



Report of Rapid Biodiversity Assessments at Damingshan National Nature Reserve, Central Guangxi, China, April and September 2000

Kadoorie Farm and Botanic Garden
in collaboration with
Guangxi Forestry Department
Guangxi Institute of Botany
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Background

The present report details the findings of visits to Central 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

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 Damingshan National Nature Reserve, Central Guangxi, China, April and September 2000

Objectives

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

Methods

- On 4 and 5 April 2000 a team from Hong Kong (JRF, ML, LKS, Vicky Lam of KFBG), France (HH), Guangdong (Mr. Wang Ruijiang of South China Institute of Botany) and Guangxi (XGS) visited Damingshan National Nature Reserve as part of a survey for White-eared Night Heron *Gorsachius magnificus* (Fellowes *et al.*, 2001).
- On 20 to 24 September 2000 a team from Hong Kong (ML, BH, LKS, NSC, GS, Winky Huen of KFBG), Beijing (JJM, LYD, LFL), Guangxi (XZH, WFN, TSC, ZSY), Guangdong (XZ) and Henan (LHJ) conducted rapid survey at Damingshan National Nature Reserve.
- On 24 September the team departed Damingshan for Shiwandashan National Nature Reserve to conduct a rapid survey (Kadoorie Farm and Botanic Garden, in prep.).
- 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 Damingshan was inferred largely based on interviews with local people on an earlier survey in 1997 (Fellowes and 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 results were supplemented by published records from the Damingshan area (Zhang Y. *et al.*, 1997 and references therein).
- Vascular plant records were made by WFN, WRJ and NSC and edited by NSC, except for orchids, for which records were made or verified by GS. Mammal records were made by LKS, ML, JRF or BH. Records of birds were made or verified by LKS, HH or ML, reptiles and amphibians by ML, fish by BC and CXL, ants by JRF, 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); Su (2000);
 - Mammals (Mammalia): Wilson and 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 and Ministry of Agriculture (1999) for plants.

Location and management

- Damingshan National Nature Reserve is at the junction of Wuming, Shanglin, Binyang and Mashan Counties, central Guangxi, at 23°24'-23°30'N by 108°20'-108°24'E (Forestry Department of Guangxi Zhuang Autonomous Region, 1993) or 23°24'-23°30'N by 108°20'-108°32'E (MacKinnon *et al.*, 1996). The reserve area is 649 km² (Forestry Department of Guangxi Zhuang Autonomous Region, 1993; MacKinnon *et al.*, 1996).
- The nature reserve has a mountainous landscape with a number of gorges, cliffs, waterfalls, and rough mountain ridges. Altitude ranges from 290 to 1,760 m at the summit of Damingshan (Longtoushan). The geology is dominated by sandy shale (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- The region has a subtropical climate. The mean annual temperature recorded at Wuming county town to the southwest of Damingshan is 22°C, whereas that at Shanglin county town to the northeast is 21°C. The temperature recorded at Damingshan above 1,000 m is usually 6-8°C lower. The lowest temperature can reach -6 °C. Annual precipitation in the reserve averages 3,000 mm (Forestry Department of Guangxi Zhuang Autonomous Region, 1993).
- There are 33 rivers originating from Damingshan. Rivers northeast of the mountain range drain to Hongshui River, whereas those on the southwestern side drains to Yong Jiang. Both rivers eventually drain to the Xi Jiang of the Zhujiang drainage system.
- Damingshan was designated a provincial nature reserve in 1982 to protect its subtropical monsoon evergreen broadleaf forests and its natural landscape (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). It is classified as a Forest Ecosystem nature reserve at the provincial level (Zhang W., 1998). The nature reserve was upgraded to National level in 2002 (So Y., Guangxi Forestry Department, pers. comm., March 2003).

Results

Vegetation

- The zonal vegetation of the central Guangxi region would have been southern subtropical monsoon evergreen broadleaf forest. The major vegetation types of the nature reserve in the early 1990s (Forestry Department of Guangxi Zhuang Autonomous Region, 1993) included:
 - i) Montane evergreen broadleaf forest at higher altitude;
 - ii) Montane dwarf forest and shrubland near summit and Tianping plateau;
 - iii) Monsoon evergreen broadleaf forest at medium to high altitude;
 - iv) Tropical seasonal rainforest in low altitude ravines at in Wuming County; and
 - v) Plantation of *Pinus massoniana* and *Illicium verum* on hillsides at low altitude.
- The present survey (September 2000), which covered only a limited area of the reserve, found several types of vegetation:
 - Extensive cover of mature hillside and ravine evergreen broadleaf forest, with trees up to 30 m in height and 100 cm dbh, occurred around Tianping Gorge. Dominant species included *Betula austrosinensis*, *Schima argentea*, *Castanopsis* spp., *Cyclobalanopsis fleuryi*, *Litsea euosma*, *Huodendron tibeticum* and *Gamblea pseudoevodiifolia*.
 - Young secondary forest about 6-10 m tall was found below medium altitude. Dominant species included *Schima superba*, *Machilus* spp. and *Castanopsis fissa*. Most of the hillside forest at this altitude had been transformed into plantation of *Pinus massoniana* and *Illicium verum*.
 - At higher altitudes, the forest had been degraded to young secondary forest about 4-6 m tall and dominated by *Schima* spp., *Betula luminifera*, *Alniphyllum fortunei*, *Aria folgneri* and *Castanopsis hystrix*, and shrubland less than 3 m tall.
 - Around the Damingshan summit and at Tianping plateau were mainly covered in grassland and shrubland less than 2 m tall, with small patches of young secondary forest scattered along streams.

Flora

- The present surveys recorded 199 vascular plant species, including 20 fern species in 16 families, six gymnosperm species in four families, and 173 angiosperm species in 59 families (Tables 1 and 2). This is a relatively low figure given its vegetation cover and subtropical location, and it would appear that sampling effort was not exhaustive.
- Among the flora recorded in the present surveys, there are three new recorded species for Guangxi:
 - The orchids *Gastrodia menghaiensis* and *Thrixspermum laurisilvaticum* are new records to Guangxi. *G. menghaiensis* is endemic to China and highly restricted in southern Yunnan.
 - *Eurya metcalfiana* is a new record to Guangxi, a few individuals were seen along streams at Tianping.
- Among the flora recorded, there are several species of conservation importance:
 - The orchids *Anoectochilus roxburghii* and *Cymbidium goeringii* are endangered in China due to over-collection, for medicinal and ornamental purposes.
 - An orchid *Pleione bulbocodioides* is also threatened by over-collection for medicinal use.
 - *Bretschneidera sinensis* is considered globally Endangered and is under Class I National Protection.
 - *Pseudotaxus chienii* is globally Endangered and is under Class II National Protection. Only two small trees less than 3 m in height were found.
 - *Diplopanax stachyanthus* is globally Vulnerable and is under Class II National Protection. It is restricted to relatively well-preserved forest in South China. A few trees were seen along one of the roads.
 - *Fokienia hodginsii* is considered at Lower Risk (Near-threatened) globally and is under Class II National Protection. It is restricted to montane forest, although it has a widespread distribution in South China.
 - *Gymnosphaera hancockii* and *G. metteniana* belong to the tree fern family, of which all members are under Class II National Protection in China. The former was locally abundant at one location, whereas less than ten individuals of the latter were found at another location. Both species have a widespread distribution in South China but they are restricted to relatively well-preserved forest.
 - *Cibotium barometz* is under Class II National Protection but it is both widespread in South China and is abundant in degraded shrubland and forest margins.
 - *Rhododendron orbiculare* ssp. *cardiobasis* and *R. wumingense* are endemic to Guangxi.
 - *Rhododendron minutiflorum* is endemic to Guangxi and North Guangdong. It is locally abundant at certain locations.
 - *Acer kweilinense* is endemic to Guangxi and Southeast Guizhou.
 - *Cyclobalanopsis poilanei* is endemic to South Guangxi and North Vietnam. It is fairly common in one of the young forests.
 - All the orchids species recorded are listed in CITES Appendix II.
- Of the 25 orchid species recorded, 9 (36%) were terrestrial, 13 (52%) were epiphytic, 1 (4%) was semi-epiphytic and 2 (8%) were saprophytic.

Table 1. Vascular plants of Damingshan National Nature Reserve recorded in the September 2000 survey (excluding Orchidaceae). Species which are Nationally Protected (Class I or II) (State Forestry Administration and Ministry of Agriculture, 1999), globally Threatened or Lower Risk (Near-threatened) (IUCN, 2002) or globally restricted are indicated.

Family	Scientific name	Remarks
PTERIDOPHYTA		
Aspleniaceae	<i>Neottopteris nidus</i> (L.) J. Sm.	
Athyriaceae	<i>Acystopteris japonica</i> (Luerss.) Nakai	
Cyatheaceae	<i>Gymnosphaera hancockii</i> (Copel.) Ching	Protected II
	<i>Gymnosphaera metteniana</i> (Hance) Tagawa	Protected II
Dicksoniaceae	<i>Cibotium barometz</i> (L.) J. Sm.	Protected II
Dipteridaceae	<i>Dipteris chinensis</i> Christ	
Dryopteridaceae	<i>Acrorumohra diffracta</i> (Baker) H. Itô	
Gleicheniaceae	<i>Diplazium laevissimum</i> (H. Christ) Nakai	
Grammitidaceae	<i>Grammitis lasiosora</i> (Blume) Ching	
Hemionitidaceae	<i>Coniogramme japonica</i> (Thunb.) Diels	
Huperziaceae	<i>Huperzia serrata</i> (Thunb.) Trevis.	
	<i>Phlegmariurus fordii</i> (Baker) Ching	

Family	Scientific name	Remarks
Hymenophyllaceae	<i>Crepidomanes auriculatum</i> (Blume) K. Iwats.	
Lycopodiaceae	<i>Diphasiastrum complanatum</i> (L.) Holub	
Marattiaceae	<i>Angiopteris fokiensis</i> Hieron.	
Nephrolepidaceae	<i>Nephrolepis auriculata</i> (L.) Trimea	
Plagiogyriaceae	<i>Plagiogyria distinctissima</i> Ching	
	<i>Plagiogyria stenoptera</i> (Hance) Diels	
Polypodiaceae	<i>Arthromeris lehmannii</i> (Mett.) Ching	
	<i>Polypodiastrum mengtzeense</i> (H. Christ) Ching	
GYMNOSPERMAE		
Cupressaceae	<i>Fokienia hodginsii</i> (Dunn) A. Henry & H. Thomas	Protected II, Lower Risk (Nt)
Pinaceae	<i>Pinus taiwanensis</i> Hayata	
	<i>Tsuga longibracteata</i> W.C. Cheng	
Podocarpaceae	<i>Podocarpus neriifolius</i> D. Don	
Taxaceae	<i>Amentotaxus argotaenia</i> (Hance) Pilg.	
	<i>Pseudotaxus chienii</i> (W.C. Cheng) W.C. Cheng	Endangered, Protected II
ANGIOSPERMAE		
Dicotyledonae		
Aceraceae	<i>Acer fabri</i> Hance	
	<i>Acer kweilinense</i> W.P. Fang & M.Y. Fang	Restricted to Guangxi & SE Guizhou
	<i>Acer oliverianum</i> Pax	
Alangiaceae	<i>Alangium chinense</i> (Lour.) Harms.	
Anacardiaceae	<i>Choerospondias axillaris</i> (Roxb.) B.L. Burtt & A.W. Hill	
Annonaceae	<i>Fissistigma oldhamii</i> (Hemsl.) Merr.	
Apocynaceae	<i>Trachelospermum brevistylum</i> Hand.-Mazz.	
Aquifoliaceae	<i>Ilex editicostata</i> Hu & T. Tang	
	<i>Ilex szechwanensis</i> Loes.	
Araliaceae	<i>Dendropanax dentigerus</i> (Harms ex Diels) Merr.	
	<i>Diplopanax stachyanthus</i> Hand.-Mazz.	
	<i>Gamblea pseudoevodiifolia</i> (K.M. Feng) C.B. Shang, Lowry & Fordin	Vulnerable, Protected II
	<i>Heteropanax brevipedicellatus</i> H.L. Li	
	<i>Schefflera octophylla</i> (Lour.) Harms	
Asteraceae	<i>Ainsliaea henryi</i> Diels	
	<i>Ainsliaea trinervis</i> Y.Q. Tseng	
	<i>Solidago decurrens</i> Lour.	
Balanophoraceae	<i>Balanophora harlandii</i> Hook. f.	
Balsaminaceae	<i>Impatiens sicutifer</i> Hook. f.	
	<i>Impatiens</i> sp.	
Berberidaceae	<i>Nandina domestica</i> Thunb.	
Betulaceae	<i>Betula austrosinensis</i> Chun ex P.C. Li	
	<i>Betula luminifera</i> H.J.P. Winkl.	
Bretschneideraceae	<i>Bretschneidera sinensis</i> Hemsl.	Endangered, Protected I
Burseraceae	<i>Canarium album</i> (Lour.) Raeusch.	
Caprifoliaceae	<i>Viburnum odoratissimum</i> Ker Gawl.	
Celastraceae	<i>Microtropis gracilipes</i> Merr. & Metc.	
Clethraceae	<i>Clethra cavaleriei</i> H. Lév.	
	<i>Clethra fabri</i> Hance	
Clusiaceae	<i>Garcinia multiflora</i> Champ. ex Benth.	
Cornaceae	<i>Dendrobenthamia hongkongensis</i> (Hemsl.) Hutch.	
Cucurbitaceae	<i>Gynostemma pentaphylla</i> (Thunb.) Makino	
Elaeocarpaceae	<i>Elaeocarpus japonicus</i> Siebold & Zucc.	
	<i>Elaeocarpus sylvestris</i> (Lour.) Poir.	
	<i>Elaeocarpus varunua</i> Buch.-Ham.	
Ericaceae	<i>Lyonia ovalifolia</i> (Wall.) Drude	
	<i>Rhododendron cavaleriei</i> H. Lév.	
	<i>Rhododendron faithiae</i> Chun	
	<i>Rhododendron minutiflorum</i> Hu	restricted to Guangxi & N. Guangdong
	<i>Rhododendron orbiculare</i> Decne. ssp. <i>cardiobasis</i> (Sleumer) D.F. Chamb.	restricted to Guangxi
	<i>Rhododendron simiarum</i> Hance	

Family	Scientific name	Remarks
	<i>Rhododendron wumingense</i> W.P. Fang	restricted to Guangxi
Escalloniaceae	<i>Itea coriacea</i> Y.C. Wu	
	<i>Itea macrophylla</i> Wall. ex Roxb.	
Euphorbiaceae	<i>Macaranga henryi</i> (Pax & K. Hoffm.) Rehder	
	<i>Mallotus barbatus</i> (Wall.) Müll. Arg.	
	<i>Mallotus paniculatus</i> (Lam.) Müll. Arg.	
	<i>Vernicia fordii</i> (Hemsl.) Airy Shaw	planted
	<i>Vernicia montana</i> Lour.	planted
Fagaceae	<i>Castanopsis carlesii</i> (Hemsl.) Hayata	
	<i>Castanopsis eyrei</i> (Champ. ex Benth.) Tutcher	
	<i>Castanopsis fabri</i> Hance	
	<i>Castanopsis fissa</i> (Champ. ex Benth.) Rehder & E. H. Wilson	
	<i>Castanopsis hystrix</i> Miq.	
	<i>Castanopsis lamontii</i> Hance	
	<i>Cyclobalanopsis fleuryi</i> (Hickel & A. Camus) Chun ex Q. F. Zheng	
	<i>Cyclobalanopsis poilanei</i> (Hickel & A. Camus) Hjelmq.	restricted to S. Guangxi & Vietnam
	<i>Cyclobalanopsis sessilifolia</i> (Blume) Schottky	
	<i>Lithocarpus elizabethae</i> (Tutcher) Rehder	
	<i>Lithocarpus litseifolius</i> (Hance) Chun	
	<i>Lithocarpus paihengii</i> Chun & Tsiang	
Gesnariaceae	<i>Lysionotus pauciflorus</i> Maxim.	
Hamamelidaceae	<i>Altingia chinensis</i> (Champ. ex Benth.) Oliv. ex Hance	
	<i>Corylopsis multiflora</i> Hance	
	<i>Liquidambar formosana</i> Hance	
	<i>Rhodoleia championii</i> Hook. f.	
Hydrangeaceae	<i>Hydrangea kwangsiensis</i> Hu var. <i>hedyotidea</i> (Chun) C.M. Hu	
Ilacaceae	<i>Ilex balansae</i> Gagnep.	
Illiciaceae	<i>Illicium majus</i> Hook. f. & Thomson	
	<i>Illicium verum</i> Hook. f.	mainly cultivated
Juglandaceae	<i>Engelhardtia fenzelii</i> Merr.	
	<i>Engelhardtia roxburghiana</i> Wall.	
Lauraceae	<i>Beilschmiedia intermedia</i> C.K. Allen	
	<i>Cinnamomum appelianum</i> Schewe	
	<i>Lindera glauca</i> (Siebold & Zucc.) Blume	
	<i>Litsea cubeba</i> (Lour.) Pers.	
	<i>Litsea euosma</i> W.W. Sm.	
	<i>Litsea pedunculata</i> (Diels) Y.C. Yang & P.H. Huang	
	<i>Litsea variabilis</i> Hemsl.	
	<i>Machilus chinensis</i> (Champ. ex Benth.) Hemsl.	
	<i>Machilus oreophila</i> Hance	
	<i>Neolitsea aurata</i> (Hayata) Koidz.	
	<i>Phoebe neurantha</i> (Hemsl.) Gamble	
	<i>Sassafras tzumu</i> (Hemsl.) Hemsl.	
Magnoliaceae	<i>Manglietia chingii</i> Dandy	
	<i>Manglietia fordiana</i> Oliv.	
Melastomataceae	<i>Bredia sessilifolia</i> H.L. Li	
	<i>Melastoma candidum</i> D. Don	
	<i>Melastoma dodecandrum</i> Lour.	
	<i>Phyllagathis cavaleriei</i> (H. Lév. & Vaniot) Guillaumin	
Moraceae	<i>Cudrania tricuspidata</i> (Carrière) Bureau ex Lavalle	
	<i>Ficus esquiroliana</i> H. Lév.	
	<i>Ficus heteromorpha</i> Hemsl.	
Myricaceae	<i>Myrica rubra</i> (Lour.) Sieb. & Zucc.	
	<i>Ardisia crispa</i> (Thunb.) A. DC.	
	<i>Ardisia gigantifolia</i> Stapf	
Myrtaceae	<i>Baeckea frutescens</i> L.	
Olacaceae	<i>Schoepfia chinensis</i> Gardner & Champ.	
Pentaphragmaceae	<i>Pentaphragma euryoides</i> Gardner & Champ.	
Piperaceae	<i>Piper hancei</i> Maxim.	
	<i>Piper hongkongense</i> C. DC.	
Polygalaceae	<i>Polygala fallax</i> Hemsl.	
	<i>Polygala latouchei</i> Franch.	
	<i>Xanthophyllum hainanense</i> Hu	
Polygonaceae	<i>Antenoron filiforme</i> (Thunb.) Roberty & Vautier	

Family	Scientific name	Remarks
Proteaceae	<i>Helicia cochinchinensis</i> Lour. <i>Helicia reticulata</i> W. T. Wang	
Rosaceae	<i>Aria folgeri</i> (C.K. Schneid.) H. Ohashi & H. Iketani	
Rubiaceae	<i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil.	
Rutaceae	<i>Skimmia arborescens</i> T. Anderson ex Gamble <i>Skimmia reevesiana</i> (Fortune) Fortune	
Sabiaceae	<i>Meliosma squamulata</i> Hance	
Schisandraceae	<i>Kadsura coccinea</i> (Lem.) A.C. Sm.	
Solanaceae	<i>Lycianthes lysimachioides</i> (Wall.) Bitter <i>caulorhiza</i> (Dunal) Bitter	
Styracaceae	<i>Alniphyllum fortunei</i> (Hemsl.) Makino <i>Huodendron tibeticum</i> (J. Anthony) Rehder <i>Rehderodendron kwangtungense</i> Chun <i>Rehderodendron kweichowense</i> Hu <i>Styrax tonkinensis</i> (Pierre) Craib ex Hartwich	
Symplocaceae	<i>Symplocos adenopus</i> Hance <i>Symplocos botryantha</i> Franch. <i>Symplocos cochinchinensis</i> (Lour.) S. Moore subsp. <i>laurina</i> (Retz.) Noot. <i>Symplocos stellaris</i> Brand	
Theaceae	<i>Adinandra bockiana</i> E. Pritz var. <i>acutifolia</i> (Hand.-Mazz.) Kobuski <i>Adinandra glischroloma</i> Hand.-Mazz. <i>Adinandra millettii</i> (Hook. & Arn.) Benth. & Hook. f. ex Hance <i>Adinandra nitida</i> Merr. ex H.L. Li <i>Camellia cuspidata</i> (Kochs) Wright <i>Cleyera japonica</i> Thunb. <i>Eurya acuminatissima</i> Merr. & Chun <i>Eurya groffii</i> Merr. <i>Eurya metcalfiana</i> Kobuski <i>Eurya stenophylla</i> Merr. <i>Gordonia axillaris</i> (Roxb. ex Ker Gawl.) Dietr. <i>Hartia cordifolia</i> H.L. Li <i>Hartia villosa</i> (Merr.) Merr. <i>Schima argentea</i> E. Pritz. <i>Schima superba</i> Gardn. & Champ.	
Tiliaceae	<i>Corchorus aestuans</i> L.	
Verbenaceae	<i>Callicarpa longipes</i> Dunn <i>Callicarpa macrophylla</i> Vahl <i>Callicarpa rubella</i> Lindl. <i>Clerodendrum cyrtophyllum</i> Turcz.	
Monocotyledonae		
Araceae	<i>Rhaphidophora decursiva</i> (Roxb.) Schott	
Liliaceae	<i>Dianella ensifolia</i> (L.) DC.	
Musaceae	<i>Musa balbisiana</i> Colla	
Poaceae	<i>Indocalamus latifolius</i> (Keng) McClure <i>Miscanthus floridulus</i> (Labill.) Warb. ex K. Schum & Lauterb.	

Table 2. Orchids recorded in Damingshan National Nature Reserve in April and September 2000.

Scientific name	Habitat	Remarks
<i>Anoectochilus roxburghii</i> (Wall.) Lindl.	on forest floor with rich humus	terrestrial, Endangered
<i>Aphyllorchis montana</i> Rchb. f.	on forest floor beside the stream	saprophytic
<i>Arundina graminifolia</i> (D. Don) Hochr.	on exposed slope	terrestrial
<i>Bulbophyllum levinei</i> Schltr.	on tree trunk in the forest	epiphytic
<i>Bulbophyllum reptans</i> (Lindl.) Lindl.	on tree trunk beside the stream in the forest	epiphytic
<i>Bulbophyllum</i> sp.	on tree trunk in the forest	epiphytic
<i>Calanthe densiflora</i> Lindl.	on forest floor with rich humus	terrestrial
<i>Cleisostoma paniculatum</i> (Ker Gawl.) Garay	on tree trunk in the forest	
<i>Cymbidium goeringii</i> (Rchb. f.) Rchb. f.	on forest floor with rich humus	terrestrial, Endangered
<i>Cymbidium lancifolium</i> Hook	on forest floor with rich humus	terrestrial
<i>Cymbidium</i> (cf. <i>floribundum</i>) sp.	on tree trunk	epiphytic
<i>Dendrobium</i> (cf. <i>moniliforme</i>) sp.	on tree trunk in the forest	epiphytic
<i>Dendrobium</i> sp.1	on tree trunk beside the road	epiphytic
<i>Epigeneium fargesii</i> (Finet) Gagnep.	on tree trunk	epiphytic

Scientific name	Habitat	Remarks
<i>Gastrodia menghaiensis</i> Z.H. Tsi et S.C. Chen	on dense bamboo floor with rich humus	saprophytic, new to Guangxi, endemic to China, previously restricted to southern Yunnan
<i>Goodyera foliosa</i> (Lindl.) Benth. ex Clarke	on forest floor beside the stream	terrestrial
<i>Habenaria rhodocheila</i> Hance	on rock crevice with rich humus	terrestrial
<i>Hetaeria cristata</i> Blume	on forest floor close to damp area	terrestrial
<i>Liparis bootanensis</i> Griff.	on rock in the forest	epiphytic
<i>Liparis nervosa</i> (Thunb.) Lindl.	on forest floor with rich humus	epiphytic
<i>Liparis stricklandiana</i> Rchb. f.	on rock beside the stream in the forest	epiphytic
<i>Pholidota chinensis</i> Lindl.	on rock and on tree trunk	epiphytic
<i>Platanthera</i> (cf. <i>minor</i>) sp.	on grassy & damp slope	terrestrial
<i>Pleione bulbocodioides</i> (Franch.) Rolfe	on mossy cliff	semi-epiphytic, endemic to China
<i>Thrixspermum laurisilvaticum</i> (Fuk.) Garay	on tree trunk and branches beside the stream	epiphytic, new to Guangxi

Mammals

- Maritime Striped Squirrels *Tamiops maritimus* were frequently seen or heard during the two surveys.
- On 4 April 2000, one Chinese Hare *Lepus sinensis* was seen.
- A call similar to that of a muntjac were heard on 4 April 2000; local guide Mr Wang said it was made by a bamboo rat *Rhizomys* sp.
- The survey team recorded the following species in the April 2000 survey: Red-hipped Squirrel *Dremomys pyrrhomerus*, Indian Giant Flying Squirrel *Petaurista philippensis*, and an unidentified flying squirrel (*Hylopetes* sp.). On 20 September 2000, a giant flying squirrel *Petaurista* sp. was seen.
- On 21 September 2000, a Chinese Ferret-badger *Melogale moschata* was seen.
- Primatologist Mr. Li Youbang of Zhejiang University confirmed the continued occurrence of Francois's Leaf Monkey (*Trachypithecus francoisi*) on steep rock faces near the summit in 2002 (Li Youbang, Zhejiang University, *in litt.*, August 2002).
- In May 1997 reserve staff were interviewed regarding the mammal fauna of Damingshan. Status of mammals is inferred based on their responses (Fellowes and Hau, 1997) and past records (Wu M.C., 1993; Zhang Y. *et al.*, 1997 and references therein), and is listed in Table 3.

Table 3. The inferred status of mammals at Damingshan National Nature Reserve, based on interviews with reserve staff (“+” = rare, “++” = common, “+++” = abundant; “#” = reported by T. Woodward and P. Hopkin, August 1997), on Fellowes and Hau (1997) and on past distribution records (W = Wuming; M = Mashan; S = Shanglin) (Wu M.C., 1993; Zhang, Y. *et al.*, 1997). Sequence follows Wilson and Cole (2000).

Scientific name	English name	Past records	Reserve staff (May 1997)	Probable status
<i>Crocidura attenuata</i>	Indochinese Shrew		(not asked)	present
<i>Macaca mulatta</i>	Rhesus Monkey		++	insecure
<i>Macaca arctoides</i>	Stump-tailed Macaque	(W, S)	-	extirpated or insecure
<i>Trachypithecus francoisi</i>	Francois's Leaf Monkey	(S)	-	insecure (presence confirmed)
<i>Catopuma temminckii</i>	Asiatic Golden Cat		+	insecure or extirpated
<i>Amblonyx cinereus</i>	Oriental Small-clawed Otter		++	insecure
<i>Melogale moschata</i>	Chinese Ferret-badger		++	present (confirmed)
<i>Martes flavigula</i>	Yellow-throated Marten		+	insecure
<i>Mustela kathiah</i>	Yellow-bellied Weasel		++	present
<i>Mustela sibirica</i>	Siberian Weasel		+	insecure
<i>Paguma larvata</i>	Masked Palm Civet	(S)	++	present
<i>Paradoxurus hermaphroditus</i>	Asian Palm Civet		+	insecure
<i>Viverra zibetha</i>	Large-spotted Civet	(W,M,S)	(not asked)	unknown
<i>Viverricula indica</i>	Small Indian Civet		++	present
<i>Sus scrofa</i>	Wild Boar		++	present

Scientific name	English name	Past records	Reserve staff (May 1997)	Probable status
<i>Moschus berezovskii</i>	Chinese Forest Musk Deer		+	insecure or extirpated
<i>Hydropotes inermis</i>	Chinese Water Deer	(W,M,S)	-	insecure or extirpated
<i>Muntiacus muntjak</i> or <i>Muntiacus reevesi</i>	Indian Muntjac or Reeves's Muntjac		++	present (species uncertain)
<i>Manis pentadactyla</i>	Chinese Pangolin	(S)	+	insecure
<i>Callosciurus erythraeus</i>	Pallas's Squirrel	(S)	++	present
<i>Dremomys pyrrhomerus</i>	Red-hipped Squirrel		(not asked) #	present (confirmed)
<i>Tamiops maritimus</i>	Maritime Striped Squirrel	(W,S)	++ #	present (confirmed)
<i>Petaurista petaurista</i> or <i>Petaurista philippensis</i>	Red Giant Flying Squirrel or Indian Giant Flying Squirrel		#	present (confirmed)
<i>Typhlomys cinereus</i>	Chinese Pygmy Dormouse	(S)	(not asked)	not known
<i>Rhizomys pruinosus</i>	Hoary Bamboo Rat		++	present
<i>Hystrix brachyura</i>	Malayan Porcupine		++	present
<i>Lepus sinensis</i>	Chinese Hare		++	present (confirmed)

- Some of the species suspected to occur are of particular conservation importance:
 - Francois's Leaf Monkey *Trachypithecus francoisi* is Vulnerable globally and Class I Protected nationally.
 - Stump-tailed Macaque *Macaca arctoides* and Asiatic Golden Cat *Catopuma temminckii* 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*, Chinese Water Deer *Hydropotes inermis* and Chinese Pangolin *Manis pentadactyla* are at Lower Risk (Near-threatened) globally and Class II Protected nationally.
 - Yellow-throated Marten *Martes flavigula* and Indian Giant Flying Squirrel *Petaurista philippensis* are Class II Protected nationally.
- Although rather few large mammal species were reported to survive, the survey teams were able to observe a number of wild mammals during both visits.

Birds

- One hundred and twenty-three bird species were recorded in these surveys and the earlier KFBG survey in May 1997 (Fellowes and Hau, 1997) (Table 4). Including the records of Woodward and Hopkin (in litt.) made in August 1997 (Lesser Coucal *Centropus bengalensis*, Emerald Dove *Chalcophaps indica*, Oriental Magpie Robin *Copsychus saularis*, Asian Paradise Flycatcher *Terpsiphone paradisi* and White-tailed Leaf Warbler *Phylloscopus davisoni*) the recorded Damingshan bird fauna is some 128 species.
- Among the most frequently encountered species in all three surveys were Mountain Bulbul *Hypsipetes maclellandii*, Hill Prinia *Prinia atrogularis*, Brownish-flanked Bush Warbler *Cettia fortipes*, Sulphur-breasted Warbler *Phylloscopus ricketti*, Small Niltava *Niltava macgrigoriae*, Streak-breasted Scimitar Babbler *Pomatorhinus ruficollis*, Rufous-capped Babbler *Stachyris ruficeps*, Red-billed Leiothrix *Leiothrix lutea*, Yellow-cheeked Tit *Parus sibilans*, Mrs Gould's Sunbird *Aethopygia gouldiae* and Grey Treepie *Dendrocitta formosae*. Frequently encountered in some surveys but not others were: Oriental Cuckoo *Cuculus saturatus* (April); Large Hawk Cuckoo *Hierococyx sparverioides*, Green-billed Malkoha *Phaenicophaeus tristis*, Black-browed Barbet *Megalaima oorti*, Bay Woodpecker *Blythipicus pyrrhotis* and Pygmy Wren Babbler *Pnoepyga pusilla* (April and May); Hainan Blue Flycatcher *Cyornis hainanus* (May); Yellow-browed Warbler *Phylloscopus inornatus* (September); and Grey-cheeked Fulvetta *Alcippe morrisonia* (April and September).

Table 4. Birds recorded in Damingshan National Nature Reserve, April and September 2000. (“*” = Frequency recorded by Fellowes and Hau (1997)). Sequence follows Clements (2000).

Scientific name	English name	May 1997 *	Apr 2000	Sep 2000
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron		✓	
<i>Pernis ptilorhynchus</i>	Oriental Honey Buzzard		✓	
<i>Spilornis cheela</i>	Crested Serpent Eagle	✓	✓	
<i>Circus cyaneus</i>	Hen Harrier			✓
<i>Accipiter trivirgatus</i>	Crested Goshawk	✓	✓	✓
<i>Accipiter soloensis</i>	Chinese Sparrowhawk			✓
<i>Accipiter gularis</i>	Japanese Sparrowhawk		✓	✓
<i>Butastur indicus</i>	Grey-faced Buzzard		✓	✓
<i>Spizaetus nipalensis</i>	Mountain Hawk Eagle	✓	✓	✓
<i>Falco tinnunculus</i>	Common Kestrel	✓	✓	✓
<i>Falco subbuteo</i>	Eurasian Hobby	✓	✓	
<i>Falco peregrinus</i>	Peregrine Falcon			✓
<i>Bambusicola thoracica</i>	Chinese Bamboo Partridge	✓		
<i>Turnix tanki</i>	Yellow-legged Buttonquail	✓		
<i>Scolopax rusticola</i>	Eurasian Woodcock			✓
<i>Tringa ochropus</i>	Green Sandpiper			✓
<i>Streptopelia chinensis</i>	Spotted Dove			✓
<i>Clamator coromandus</i>	Chestnut-winged Cuckoo	✓		
<i>Hierococcyx sparveroides</i>	Large Hawk Cuckoo	✓	✓	
<i>Hierococcyx fugax</i>	Hodgson's Hawk Cuckoo	✓		
<i>Cuculus saturatus</i>	Oriental Cuckoo	✓	✓	✓
<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	✓	✓	
<i>Otus spilocephalus</i>	Mountain Scops Owl	✓	✓	✓
<i>Otus bakkamoena</i>	Collared Scops Owl	✓		✓
<i>Otus sunia</i>	Oriental Scops Owl	✓	✓	
<i>Bubo bubo</i>	Eurasian Eagle Owl		✓	
<i>Glaucidium brodiei</i>	Collared Owlet		✓	✓
<i>Glaucidium cuculoides</i>	Asian Barred Owlet			✓
<i>Hirundapus caudacutus</i>	White-throated Needletail			✓
<i>Hirundapus cochinchinensis</i>	Silver-backed Needletail	✓	✓	
<i>Apus pacificus</i>	Fork-tailed Swift	✓		✓
<i>Apus affinus</i>	House Swift	✓	✓	✓
<i>Alcedo atthis</i>	Common Kingfisher			✓
<i>Eurystomus orientalis</i>	Dollarbird			✓
<i>Megalaima oorti</i>	Black-browed Barbet	✓	✓	
<i>Megalaima virens</i>	Great Barbet	✓		✓
<i>Picumnus innominatus</i>	Speckled Piculet	✓		✓
<i>Dendrocopus hyperythrus</i>	Rufous-bellied Woodpecker			✓
<i>Celeus brachyurus</i>	Rufous Woodpecker			✓
<i>Gecinulus grantia</i>	Pale-headed Woodpecker	✓		
<i>Blythipicus pyrrhotis</i>	Bay Woodpecker	✓	✓	✓
<i>Delichon dasypus</i>	Asian House Martin			✓
<i>Hirundo rustica</i>	Barn Swallow	✓	✓	✓
<i>Hirundo daurica</i>	Red-rumped Swallow	✓	✓	✓
<i>Motacilla alba</i>	White Wagtail	✓		
<i>Motacilla cinerea</i>	Grey Wagtail	✓		✓
<i>Anthus hodgsoni</i>	Olive-backed Pipit			✓
<i>Coracina melaschistos</i>	Black-winged Cuckooshrike			
<i>Pericrocotus flammeus</i>	Scarlet Minivet		✓	
<i>Pericrocotus solaris</i>	Grey-chinned Minivet		✓	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul			✓
<i>Pycnonotus sinensis</i>	Light-vented Bulbul	✓	✓	✓
<i>Hemixos castanonotus</i>	Chestnut Bulbul	✓	✓	✓
<i>Hypsipetes mcclllandii</i>	Mountain Bulbul	✓	✓	✓
<i>Hypsipetes leucocephalus</i>	Black Bulbul			✓
<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird			✓
<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush			✓
<i>Myophonus caeruleus</i>	Blue Whistling Thrush	+	✓	✓
<i>Brachypteryx leucophrys</i>	Lesser Shortwing		✓	✓
<i>Brachypteryx montana</i>	White-browed Shortwing		✓	
<i>Prinia atrogularis</i>	Hill Prinia	✓	✓	✓
<i>Prinia flaviventris</i>	Yellow-bellied Prinia		✓	✓
<i>Prinia inornata</i>	Plain Prinia			✓
<i>Cettia fortipes</i>	Brownish-flanked Bush Warbler	✓	✓	✓

Scientific name	English name	May 1997 *	Apr 2000	Sep 2000
<i>Cettia acanthizoides</i>	Yellowish-bellied Bush Warbler	✓	✓	
<i>Bradypterus seebohmi</i>	Russet Bush Warbler		✓	
<i>Orthotomus cuculatus</i>	Mountain Tailorbird	✓	✓	✓
<i>Orthotomus sutorius</i>	Common Tailorbird			✓
<i>Phylloscopus proregulus</i>	Pallas's Warbler		✓	
<i>Phylloscopus inornatus</i>	Yellow-browed Warbler		✓	✓
<i>Phylloscopus borealis</i>	Arctic Warbler			✓
<i>Phylloscopus tenellipes</i>	Pale-legged Leaf Warbler			✓
<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	✓		✓
<i>Phylloscopus reguloides</i>	Blyth's Leaf Warbler	✓	✓	
<i>Phylloscopus ricketti</i>	Sulphur-breasted Warbler	✓	✓	✓
<i>Seicercus burkii</i>	Golden-spectacled Warbler	✓	✓	✓
<i>Muscicapa griseisticta</i>	Grey-streaked Flycatcher			✓
<i>Muscicapa sibirica</i>	Dark-sided Flycatcher			✓
<i>Muscicapa dauurica</i>	Asian Brown Flycatcher			✓
<i>Muscicapa muttui</i>	Brown-breasted Flycatcher	✓		
<i>Ficedula zanthopygia</i>	Yellow-rumped Flycatcher			✓
<i>Eumyias thalassina</i>	Verditer Flycatcher	✓		✓
<i>Niltava macgrigoriae</i>	Small Niltava	✓	✓	✓
<i>Cyornis hainanus</i>	Hainan Blue Flycatcher	✓	✓	✓
<i>Culicicapa ceylonensis</i>	Grey-headed Canary Flycatcher		✓	✓
<i>Luscinia calliope</i>	Siberian Rubythroat			✓
<i>Luscinia cyane</i>	Siberian Blue Robin			✓
<i>Rhyacornis fuliginosus</i>	Plumbeous Water Redstart	✓	✓	✓
<i>Enicurus schistaceus</i>	Slaty-backed Forktail	✓	✓	✓
<i>Saxicola torquata</i>	Common Stonechat			✓
<i>Saxicola ferrea</i>	Grey Bushchat			✓
<i>Garrulax pectoralis</i>	Greater Necklaced Laughingthrush			✓
<i>Garrulax maesi</i>	Grey Laughingthrush	✓	✓	✓
<i>Garrulax canorus</i>	Hwamei	✓	✓	✓
<i>Garrulax milnei</i>	Red-tailed Laughingthrush			✓
<i>Pomatorhinus erythrocnemis</i>	Spot-breasted Scimitar Babbler	✓	✓	✓
<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar Babbler	✓	✓	✓
<i>Pnoepyga pusilla</i>	Pygmy Wren Babbler	✓	✓	✓
<i>Stachyris ruficeps</i>	Rufous-capped Babbler	✓	✓	✓
<i>Babax lanceolatus</i>	Chinese Babax			✓
<i>Leiothrix lutea</i>	Red-billed Leiothrix	✓	✓	✓
<i>Pteruthius flaviscapis</i>	White-browed Shrike Babbler			✓
<i>Minla cyanouroptera</i>	Blue-winged Minla		✓	
<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>Aegithalos concinnus</i>	Black-throated Tit	✓	✓	✓
<i>Parus spilonotus</i>	Yellow-cheeked Tit	✓	✓	✓
<i>Aethopyga gouldiae</i>	Mrs Gould's Sunbird	✓	✓	✓
<i>Aethopyga christinae</i>	Fork-tailed Sunbird			✓
<i>Dicaeum concolor</i>	Plain Flowerpecker	✓	✓	
<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker			✓
<i>Dicaeum cruentatum</i>	Scarlet-backed Flowerpecker			✓
<i>Zosterops japonicus</i>	Japanese White-eye		✓	✓
<i>Oriolus chinensis</i>	Black-naped Oriole			✓
<i>Lanius cristatus</i>	Brown Shrike	✓		
<i>Lanius schach</i>	Long-tailed Shrike		✓	
<i>Dicrurus macrocercus</i>	Black Drongo	✓		✓
<i>Dicrurus leucophaeus</i>	Ashy Drongo		✓	✓
<i>Dicrurus hottentottus</i>	Spangled Drongo			✓
<i>Dendrocitta formosae</i>	Grey Treepie	✓	✓	✓

- Oriental Honey Buzzard *Pernis ptilorhynchus*, Crested Serpent Eagle *Spilornis cheela*, Hen Harrier *Circus cyaneus*, Crested Goshawk *Accipiter trivirgatus*, Chinese Sparrowhawk *Accipiter soloensis*, Japanese Sparrowhawk *Accipiter gularis*, Grey-faced Buzzard *Butastur indicus*, Mountain Hawk Eagle *Spizaetus nipalensis*, Common Kestrel *Falco tinnunculus*, Eurasian Hobby *Falco subbuteo*, Peregrine Falcon *Falco peregrinus*, Mountain Scops Owl *Otus spilocephalus*, Collared Scops Owl

Otus bakkamoena, Oriental Scops Owl *Otus sunia*, Eurasian Eagle Owl *Bubo bubo*, Collared Owlet *Glaucidium brodiei*, Asian Barred Owlet *Glaucidium cuculoides* and Silver-backed Needletail *Hirundapus cochinchinensis* are Class II Protected nationally.

- The globally Endangered White-eared Night Heron *Gorsachius magnificus* was recorded from Damingshan in June 1994, when four sightings of single adults and one of two young birds were made (Zhou, 1996). Subsequent visits, including the present surveys, have failed to detect the species although a rehabilitated bird was released at Damingshan in August 1998 (Fellowes *et al.*, 2001).
- The timing of the 2000 surveys coincided with spring and autumn migrations, explaining the high richness of raptors, warblers and flycatchers.
- The large numbers of certain forest-dependent bird species (woodpeckers, bulbuls, flycatchers and babblers) indicated that the forests at Damingshan have fairly high ecological integrity.

Reptiles and Amphibians

- Thirteen species of amphibian and fifteen species of reptile (six lizards and nine snakes) were recorded at Damingshan during the surveys (Table 5).
- The identity of *Paa* (cf. *shinii*) sp. and *Platyplacopus* (cf. *kuehnei*) sp. could not be confirmed.

Table 5. Amphibians and reptiles recorded in Damingshan National Nature Reserve in May 1997 and September 2000. Sequence follows Zhao E.-M. and Adler (1993).

Species	Habitat	
AMPHIBIA		
<i>Brachytarsophrys carinensis</i>	stream	✓
<i>Bufo melanostictus</i>	paddy field	✓
<i>Amolops ricketti</i>	stream	✓
<i>Occidozyga martensii</i>	paddy field	✓
<i>Paa</i> (cf. <i>shinii</i>) sp.	stream	✓
<i>Rana adenopleura</i>	pool	✓
<i>Rana limnocharis</i>	field	✓
<i>Rana livida</i>	stream	✓
<i>Rana versabilis</i>	stream	✓
	forest edge	✓
	forest	✓
	riparian forest	✓
<i>Philautus odontotarsus</i>	forest edge pool	✓
<i>Philautus gracilipes</i>	forest seep	✓, eggs
<i>Polypedates dennysi</i>	forest edge	✓
<i>Polypedates megacephalus</i>	forest edge	✓
	paddy field	✓
REPTILIA		
<i>Hemidactylus bowringii</i>	montane grassland	✓
<i>Platyplacopus</i> (cf. <i>kuehnei</i>) sp.	forest edge	✓
<i>Scincella modesta</i>	forest	✓
<i>Sphenomorphus indicus</i>	stream/forest	✓
	plantation	✓
<i>Tropidophorus guangxiensis</i>	forest	✓
	montane shrubland	✓
	forest edge	✓
<i>Ophisaurus harti</i>	forest edge	✓
<i>Boiga kraepelini</i>	forest	✓
<i>Calamaria pavimentata</i>	forest	✓
<i>Dinodon flavozonatum</i>	forest edge	✓
<i>Lycodon ruhstrati</i>	forest edge	✓
<i>Opisthotropis latouchii</i>	stream	✓
<i>Plagiopholis styani</i>	forest edge	✓
<i>Rhabdophis subminiatus</i>	forest edge	✓
<i>Ovophis monticola</i>	montane grassland	✓
<i>Trimeresurus stejnegeri</i>	forest	✓
	forest edge	✓
	village	✓

- Species of conservation concern recorded include *Philautus gracilipes*, which was previously known only from Yunnan, but subsequently recorded by KFBG at Dawuling Nature Reserve in Guangdong (Anon., 2003).
- The high diversity of forest and forest stream herpetofauna indicates that Damingshan is still of high integrity.

Fish

- Ten freshwater fish species were recorded from Damingshan Nature Reserve and the surrounding areas in September 2000. No frequency data were collected during the survey (Table 6).
- The stream catfish *Pterocryptis* sp. nov. is new to science; specimens from Damingshan have been assigned as the holotype and a paratype (Ng and Chan, in prep.).

Table 6. Freshwater fish recorded from Damingshan National Nature Reserve and surrounding areas, September 2000. Sequence of families follows Nelson (1994).

Species
<i>Opsariichthys bidens</i>
<i>Nicholsicypris normalis</i>
<i>Sarcocheilichthys nigripinnis nigripinnis</i>
<i>Acheilognathus tonkinensis</i>
<i>Rectoris posehensis</i>
<i>Carassius auratus</i>
<i>Micronemacheilus pulcher</i>
<i>Schistura fasciolata</i>
<i>Pterocryptis</i> sp. nov.
<i>Rhinogobius giurinus</i>

- Some species recorded are of particular conservation significance:
 - *Pterocryptis* sp. nov. is globally restricted and has so far been found only in scattered localities of the Beijiang and Xijiang catchments of the Zhujiang drainage system (Ng and Chan, in prep.).
 - *Rectoris posehensis* is uncommon and is restricted to northern Vietnam and the Xijiang catchment.
- In September 2000, the hillstream visited inside the nature reserve had tea-coloured water resulting from detritus leachage from past logging activity, and fish diversity and abundance was very low at the time of our visit. Nonetheless, *Pterocryptis* sp. nov. was collected in this stream. This stream merges with other streams and forms a much larger river in the foothills, where water was clearer and fish diversity and abundance much higher.

Ants

- Ants were not covered by the present surveys in 2000, but results of an earlier survey in May 1997 (Fellowes and Hau, 1997) can be updated here following improved understanding of ant taxonomy (Table 7). At least 40 species were recorded, of which many cannot be firmly identified.
- The most frequently encountered species included *Paratrechina* sp. 4, *Pheidole* sp. 11, *Gnamptogenys* sp. 2, *Pachycondyla* sp. 2 and *Myrmica* sp. 1.

Table 7. Ant species recorded in and around Damingshan National Nature Reserve, May 1997. “*” = Species with a strong forest association.

Species
<i>Aenictus (laeviceps group)</i> sp. 2
<i>Aphaenogaster</i> (cf. <i>beccarii</i>) sp. 1 * (recorded as <i>A. (takahashii)</i> sp. 1)
<i>Camponotus</i> (cf. <i>mitis</i>) sp. 11 (recorded as <i>C. mitis</i>)
<i>Camponotus</i> sp. 40
<i>Cerapachys sulcinodis</i> *
<i>Crematogaster</i> (cf. <i>biroi</i>) sp. 4
<i>Cryptopone</i> sp. 1 *
<i>Gnamptogenys</i> sp. 2 *
<i>Hypoponera</i> sp. 3 *
<i>Lasius</i> sp. 1 (includes “ <i>Lasius</i> sp. 2”) *
<i>Leptogenys kitteli</i> ? * (recorded as <i>Leptogenys</i> sp. 12)
<i>Leptothorax</i> (cf. <i>galeatus</i>) sp. 2
<i>Leptothorax</i> sp. 1
<i>Liometopum</i> sp. 2 (includes specimens misidentified as <i>Liometopum</i> sp. 1)

Species

Myrmica sp. * (misidentified as *Paratopula* sp. 2)
Odontomachus monticola *
Oligomyrmex sp. 8 (recorded as *Oligomyrmex* sp. 1)
Pachycondyla (cf. *luteipes*) sp. 2 * (recorded as *P. obscurans*)
Pachycondyla (*javana* group) sp. 1 * (recorded as *P. astuta*)
Paratrechina (cf. *bourbonica*) sp. 4 (recorded as *P. bourbonica*)
Paratrechina (nr. *indica*) sp. 9 * (recorded as *P. (vaga* group) sp. 9)
Paratrechina sp. 29 (recorded as *P. longicornis*)
Pheidole (*hortensis* group) sp. 9-D (recorded as *Pheidole* sp. 30)
Pheidole fervida * (recorded as *Pheidole* sp. 31)
Pheidole sp. 11
Pheidole sp. 29-A (recorded as sp. *Pheidole* sp. 29)
Pheidole sp. 44 (misidentified as *Pheidole* sp. 27)
Pheidologeton affinis (recorded as *P. (cf. affinis)* sp. 1)
Plagiolepis (cf. *allaudi*) sp. 3 (recorded as *Plagiolepis* sp. 4)
Ponera sp. 6 ? (recorded as *Ponera* sp. 1)
Prenolepis (cf. *emmae*) sp. 1 * (recorded as *P. emmae*)
Prenolepis magnocula * (recorded as *Prenolepis* sp. 2)
Prenolepis sp. 8 * (= *Paratrechina opisothalmia*)
Prenolepis sp. 9 *
Pseudolasius sp. or spp. (recorded as *P. (cf. cibdelus)* sp. 1 and sp. 4)
Pyramica (formerly *Pentastruma*) *canina* *
Strumigenys (cf. *lewisi*) sp. * (recorded as *Strumigenys* sp. 5)
Technomyrmex sp. 5
Tetramorium (sp. 6 group) sp. (recorded as *Tetramorium* sp. 16)
Vollenhovia sp. 3

- *Camponotus* sp. 40, *Leptothorax* sp. 1, *Pheidole* sp. 44, *Technomyrmex* sp. 5 and *Vollenhovia* sp. 3 are known only from Damingshan. *Camponotus* sp. 40 is a large, distinctive species which was abundant in forest at high altitudes.
- Excluding these unique species, 54% of species recorded are forest-associated. This is a moderately high figure for secondary vegetation, indicating quite high forest integrity in the areas surveyed.

Dragonflies

- Twenty-three dragonfly species were recorded during the September 2000 survey and the earlier survey in 1997 (Fellowes and Hau, 1997) (Table 8). Of these three species could not be firmly identified.
- Most frequently encountered in May 1997 included *Sinolestes* sp. and *Anax nigrofasciatus*.

Table 8. Dragonfly species recorded at Damingshan National Nature Reserve, May 1997 and September 2000.

Species	May 1997	Sept 2000
<i>Bayadera brevicauda continentalis</i>	✓	
<i>Megalestes distans</i> .	✓	
<i>Megalestes</i> sp. nov.		✓
<i>Sinolestes edita</i>	✓	
<i>Priscagrion pinheyi</i> sp. nov.	✓	
<i>Rhipidolestes alleni</i> sp. nov.	✓	
<i>Indocnemis ambigua</i>	✓	
<i>Indocnemis orang</i>		✓
<i>Drepanosticta</i> sp.	✓	
<i>Anax nigrofasciatus nigrofasciatus</i>	✓	
<i>Gynacantha subinterrupta</i>		✓
<i>Planaeschna risi risi</i>		✓
<i>Planaeschna suichangensis</i>		✓
<i>Crocothemis servilia servilia</i>	✓	
<i>Diplacodes trivialis</i>		✓
<i>Neurothemis fulvia</i>		✓
<i>Neurothemis tullia tullia</i>		✓
<i>Orthetrum glaucum</i>	✓	✓
<i>Orthetrum sabina sabina</i>	✓	✓
<i>Sympetrum eroticum</i>		✓
<i>Sympetrum speciosum taiwanum</i>		✓
<i>Sympetrum</i> sp.	✓	
<i>Trithemis aurora</i>	✓	✓

- Four previously undescribed species of Zygoptera were collected from Damingshan during the two surveys. Description of *Megalestes* sp. nov. is in preparation (Wilson and Reels, in prep.). *Priscagrion pinheyi* is both a new species and a new genus, described by Zhou and Wilson (2001), while *Rhipidolestes alleni* was described by Wilson (2000). Damingshan is named as the type locality for both of these species. *Drepanosticta* sp. is undoubtedly a new species but only a single, teneral, female was collected, so a formal description of the species is not currently possible. All four of these species should be considered as of conservation importance.
- *Bayadera brevicauda*, the *Megalestes* spp., *Sinolestes edita*, *Priscagrion pinheyi*, *Rhipidolestes alleni*, the *Indocnemis* spp., *Drepanosticta* sp. and the three aeshnids collected are typical of forest habitat. The libellulids collected are more generally distributed, with the exception of the late-emerging *Sympetrum* spp., which also tend to be associated with forested areas.

Butterflies

- Fifty-five butterfly species were encountered during the September 2000 survey, together with the results from May 1997 the total is 77 species (Table 9). *Capila* (cf. *pieridoides*) sp. could not be firmly identified as no specimen was collected; *Ochlodes* sp. could not be identified due to the poor condition of the specimen.
- Some species (*Notocrypta curvifascia*, *Abisara burnii*, *Tongeia potanini*, *Lethe diana*, *L.dura* and *Mycalesis gotama*) are apparently new records for Guangxi (Chou, 1994; Bascombe, 1995).
- The most frequently encountered species in May 1997 were *Pieris canidia*, *Euthalia niepelti*, *Lethe dura* and *Mycalesis francisca*. Among the most widespread and abundant in September 2000 were *Euploea midamus*, *Ideopsis similis*, *Papilio protenor* and *Ypthima baldus*.

Table 9. Butterfly species recorded at Damingshan National Nature Reserve. Sequence of families follows Bascombe (1995).

Species	May 1997	Habitat	Sep 2000
<i>Ampittia virgata</i>		grassland	✓
<i>Capila pieridoides</i> ?		forest	✓
<i>Hasora anura</i>		shrubland	✓
<i>Iambrix salsala</i>		forest edge	✓
<i>Notocrypta curvifascia</i>		forest	✓
<i>Ochlodes</i> sp.?		forest edge	✓
<i>Odontoptilum angulatum</i>		riparian forest	✓
<i>Parnara guttata</i>		grassland	✓
<i>Pelopidas mathias</i>		shrubland	✓
<i>Pithauria marsena</i>	✓		
<i>Atrophaneura aidoneus</i>	✓		
<i>Graphium agamemnon</i>		field/forest	✓
<i>Graphium chironides</i>	✓		
<i>Graphium doson</i>		riparian forest	✓
<i>Lamproptera curia</i>		field/village	✓
<i>Papilio bianor</i>	✓		
<i>Papilio helenus</i>	✓		
<i>Papilio melaneus</i>	✓		
<i>Papilio paris</i>		field/village	✓
<i>Papilio polytes</i>		field/village	✓
<i>Papilio protenor</i>	✓	forest	✓
		field/village	✓
<i>Papilio (Chilasa) agestor</i>	✓		
<i>Appias lalassis</i>	✓		
<i>Eurema hecabe</i>	✓		
<i>Eurema laeta</i>		field	✓
<i>Hebomoia glaucippe</i>	✓	field	✓
<i>Pieris (Artogetia) canidia</i>	✓		
<i>Prioneris thestylis</i>	✓		
<i>Abisara burnii</i>		forest	✓
<i>Abisara echerius</i>		forest edge	✓
<i>Abisara neophron</i>		field/forest	✓
<i>Acytolepis puspa</i>		riparian forest	✓

Species	May 1997	Habitat	Sep 2000
<i>Celastrina lavendularis</i>	✓		
<i>Celatoxia marginata</i>	✓		
<i>Dodona dipoea</i>	✓		
<i>Spindasis syama</i>		shrubland	✓
<i>Taraka hamada</i>	✓	forest edge	✓
<i>Tongeia potanini</i>		grassland	✓
<i>Udara albocaerulea</i>	✓	forest edge	✓
<i>Zizeeria maha</i>		grassland/field	✓
<i>Acraea issoria</i>		field/village	✓
<i>Argynnis (Chlidreia) childreni</i>		montane grassland	✓
<i>Argyreus hyperbius</i>	✓		
<i>Ariadne ariadne</i>		field/village	✓
<i>Athyma asura</i>	✓		
<i>Athyma perius</i>		field/village	✓
<i>Athyma selenophora</i>		forest	✓
		forest edge	✓
<i>Cethosia biblis</i>		field/forest	✓
<i>Cyrestis sp.</i>	✓		
<i>Danaus genutia</i>		field	✓
<i>Euploea midamus</i>	✓	forest edge	✓
		field/village	✓
<i>Euploea mulciber</i>	✓	forest	✓
<i>Euthalia niepelti</i>	✓		
<i>Euthalia phemius</i>		riparian forest	✓
<i>Ideopsis similis</i>	✓	forest edge	✓
		field	
<i>Lethe (Neope) muirheadii</i>		shrubland	✓
<i>Lethe confusa</i>		field/village	✓
		forest edge	
<i>Lethe diana</i>		grassland/shrubland	✓
<i>Lethe dura</i>	✓	grassland/shrubland	✓
<i>Lethe verma</i>	✓	forest	✓
<i>Lethe violaceopicta</i>	✓		
<i>Limenitis (Parasarpa) dudu</i>	✓		
<i>Limenitis (Parathyma) sulphitia</i>		field/forest	✓
<i>Melanitis leda</i>		forest	✓
<i>Melanitis phedima</i>		riparian forest	✓
<i>Mycalesis francisca</i>	✓		
<i>Mycalesis gotama</i>		field/forest	✓
<i>Neptis hylas</i>		forest edge	✓
<i>Neptis soma</i>	✓		
<i>Parantica sita</i>		forest edge	✓
		riparian forest	✓
		field	✓
<i>Polygonia (Kaniska) canace</i>	✓	field	✓
<i>Precis (Junonia) iphita</i>		field	✓
<i>Sephisa chandra</i>		forest edge	✓
<i>Stichophthalma howqua</i>		forest	✓
<i>Symbrenthia hypselis</i>		riparian forest	✓
<i>Vanessa indica</i>		forest edge	✓
<i>Ypthima baldus</i>		forest edge	✓

- Several forest-associated species such as *Lethe* spp., *Stichophthalma howqua*, *Symbrenthia hypselis*, *Taraka hamada* and *Tongeia potanini* were present.

Summary of flora and fauna

- The Damingshan region as a whole has a fragmented forest vegetation in a matrix of grassland/shrubland, young secondary forest and plantation. The present visits to Damingshan surveyed the extensive mature broadleaf evergreen forest between 800 and 1,100 m at Tianping Gorge in the core area. Most of the slopes visited between 500 and 800 m, including those at Chaoyangshan, however, had been transformed to young secondary forest or plantation. Some slopes and plateau had

also been degraded to grassland and shrubland. The present surveys recorded 199 vascular plant species, including three new records for Guangxi (*Gastrodia menghaiensis*, *Thrixspermum laurisilvaticum* and *Eurya metcalifiana*), seven globally Threatened or nationally Protected species, and a further five globally restricted species.

- While Damingshan has apparently lost most of the larger mammal species it still supports mammals of conservation importance, including the globally Vulnerable Francois's Leaf Monkey. Some smaller mammals dependent on mature forest (e.g. flying squirrels) appeared to be present in healthy numbers during our visits.
- One hundred and twenty-eight bird species have been recorded in recent years at Damingshan, including 18 nationally Protected species (mostly raptors and owls). This rather high total was in part due to the influx of migrants in April and September.
- Thirteen species of amphibian and fifteen species of reptile (six lizards and nine snakes) were recorded at Damingshan, including the frog *Philautus gracilipes* previously known only from Yunnan (but also recently found at Dawuling Nature Reserve, Guangdong). A high proportion of species was forest and forest stream specialists.
- Ten freshwater fish species were recorded from the Damingshan area, including two globally restricted species. More intensive surveys would expect to reveal many more, especially in the larger low altitude section, given the high water quality and instream habitat integrity there.
- An earlier ant survey in 1997 detected at least 40 species, of which five are known only from Damingshan. Of the other species more than half are forest-dependent, indicating quite high integrity.
- Twenty-three dragonfly species were recorded during the KFBG surveys. Four of them were previously undescribed and are of conservation importance. A fairly high proportion of the species are forest-associated.
- Seventy-seven butterfly species were encountered during the May 1997 and September 2000 surveys. Several forest-associated species such as *Lethe* spp., *Stichopthalma howqua*, *Symbrenthia hypselis*, *Taraka hamada* and *Tongeia potanini* were present.
- Damingshan was considered by MacKinnon *et al.* (1996) to be of national biodiversity significance, or global if extended north to Xun Jiang to include karst landscape and southwest to include the forested hills north of Nanning. The present findings confirm the importance of Damingshan, which has also been recognised in the Central Government's approval of national-level nature reserve status.

Threats and problems

- Some hunting occurred at Damingshan. Shooting was heard on 4 April 2000, and the local guide reported that people came into the forest to shoot monkeys. This claim coincides with a report from primatologist Li Youbang who met people hunting the few Francois's Leaf Monkeys remaining in the steep gorges of Damingshan.
- At the time of our visits, electrofishing was common in the river at the foothills outside the nature reserve, where fish diversity and abundance was the richest.

Opportunities

- Damingshan Nature Reserve contains fairly extensive mature forest, which could support viable populations of most or all of the species that remain.
- Damingshan is the nearest national-level nature reserve (~100 km) to the provincial capital Nanning, and has basic and clean accommodation at Tianping. Well-organised ecotourism may be a good way to generate income for reserve maintenance and environmental education. The reserve staff have shown willingness to provide educational facilities for visitors. To this end Kadoorie Farm and Botanic Garden and Guangxi Forestry Department have together produced leaflets and a permanent educational frame to help visitors appreciate the environment, geology and biota of Damingshan, and the role of the forest in watershed protection, which has been demonstrated by earlier studies (Forestry Department of Guangxi Zhuang Autonomous Region, 1993). In further ecotourism development, tourist attractions need to be carefully planned in order to minimize potential adverse impacts to the present quiet, natural setting. 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).
- Young hillside secondary forest at Tianping and Chaoyangshan will gain conservation value by natural succession if they are left undisturbed for 10-30 years. The conservation value of the nature reserve could be significantly increased by replacing the existing *Illicium verum* plantations with native broadleaf forest, as lower altitude forests are currently lacking. This could occur naturally if the plantations are abandoned for some years. Vegetation regeneration at the abandoned plantation and the most degraded hillside forest could be speeded up by reforestation with an assembly of native species representative of the nearby vegetation.
 - To ensure the continued survival of globally Threatened species, such as Francois's Leaf Monkey and White-eared Night Heron, the reserve management should treat enforcement of the hunting and logging ban as a top priority.
 - Damingshan is believed to form an important migration route for birds in Guangxi (Forestry Department of Guangxi Zhuang Autonomous Region, 1993); a longer-term study might reveal its importance to bird migration regionally and globally.
 - It has been suggested to extend Damingshan to other forest and karst regions nearby (MacKinnon *et al.*, 1996). One nearby site west-southwest of Damingshan is Longjun Nature Reserve, a 14 km² karst reserve designated to protect the globally Vulnerable tree *Excentrodendron hsienmu*.

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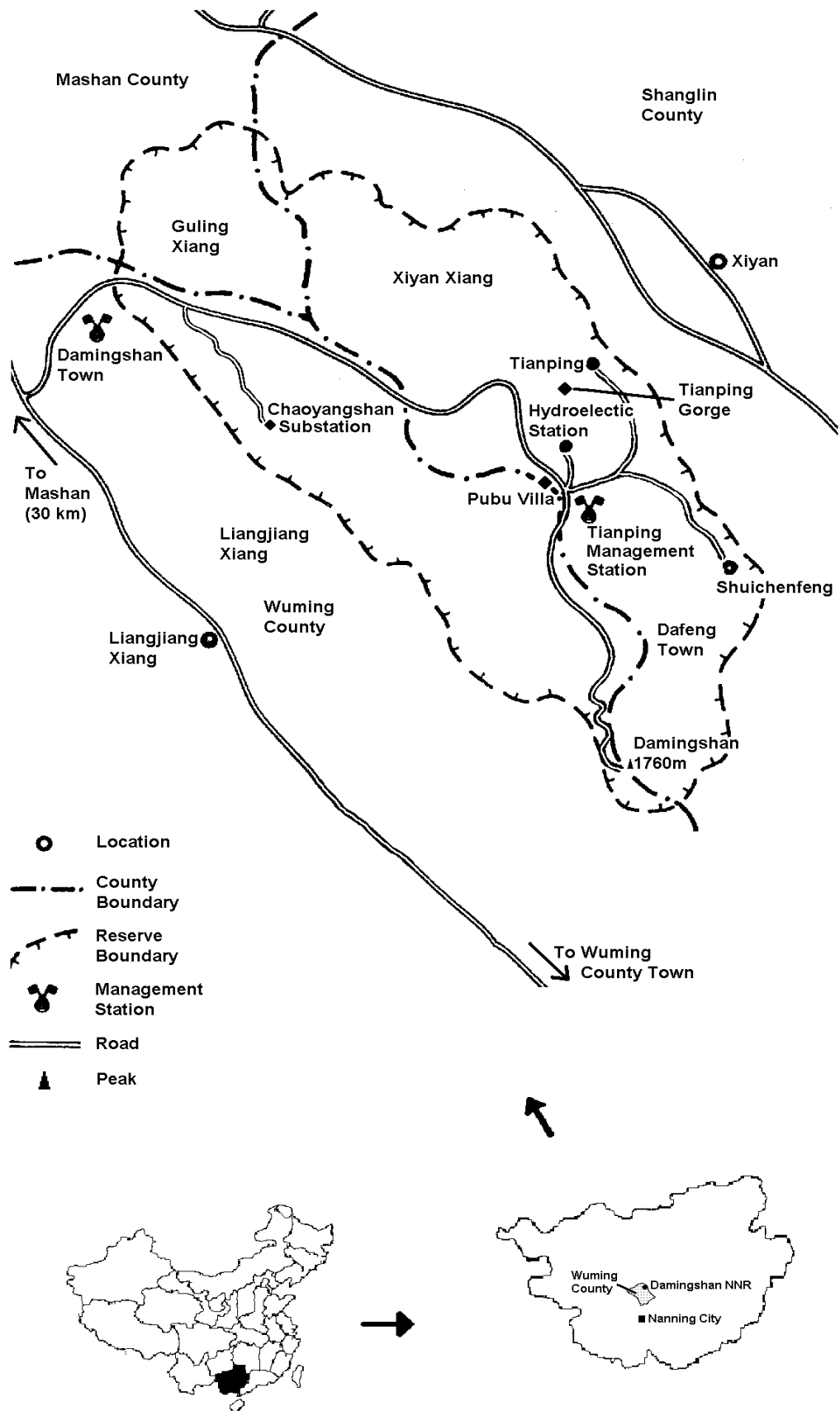


Figure 1. Map showing Damingshan National Nature Reserve, Central Guangxi, China.