only from Dayaoshan and nearby lowland forests streams in West Guangxi, but an isolated population was recently discovered in West Guangdong and another reported from northeastern Vietnam. The species remains highly restricted and at risk of extinction.
- Populations of the larger mammals reported at Dayaoshan, such as Dhole, Clouded Leopard, Serow, Père David's Macaque and Chinese Forest Musk Deer, are probably in a precarious state if they still survive. Larger-bodied birds susceptible to hunting, such as pigeons and owls, were low in number during the present surveys.
- The unconfirmed reports of Black Muntjac are of conservation interest; the species was also reported from nearby Dapingshan (Kadoorie Farm and Botanic Garden, 2002a). Birds of conservation concern include the globally Vulnerable Cabot's Tragopan, Fairy Pitta, Brown-chested Jungle Flycatcher and Gold-fronted Fulvetta.
- Ecosystem integrity was extremely variable, but the presence of many forest-dependent animal species indicated that some of the forests were ecologically intact. A montane forest was rich in forest specialists in various faunal groups; another location had a rich forest avifauna, while some forest patches, though perhaps depleted in larger forest fauna, were rich in forest ants.
- MacKinnon *et al.* (1996) considered Dayaoshan of national biodiversity importance on the basis of its vast size and moderately high reported forest cover (58%). Natural forest cover is now reduced, but the area remains of great importance due to its high diversity of habitats and species, and high endemism.

Threats and problems

- Forest below 1,000m had been largely cleared for agriculture, and those remaining were degraded and fragmented. This reduction in natural forest cover has impaired the functions of the reserve in both biodiversity and headwater protection.
- At the times of the visits the forests at Dayaoshan were still under threat through destructive economic development. In 1998 illegal felling was under way near Longan Cun, reportedly with the backing of a senior provincial government official above the jurisdiction of the Forestry Department. Many forests at lower altitude had been cleared for plantation of *Illicium verum* (Star Anise) which was promoted so heavily that by 1998 the plantations had become uneconomic due to oversupply.
- Hasty development of the tourist industry is also a major threat. Building of roads had led to forest destruction and fragmentation. Littering by tourists has caused pollution in a number of scenic spots. The building of lodges near the top of Shengtangshan caused the destruction of an extensive patch of montane mixed coniferous and broadleaf forest, and increased disturbance to the remaining forest. There were plans to expand the tourist facilities at Shengtangshan, by constructing a new road to the mature secondary broadleaf forest at mid-altitude and building on scenic spots to cater for more tourists. This poses a potential threat to the fragile montane ecosystem if the various impacts of such activities on the flora and fauna are not carefully controlled.
- Some important habitats are outside the protected area. A patch of forest and the associated streams which supports *Shinisaurus corocodilurus* were outside the Reserve and were threatened by road construction and associated disturbance.
- Illegal hunting and collection of wildlife seemed to be rampant inside the Reserve. No pigeons were recorded from the Reserve, suggesting hunting pressure is severe, and local villagers carrying guns were encountered during the survey. Frog populations in a forest were depleted by collectors. Older individuals of *Podocarpus wangii* had been collected and sold as ornamental plants. Since the Nature Reserve covers a large area and a number of forest patches, the present team of wardens seemed insufficient for effective policing and management. The apparent lack of proper maps of the Reserve and natural vegetation types is another barrier to effective management.
- This hunting pressure continued to affect even species under State protection. Although *Shinisaurus crocodilurus* is a nationally protected species and convicted poachers have suffered heavy penalties, some villagers were still willing to guide collectors to its habitat streams for a small reward. The species was still sometimes seen in Hong Kong petshops/stalls up to the late 1990s (Lau *et al.*, 1997; Chan, in press) although it was a CITES II species. Researchers note that wild populations have declined in recent decades due to over-exploitation. Thus illegal trade of this lizard continues to threaten it with local extinction.
- Liming in streams for fish is said to be serious in certain part of the Reserve. One villager reported that liming is not done by local residents, who see the need for sustainable practices, but by gangs of poachers from the towns who do not have this consideration for sustainability. Electrofishing, although illegal, is widely practiced over the whole Reserve, and directly or indirectly affects the survival of many rare species (Xu, 2001).

Opportunities and recommendations

- The objectives of Dayaoshan National Nature Reserve should be clarified and reviewed. In view of its outstanding conservation importance, and the economic importance of catchment protection, management priorities should be the retention and restoration of natural forest and watercourses, and these should take precedence over other activities (MacKinnon & Xie, 2001).

- The boundaries of the Nature Reserve and the distribution of existing forests and biota of concern should be mapped in detail so that feasible management measures can be planned and executed.
- Better enforcement is needed against illegal logging, hunting and liming/electrofishing for fish. Clearing of forest for agriculture and logging should be stopped completely. This will call for elevation of the power and resources available to the responsible agency, namely the Forestry Department of Guangxi. It will also call for a proactive partnership with local residents, recognising and promoting their incentives to conserve natural resources.
- Tourism development should be put under strict control so that it might become a sustainable source of income and at the same time promote biodiversity conservation. Such income should partly be used to fund the conservation management of the Nature Reserve. Ecotourism development should follow existing guidelines (e.g. Ceballos-Lascuráin, 1996) that minimise negative impacts and optimise the raising of public awareness of nature.
- Degraded habitats should, where possible, be restored. Beginning with those which are uneconomic, plantations should be replanted with native tree species to restore the habitat for wildlife. Native tree nurseries at KFBG, Hong Kong and Zengcheng, Guangdong provide models which could be applied to the Dayaoshan situation.
- The good-quality unprotected forest should be incorporated into the Nature Reserve. Linhai Villa is a popular tourist stop and offers good facilities and functions (e.g. access, accommodation, dining, Yao cultural dances). These should incorporate an element of environmental education.
- Shengtangshan has spectacular scenery and interesting fauna and flora. Small-scale tours are run by a local ex-hunter. There seemed to be plans for expansion by the Tourist Bureau. The possibility of developing eco-tourism without compromising the ecological value of this site should be examined.
- A multi-disciplinary conservation programme of *Shinisaurus crocodilurus* is needed to ensure the survival of this unique species. First steps have been taken through a partnership between Guangxi Forestry Department and KFBG, involving improved fencing and signs. The reserve management should examine the possibility of extending Dayaoshan Nature Reserve to include the unprotected habitats near Longjun Cun. A study is now being carried out by a KFBG studentship holder, Zeng Zhifeng, to determine the distribution and population density of this lizard in Guangxi. A study on the phylogenetic relationships, distribution and status of the other recently discovered populations is also needed in order to come up with a comprehensive conservation action plan for this endangered lizard. If restocking/supplementing is needed, cooperation from zoos that have bred this lizard in captivity should be sought. Kadoorie Farm and Botanic Garden might also play an active role in the breeding/release programme (e.g. by rehabilitating and breeding lizards confiscated in Hong Kong or elsewhere).

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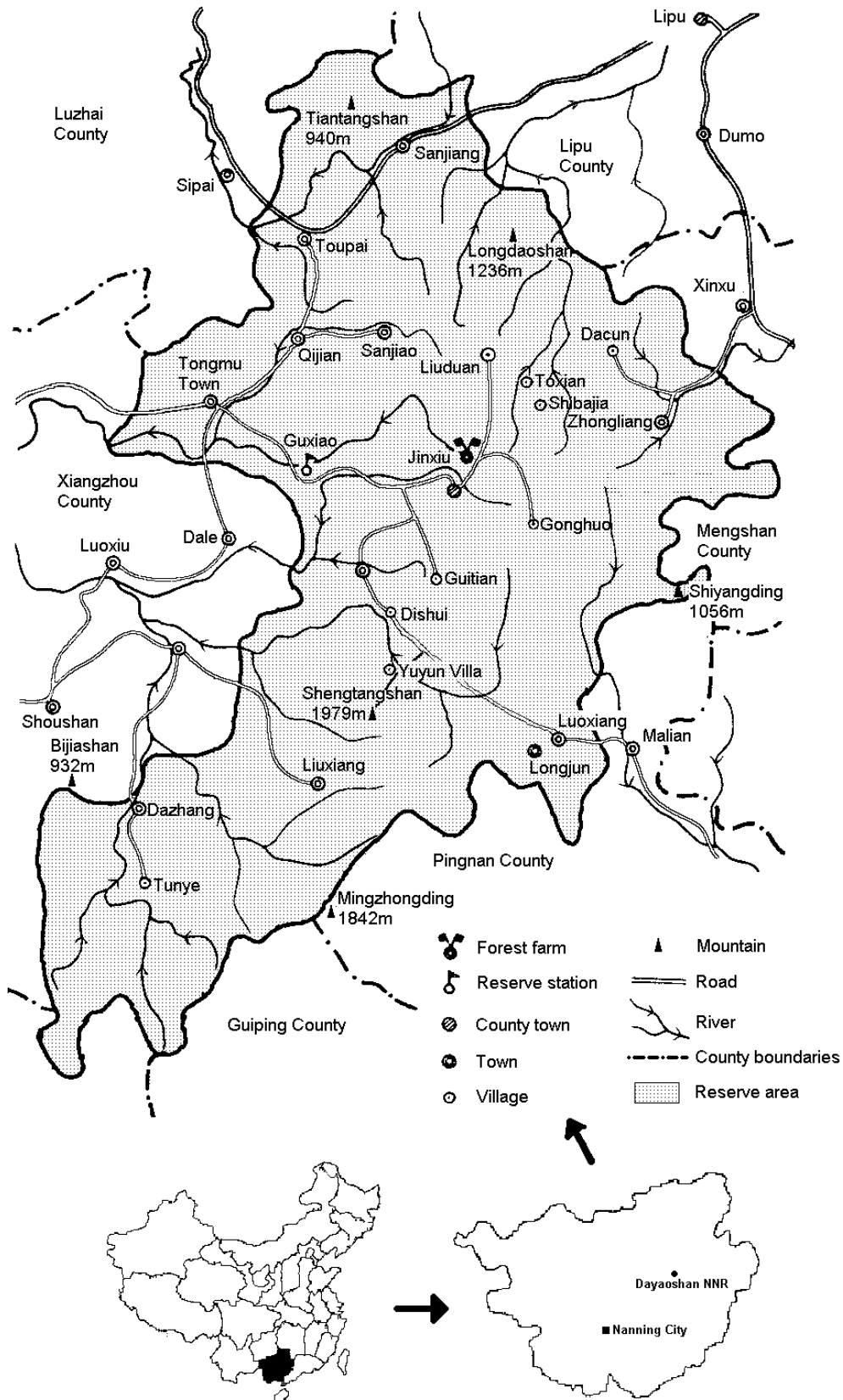


Figure 1. Map showing location of Dayaoshan National Nature Reserve, East Guangxi, China.