



**Report of a Rapid Biodiversity Assessment at
Nanling National Nature Reserve, Northwest
Guangdong, China, June-July 2000**

**Kadoorie Farm and Botanic Garden
in collaboration with
Guangdong Provincial Forestry Department
South China Normal University**

May 2003

**South China Forest Biodiversity Survey Report Series: No. 29
(Online Simplified Version)**

Report of a Rapid Biodiversity Assessment at Nanling National Nature Reserve, Northwest Guangdong, China, June-July 2000

Editors

John R. Fellowes, Bosco P.L. Chan, Michael W.N. Lau,
Ng Sai-Chit, Gloria L.P. Siu and Lee Kwok Shing

Contributors

| | | |
|--|-------------------|-------|
| Kadoorie Farm and Botanic Garden: | Billy C.H. Hau | (BH) |
| | John R. Fellowes | (JRF) |
| | Michael W.N. Lau | (ML) |
| | Lee Kwok Shing | (LKS) |
| | Ng Sai-Chit | (NSC) |
| | Gloria L.P. Siu | (GS) |
| | Captain Wong | (CW) |
| | Bosco P.L. Chan | (BC) |
| Nanling National Nature Reserve Management Office: | Yang Qingyuan | (YQY) |
| South China Normal University: | Chen Xianglin | (CXL) |
| Xinyang Teachers' College: | Li Hongjing | (LHJ) |
| Voluntary specialists: | Graham T. Reels | (GTR) |
| | Keith D.P. Wilson | (KW) |

Background

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

Citation

Kadoorie Farm and Botanic Garden, 2003. *Report of a Rapid Biodiversity Assessment at Nanling National Nature Reserve, Northwest Guangdong, China, June-July 2000*. South China Forest Biodiversity Survey Report Series No. 29. KFBG, Hong Kong SAR, ii + 33 pp.

Copyright

© Kadoorie Farm and Botanic Garden Corporation
Lam Kam Road, Tai Po, N.T., Hong Kong SAR

May 2003

Contents

| | |
|--------------------------------------|----|
| Objectives | 1 |
| Methods | 1 |
| Location and management | 2 |
| Results | 2 |
| <i>Vegetation</i> | 2 |
| <i>Flora</i> | 3 |
| <i>Mammals</i> | 13 |
| <i>Birds</i> | 17 |
| <i>Reptiles and Amphibians</i> | 19 |
| <i>Fish</i> | 22 |
| <i>Dragonflies</i> | 23 |
| <i>Butterflies</i> | 25 |
| Summary of flora and fauna | 28 |
| Threats and problems | 28 |
| Opportunities | 29 |
| Acknowledgements | 29 |
| References | 30 |
| Figure 1 Map..... | 33 |

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 a Rapid Biodiversity Assessment at Nanling National Nature Reserve, Northwest Guangdong, China, June-July 2000

Objectives

- The aims of the survey were to collect up-to-date information on the fauna and flora of Nanling National Nature Reserve, and to use this to help determine conservation priorities within South China.

Methods

- On 25 June 2000 a team of biologists from Hong Kong (BH, GS, ML, LKS, GTR, NSC, KW) and Xinyang (LHJ), left Guangzhou for Ruyang. At 17.10 the team arrived at the Ruyuan Forestry Bureau of Nanling National Nature Reserve, in Ruyuan town. They reached Ruyang management station of the Nature Reserve (1,030 m).
- On 29 June the team departed Ruyang for Dadingshan.
- On 2 July they left Dadingshan at 08.00 and arrived at Longtanjiao nature reserve station (370 m) at 09.25.
- On 4 July the team arrived at the Chengjia nature reserve station (200 m) at 09.00.
- On 5 July the team departed Chengjia at 13.00 and travelled via Lianzhou to Dadongshan nature reserve station (740 m), which they reached at 18.20.
- During fieldwork visual searching for plants, mammals, birds, reptiles, amphibians, fish, ants, butterflies and dragonflies was conducted. Frogs and birds were also identified by their calls. Plant records were made by field observation, with some specimens collected.
- Status of large and medium-sized mammals (excluding Insectivora, Chiroptera and Muridae) at Nanling was inferred largely based on interviews with local people, with reference to colour pictures. For purposes of these interviews a list of South China mammals was compiled from various sources including Guangdong Forestry Department and South China Institute of Endangered Animals (1987), Corbet & Hill (1992) and Zhang Y. *et al.* (1997).
- Vascular plant records were made or verified by NSC except for orchids, for which records were made or verified by GS. Mammal records were made by LKS, ML, JRF, BH, GTR or KW. Records of birds were made by LKS, ML or JRF, reptiles and amphibians by ML, fish by BC and CXL, dragonflies by KW or GTR and butterflies by GTR or ML. Ant records have yet to be processed, and will be published elsewhere.
- Nomenclature in the report is standardised based, unless otherwise stated, on the following references:
 - Flora (Pteridophyta, Gymnospermae and Angiospermae excluding Orchidaceae): Anon. (1959-2001); Anon. (1996-2001); Anon. (2002a, 2002b); The Plant Names Project (2002);
 - Orchids (Angiospermae: Orchidaceae): Chen S.-C. (1999); Lang (1999); Tsi (1999);
 - 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);
 - Dragonflies (Insecta: Odonata): Schorr *et al.* (2001a, 2001b);
 - Butterflies (Insecta: Lepidoptera): Bascombe (1995); Wang M. & Fan (2002).
- 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 X.P. *et al.* (in press).

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

Location and management

- Nanling National Nature Reserve spreads across Ruyuan County (Shaoguan City District) and Yangshan County and Lianzhou City (Qingyuan City District), in northwest Guangdong. It adjoins Mangshan National Nature Reserve in southern Hunan. The coordinates are given as 24°38'02" - 25°00'00"N, 112°40'37" - 113°15'00"E by Zhang J. (1997), and 24°39' - 25°08'N, 112°41' - 113° 15'E by the reserve officials (pers. comm., 2000).
- The size of the National Nature Reserve is 584 km². It was formed in 1993-1994 by the merging of several provincial nature reserves: Ruyang (309 km²), Dadingshan (155 km²), Dadongshan (46 km²) and Chengjia (21 km²); subsequently Longtanjiao (53 km²) was also incorporated.
- The geology is mainly granite, with limestone dominant in a small part of the reserve towards the margin (Zhang J., 1997). The landscape is a mixture of earth and rock hills, with varied topography including rocky outcrops. Altitude ranges from 300 to 1,902 m at the summit of Shikengkong in Ruyang, near the Hunan border.
- The region as a whole has a subtropical monsoon climate with a mean annual temperature of 19 to 20°C. Mean monthly temperature ranges from 9°C in January to almost 29°C in July; annual precipitation ranges from 1,570 to 1,800 mm, and mainly occurs between March and August. The rivers radiating from the summit are all part of the Bei Jiang catchment of the Zhujiang drainage system.
- Each of the original five reserves retains a management station. Nanling National Nature Reserve was established to protect the subtropical evergreen broadleaf forest and rare flora and fauna (Zhang J., 1997). It is listed as a National-level Forest Ecosystem nature reserve (Zhang W., 1998).

Results

Vegetation

- The vegetation of Nanling region was reported to include the following types (Zhang J., 1997):
 - i) Subtropical monsoon evergreen broadleaf forest, the zonal vegetation of the region, below high altitude;
 - ii) Montane evergreen broadleaf forest, between medium-high and very high altitude;
 - iii) Young secondary forest of *Pinus massoniana* and plantation of *Cunninghamia lanceolata* (China Fir), found mainly below high altitude;
 - iv) Montane mixed broadleaf and coniferous forest, at very altitude;
 - v) Montane evergreen dwarf moss-forest, above very high altitude.
- The present survey found that whereas extensive stands of mature forest could be found at Ruyang, vegetation elsewhere was fairly fragmented. Patchy cover of mature forest could be found in relatively inaccessible valleys and at higher altitudes in the other reserve sections. These patches occurred in a matrix of lower-altitude young secondary forest dominated by *Pinus massoniana*, *Alniphyllum fortunei*, *Choerospondias axillaris*, *Liquidambar formosana* and *Castanopsis fabri*, and old plantations of *Cunninghamia lanceolata*. A representative patch of such secondary forest could be seen at Dadingshan.
- At Shikengkong, the team visited extensive stands of montane dwarf forest 4-6 m in height, and dominated by *Rhododendron simiarum*, *Cyclobalanopsis stewardiana*, *Cycl. obovatifolia*, *Lithocarpus hancei*, *Schima superba* and *Illicium spathulatum*. Small patches of similar dwarf

forest dominated by *Rhododendron fortunei*, *Schima superba*, *Illicium spathulatum* and *Hartia crassifolia* could be found near the summit of Dadingshan.

- Extensive stands of mature evergreen broadleaf forest up to 20 m in height and 80 cm dbh could be found at Ruyang. These were dominated by *Lithocarpus chrysocomus*, *Castanopsis carlesii*, *Cast. hystrix*, *Cast. eyrei*, *Fagus longipetiolata*, *Exbucklandia tonkinensis* and *Altingia chinensis*. Above these, near a mountain ridge, there was hillside mixed broadleaf and coniferous forest, up to 20 m tall and 80 cm dbh, and dominated by *Tsuga longibracteata*, *Pinus kwangtungensis* and *Lithocarpus chrysocomus*.
- On the steep hillside of Chengjia (700-800 m) was relatively sparse forest, with trees up to 30 m tall and 100 cm dbh. This was dominated by *Cast. eyrei*, *Cast. kawakamii*, *Pinus massoniana* and *Alniphyllum fortunei*. Mature evergreen broadleaf forest up to 20m tall and 60cm dbh could be found between medium and high altitude at Dadingshan, Dadongshang and Longtanjiao; this was dominated by *Cast. carlesii*, *Exbucklandia tonkinensis*, *Machilus* spp., *Cast. fabri* and *Schima superba*.

Flora

- The present survey recorded 491 vascular plant species including 72 fern species in 26 families, nine gymnosperms in six families, and 361 angiosperms in 91 families. Nanling National Nature Reserve was rich in orchids (Table 2) with 49 species (the highest total so far recorded by KFBG surveys in Guangdong), and moderately rich in other vascular plants (Table 1). Earlier surveys had recorded 2,292 seed plant species (gymnosperms and angiosperms) at Nanling Nature Reserve (Feng *et al.* 1998), and 3,831 vascular plants in the whole Nan Ling (“South Range”) region, including neighbouring mountainous parts of Hunan, Jiangxi, Fujian and Guangxi (Chen T. & Zhang, 1994).
- One orchid found on the present survey was new to science. It has been described as *Anoectochilus nanlingensis* (Lang & Siu, 2002). Another orchid found on the present survey represents a new genus to Mainland China (*Didymoplexis* sp.). A further four plant species found (*Dipteris chinensis*, *Carex phyllocephala*, *Amitostigma gracile* and *Galeola matsudai*) had not previously been recorded from Guangdong; *D. chinensis* has also recently been recorded from Qiniangshan and Guduoshan in coastal Guangdong (Xing & Yu, 2000; Yan Y.H., SCIB, pers. comm., 2002).
- Among the flora recorded in the present survey, there were a number of species of conservation importance.
 - The orchids *Anoectochilus roxburghii*, *Cymbidium sinense*, *C. goeringii*, *C. kanran* and *C. ensifolium* are endangered in China due to over-collection, for medicinal and ornamental purposes.
 - *Fagus longipetiolata* is globally Vulnerable. Although widespread in the region south of the Qingling Mountains, it is mainly restricted to mature forest.
 - *Artocarpus hypargyreus* and *Dalbergia balansae* are globally Vulnerable, although both species are widespread in South China and do not seem to be restricted to good forest. The former was occasionally seen at Dadingshan, Longtanjiao and Chengjia. The latter was rare.
 - *Fokienia hodginsii* and *Pinus kwangtungensis* are under Class II National Protection and both are considered by to be vulnerable in China (pp. 69 & 25, Vol. 4 of Anon. (1996-2001)). *Fokienia hodginsii* is also considered globally Near-threatened. *Pinus kwangtungensis* is restricted to montane forests of South China.
 - *Semiliquidambar cathayensis* is globally Near-threatened and under Class II National Protection in China. A single tree 6 m tall was seen.
 - *Castanopsis kawakamii* is globally Near-threatened although it is widespread in South China and occasionally dominant in hillside evergreen forest. It was locally dominant at Chengjia.
 - *Cibotium barometz* is under Class II National Protection in China although it is widespread in South China and common in degraded secondary forest.

- *Tsuga longibracteata* is also considered vulnerable in China (pp. 39, Vol. 4 of Anon. (1996-2001)). It was locally common at Xiaohuang Shan.
- Three species recorded (*Rhododendron brevinerve*, *Rhododendron rhuyuenense* and *Morinda nanlingensis*) are restricted to the Nan Ling region.
- All the orchid species recorded are listed in CITES Appendix II.
- Of the 49 orchid species recorded, 33 (67%) were terrestrial, 14 (29%) were epiphytic and 2 (4%) were saprophytic. A number of them (including species of *Anoectochilus*, *Calanthe* and the terrestrial *Cymbidium*) are forest-dependent species. The most abundant species included *Pleione* sp. in good forests and *Spiranthes* (cf. *hongkongensis*) sp. in more disturbed habitats.

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

| Family | Species | Notes |
|---------------------|--|--------------------------|
| PTERIDOPHYTA | | |
| Adiantaceae | <i>Adiantum edgeworthii</i> Hook. | |
| Aspleniaceae | <i>Asplenium prolongatum</i> Hook. | |
| | <i>Asplenium unilaterale</i> Lam. | |
| | <i>Asplenium wrightii</i> Eaton ex Hook. | |
| Athyriaceae | <i>Allantodia matthewii</i> (Copel.) Ching | |
| | <i>Allantodia metteniana</i> (Miq.) Ching | |
| | <i>Allantodia squamigera</i> (Mett.) Ching | |
| Blechnaceae | <i>Blechnum orientale</i> L. | |
| | <i>Chieniopteris harlandii</i> (Hook.) Ching | |
| | <i>Woodwardia japonica</i> (L.f.) Sm. | |
| | <i>Woodwardia orientalis</i> Sw. | |
| Bolbitidaceae | <i>Bolbitis subcordata</i> (Copel.) Ching | |
| Dennstaedtiaceae | <i>Microlepia hancei</i> Prantl | |
| | <i>Microlepia marginata</i> (Houtt.) C. Chr. | |
| Dicksoniaceae | <i>Cibotium barometz</i> (L.) J. Sm. | Protected II (1999) |
| Dipteridaceae | <i>Dipteris chinensis</i> Christ | new record for Guangdong |
| Drynariaceae | <i>Drynaria roosii</i> Nakaike | |
| Dryopteridaceae | <i>Arachniodes amoena</i> (Ching) Ching | |
| | <i>Arachniodes sphaerosora</i> (Ching) Ching | |
| | <i>Cyrtomium fortunei</i> J. Sm. | |
| | <i>Dryopteris championii</i> (Benth.) C. Chr. | |
| | <i>Dryopteris decipiens</i> (Hook.) Kuntze | |
| | <i>Dryopteris fuscipes</i> C. Chr. | |
| | <i>Dryopteris scottii</i> (Bedd.) Ching ex C. Chr. | |
| | <i>Polystichum eximium</i> (Mett. ex Kuhn) C. Chr. | |
| Elaphoglossaceae | <i>Elaphoglossum yoshinagae</i> (Yatabe) Makino | |
| Gleicheniaceae | <i>Dicranopteris pedata</i> (Houtt.) Nakaike | |
| | <i>Diplopterygium chinensis</i> (Rosenst.) DeVol | |
| | <i>Diplopterygium glaucum</i> (Thunb. ex Houtt.) Nakai | |
| Grammitidaceae | <i>Grammitis dorsipila</i> (Christ) C. Chr. & Tardieu | |
| | <i>Micropolypodium cornigera</i> (Baker) X.C. Zhang | |
| Hemionitidaceae | <i>Coniogramme japonica</i> (Thunb.) Diels | |
| Huperziaceae | <i>Huperzia serrata</i> (Thunb.) Trevis. | |
| | <i>Phlegmariurus fordii</i> (Baker) Ching | |
| Hymenophyllaceae | <i>Mecodium excertum</i> (Wall.) Copel. | |
| | <i>Mecodium osmundoides</i> (Bosch) Ching | |
| Lindsaeaceae | <i>Stenoloma chusanum</i> (L.) Ching | |
| Lycopodiaceae | <i>Lycopodiastrium casuarinoides</i> (Spring) Holub | |
| Marattiaceae | <i>Angiopteris fokiensis</i> Hieron. | |
| Nephrolepidaceae | <i>Nephrolepis auriculata</i> (L.) Trimea | |
| Osmundaceae | <i>Osmunda japonica</i> Thunb. | |
| | <i>Osmunda vachellii</i> Hook. | |
| Plagiogyriaceae | <i>Plagiogyria dunnii</i> Copel. | |

| Family | Species | Notes |
|--------------------------------------|---|---|
| Polypodiaceae | <i>Plagiogyria euphlebia</i> Mett. | |
| | <i>Plagiogyria japonica</i> Nakai | |
| | <i>Arthromeris lehmannii</i> (Mett.) Ching | |
| | <i>Colysis elliptica</i> (Thunb.) Ching | |
| | <i>Colysis elliptica</i> (Thunb.) Ching var. <i>pothifolia</i> Ching | |
| | <i>Colysis hemionitidea</i> (Wall. ex Mett.) C. Presl | |
| | <i>Colysis wrightii</i> (Hook.) Ching | |
| | <i>Lepidogrammits rostrata</i> (Bedd.) Ching | |
| | <i>Lepisorus obscure-venulosus</i> (Hayata) Ching | |
| | <i>Microsorium buergerianum</i> (Miq.) Ching | |
| | <i>Microsorium dilatatum</i> (Bedd.) Sledge | |
| | <i>Microsorium fortunei</i> (T. Moore) Ching | |
| | <i>Microsorium punctatum</i> (L.) Copel. | |
| | <i>Microsorium zippelii</i> (Blume) Ching | |
| | <i>Phymatopteris albopes</i> (C Chr. & Ching) Pic. Serm. | |
| | <i>Phymatopteris hastata</i> (Thunb.) Pic. Serm. | |
| | <i>Phymatopteris rhynchophylla</i> (Hook.) Pic. Serm. | |
| | <i>Pyrrhosia lingua</i> (Thunb.) Farw | |
| | Pteridaceae | <i>Pteris cretica</i> L. <i>nervosa</i> Ching & S.H. Wu |
| <i>Pteris dispar</i> Kunze | | |
| <i>Pteris excelsa</i> Gaud. | | |
| <i>Pteris fauriei</i> Hieron. | | |
| <i>Pteris insignis</i> Mett. ex Kuhn | | |
| <i>Pteris vittata</i> L. | | |
| Sinopteridaceae | <i>Pteris wallichiana</i> Agardh | |
| | <i>Aleuritopteris pseudofarinosa</i> Ching & S.K. Wu | |
| Thelypteridaceae | <i>Onychium japonicum</i> (Thunb.) Kunze | |
| | <i>Dictyocline wilfordii</i> (Hook.) J. Sm. | |
| | <i>Phegopteris decursivepinnata</i> (Van Hall) Fée | |
| GYMNOSPERMAE | | |
| Cephalotaxaceae | <i>Cephalotaxus fortunei</i> Hook. | |
| Cupressaceae | <i>Fokienia hodginsii</i> (Dunn) A. Henry & H. Thomas | Protected II, Lower Risk (nt) |
| Pinaceae | <i>Pinus kwangtungensis</i> Chun & Tsiang | Protected II |
| | <i>Pinus massoniana</i> Lamb. | |
| | <i>Tsuga chinensis</i> (Franch.) Pritz. | |
| | <i>Tsuga longibracteata</i> W.C. Cheng | endemic to Nan Ling region |
| Podocarpaceae | <i>Podocarpus neriifolius</i> D. Don | |
| Taxaceae | <i>Amentotaxus argotaenia</i> (Hance) Pilg. | |
| Taxodiaceae | <i>Cunninghamia lanceolata</i> (Lamb.) Hook. | planted |
| ANGIOSPERMAE | | |
| Dicotyledonae | | |
| Aceraceae | <i>Acer davidii</i> Franch. | |
| | <i>Acer tutcheri</i> Duthie | |
| | <i>Acer wilsonii</i> Rehd. | |
| Actinidiaceae | <i>Actinidia callosa</i> Lindl. | |
| | <i>Actinidia callosa</i> Lindl. var. <i>discolor</i> C.F. Liang | |
| | <i>Actinidia eriantha</i> Benth. | |
| | <i>Actinidia fulvicoma</i> Hance var. <i>lanata</i> (Hemsl.) C.F. Liang | |
| | <i>Actinidia glaucophylla</i> F. Chun | |
| | <i>Actinidia latifolia</i> (Gardner & Champ.) Merr. | |
| Alangiaceae | <i>Actinidia melliana</i> Hand.-Mazz. | |
| | <i>Alangium chinense</i> (Lour.) Harms. | |
| Anacardiaceae | <i>Alangium kurzii</i> Craib | |
| | <i>Choerospondias axillaris</i> (Roxb.) B.L. Burt & A.W. Hill | |
| | <i>Rhus chinensis</i> Mill. | |
| | <i>Rhus hypoleuca</i> Champ. ex Benth. | |
| | <i>Toxicodendron succedaneum</i> (L.) Kuntze. | |

| Family | Species | Notes |
|------------------|---|------------------|
| Annonaceae | <i>Toxicodendron sylvestri</i> (Siebold & Zucc.) Kuntze <i>Fissistigma oldhamii</i> (Hemsl.) Merr. <i>Fissistigma unicum</i> (Dunn) Merr. | |
| Apiaceae | <i>Pternopetalum trichomanifolium</i> (Franch.) Hand.-Mazz. | |
| Apocynaceae | <i>Pottsia laxiflora</i> (Blume) Kuntze <i>Urceola rosea</i> (Hook. & Arn.) D.J. Middleton | |
| Aquifoliaceae | <i>Ilex championii</i> Loes. <i>Ilex ficoidea</i> Hemsl. <i>Ilex kwangtungensis</i> Merr. <i>Ilex pubescens</i> Hook. & Arn. <i>Ilex tsoii</i> Merr. & Chun <i>Ilex viridis</i> Champ. ex Benth. | |
| Araliaceae | <i>Dendropanax proteus</i> Benth. <i>Hedera nepalensis</i> K. Koch var. <i>sinensis</i> (Tobler) Rehder <i>Heteropanax fragrans</i> (D. Don) Seem. <i>Schefflera delavayi</i> (Franch.) Harms <i>Schefflera minutistellata</i> Merr. ex H.L. Li <i>Schefflera octophylla</i> (Lour.) Harms | |
| Aristolochiaceae | <i>Asarum caudigerum</i> Hance | |
| Asclepiadaceae | <i>Cynanchum officinale</i> (Hemsl.) Tsiang & H.D. Zhang <i>Toxocarpus fuscus</i> Tsiang | |
| Balsaminaceae | <i>Impatiens</i> sp. | |
| Begoniaceae | <i>Begonia crassirostris</i> Irmsch. <i>Begonia fimbriatipula</i> Hance <i>Begonia palmata</i> D. Don | |
| Berberidaceae | <i>Epimedium sagittatum</i> (Sieb. & Zucc.) Maxim. | |
| Boraginaceae | <i>Ehretia longiflora</i> Champ. ex Benth. | |
| Campanulaceae | <i>Codonopsis lanceolata</i> (Siebold & Zucc.) Trautv. <i>Platycodon grandiflorus</i> (Jacquin) A. DC. <i>Pratia nummularia</i> (Lam.) A. Br. & Aschers. | |
| Caprifoliaceae | <i>Lonicera rhytidophylla</i> Hand.-Mazz. <i>Viburnum fordiae</i> Hance <i>Viburnum sempervirens</i> Koch <i>Viburnum</i> sp. | |
| Celastraceae | <i>Celastrus aculeata</i> Merr. <i>Celastrus orbiculatus</i> Thunb. <i>Microtropis gracilipes</i> Merr. & Metc. <i>Tripterygium wilfordii</i> Hook. f. | |
| Chloranthaceae | <i>Sarcandra glabra</i> (Thunb.) Nakai | |
| Clethraceae | <i>Clethra cavaleriei</i> H. Lévl. | |
| Clusiaceae | <i>Garcinia multiflora</i> Champ. ex Benth. <i>Garcinia oblongifolia</i> Champ. ex Benth. | |
| Convolvulaceae | <i>Evolvulus alsinoides</i> (L.) L. | |
| Cornaceae | <i>Dendrobenthamia hongkongensis</i> (Hemsl.) Hutch. | |
| Crassulaceae | <i>Sedum subtile</i> Miq. | |
| Cucurbitaceae | <i>Trichosanthes ovigera</i> Blume | |
| Daphniphyllaceae | <i>Daphniphyllum calycinum</i> Benth | |
| Droseraceae | <i>Drosera rotundifolia</i> L. | |
| Ebenaceae | <i>Diospyros kaki</i> Thunb. | probably planted |
| Elaeocarpaceae | <i>Diospyros morrisiana</i> Hance ex. Walpers <i>Elaeocarpus chinensis</i> (Gardner & Champ.) Hook. f. ex Benth. <i>Elaeocarpus decipiens</i> Hemsl. <i>Elaeocarpus japonicus</i> Siebold & Zucc. <i>Elaeocarpus sylvestris</i> (Lour.) Poir. <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 | |

| Family | Species | Notes |
|-----------------|---|----------------------------|
| | <i>Rhododendron brevinerve</i> Chun & W.P. Fang | endemic to Nan Ling region |
| | <i>Rhododendron championiae</i> Hook. f. | |
| | <i>Rhododendron fortunei</i> Lindl. | |
| | <i>Rhododendron levinei</i> Merr. | |
| | <i>Rhododendron mariesii</i> Hemsl. & E.H. Wilson | |
| | <i>Rhododendron moulmainsense</i> Hook. f. (<i>R. westlandii</i> Hemsl.) | |
| | <i>Rhododendron ovatum</i> (Lindl.) Planch. ex Maxim. | |
| | <i>Rhododendron rhuynense</i> Chun ex P.C. Tam | endemic to Nan Ling region |
| | <i>Rhododendron simiarum</i> Hance | |
| | <i>Rhododendron simsii</i> Planch. | |
| | <i>Vaccinium bracteatum</i> Thunb. | |
| Erythroxylaceae | <i>Erythroxylum sinense</i> Y. C. Wu | |
| Escalloniaceae | <i>Itea chinensis</i> Hook. & Arn | |
| Euphorbiaceae | <i>Antidesma japonicum</i> Siebold & Zucc. | |
| | <i>Breynia fruticosa</i> (L.) Hook. f. | |
| | <i>Endospermum chinense</i> Benth. | |
| | <i>Glochidion triandrum</i> (Blanco) C.B. Rob | |
| | <i>Mallotus japonicus</i> (Thunb.) Müll. Arg. var. | |
| | <i>oreophilus</i> (Müll. Arg.) S.M. Huang | |
| | <i>Mallotus paniculatus</i> (Lam.) Müll. Arg. | |
| | <i>Mallotus philippinensis</i> (Lam.) Müll. Arg. | |
| | <i>Mallotus repandus</i> (Willd.) Müll. Arg. var. | |
| | <i>chrysocarpus</i> (Pamp.) S.M. Hwang | |
| | <i>Sapium discolor</i> (Champ. ex Benth.) Müll.-Arg. | |
| 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 & E. H. Wilson | |
| | <i>Castanopsis fordii</i> Hance | |
| | <i>Castanopsis hystrix</i> Miq. | |
| | <i>Castanopsis kawakamii</i> Hayata | Lower Risk (nt) |
| | <i>Castanopsis lamontii</i> Hance | |
| | <i>Castanopsis tibetana</i> Hance | |
| | <i>Cyclobalanopsis edithiae</i> (Skan) Schottky | |
| | <i>Cyclobalanopsis fleuryi</i> (Hickel & A. Camus) Chun ex Q. F. Zheng | |
| | <i>Cyclobalanopsis glauca</i> (Thunb.) Oerst. | |
| | <i>Cyclobalanopsis myrsinifolia</i> (Blume) Oerst. | |
| | <i>Cyclobalanopsis</i> sp. | |
| | <i>Cyclobalanopsis obovatifolia</i> (C.C. Huang) Q.F. Zheng | |
| | <i>Cyclobalanopsis stewardiana</i> (A. Camus) Y.C. Hsu & H.W. Jen | |
| | <i>Fagus longipetiolata</i> Seemen | Vulnerable |
| | <i>Lithocarpus brevicaudatus</i> (Skan) Hayata | |
| | <i>Lithocarpus chrysocomus</i> Chun & Tsiang | |
| | <i>Lithocarpus comeus</i> (Lour.) Rehder | |
| | <i>Lithocarpus elizabethae</i> (Tutcher) Rehder | |
| | <i>Lithocarpus fenestratus</i> (Roxb.) Rehder | |
| | <i>Lithocarpus glaber</i> (Thunb.) Nakai | |
| | <i>Lithocarpus haipinii</i> Chun | |
| | <i>Lithocarpus hancei</i> (Benth.) Rehder | |
| | <i>Lithocarpus harlandii</i> (Hance ex Walp.) Rehder | |
| | <i>Lithocarpus litseifolius</i> (Hance) Chun | |
| Flacourtiaceae | <i>Homalium cochinchinense</i> (Lour.) Druce | |
| | <i>Xylosma longifolium</i> Clos | |
| Gentianaceae | <i>Crawfordia</i> sp. | |
| Gesnariaceae | <i>Aeschynanthus acuminatus</i> Wall. ex A. DC. | |

| Family | Species | Notes | |
|------------------------------|--|--|--|
| Hamamelidaceae | <i>Chirita pinnatifida</i> (Hand.-Mazz.) B.L. Burt | | |
| | <i>Oreocharis auricula</i> (S. Moore) C.B. Clarke | | |
| | <i>Altingia chinensis</i> (Champ. ex Benth.) Oliv. ex Hance | | |
| | <i>Corylopsis multiflora</i> Hance | | |
| | <i>Exbucklandia tonkinensis</i> (Lecomte) Steenis | | |
| | <i>Liquidambar formosana</i> Hance | | |
| Hydrangeaceae | <i>Loropetalum chinense</i> (R. Br.) Oliv. | Protected II, Lower Risk (nt) | |
| | <i>Semiliquidambar cathayensis</i> H. T. Chang | | |
| | <i>Dichroa febrifuga</i> Lour. | | |
| | <i>Dichroa yaoshanensis</i> Y.C. Wu | | |
| | <i>Hydrangea chinensis</i> Maxim. | | |
| | <i>Hydrangea kwangsiensis</i> Hu var. <i>hedyotidea</i> (Chun) C.M. Hu | | |
| | <i>Hydrangea paniculata</i> Siebold | | |
| | <i>Pileostegia tomentella</i> Hand.-Mazz. | | |
| | <i>Pileostegia viburnoides</i> Hook. f. & Thomson | | |
| | <i>Schizophragma integrifolium</i> Oliv. | | |
| Icacinaceae | <i>Mappianthes iodoides</i> Hand.-Mazz. | | |
| Illiciaceae | <i>Illicium spathulatum</i> Y.C. Wu | | |
| Juglandaceae | <i>Engelhardtia fenzelii</i> Merr. | | |
| | <i>Engelhardtia roxburghiana</i> Wall. | | |
| Lamiaceae | <i>Gomphostemma chinense</i> Oliv. | | |
| | <i>Paraphlomis javanica</i> (Blume) Prain | | |
| | <i>Prunella vulgaris</i> L. | | |
| Lardizabalaceae | <i>Scutellaria glossecrenata</i> Merr. & Chun ex H.W. Li | | |
| | <i>Stauntonia chinensis</i> DC. | | |
| | <i>Stauntonia obovata</i> Hemsl. | | |
| Lauraceae | <i>Beilschmiedia fordii</i> Dunn | | |
| | <i>Cinnamomum appelianum</i> Schewe | | |
| | <i>Cinnamomum porrectum</i> (Roxb.) Kosterm. | | |
| | <i>Cinnamomum validinerve</i> Hance | | |
| | <i>Cryptocarya concinna</i> Hance | | |
| | <i>Lindera pulcherrima</i> (Nees) Benth. var. <i>hemsleyana</i> (Diels) H.B. Cui | | |
| | <i>Litsea cubeba</i> (Lour.) Pers. | | |
| | <i>Litsea elongata</i> (Nees) Benth. & Hook. f. | | |
| | <i>Litsea greenmaniana</i> C.K. Allen | | |
| | <i>Machilus chekiangensis</i> S.K. Lee | | |
| | <i>Machilus pauhoi</i> Kanehira | | |
| | <i>Machilus thunbergii</i> Siebold & Zucc. | | |
| | <i>Machilus velutina</i> Champ. ex Benth. | | |
| | <i>Machilus wangchiana</i> Chun | | |
| | <i>Neolitsea aurata</i> (Hayata) Koidz. | | |
| | <i>Neolitsea cambodiana</i> Lecomte | | |
| | <i>Neolitsea chuii</i> Merr. | | |
| | <i>Neolitsea levinei</i> Merr. | | |
| | <i>Neolitsea phanerophlebia</i> Merr. | | |
| | <i>Neolitsea pulchella</i> (Meissn.) Merr. | | |
| | Magnoliaceae | <i>Manglietia fordiana</i> Oliv. | |
| | | <i>Michelia chapensis</i> Dandy | |
| | | <i>Michelia foveolata</i> Merr. ex Dandy | |
| <i>Michelia maudiae</i> Dunn | | | |
| Malvaceae | <i>Urena procumbens</i> L. | | |
| Melastomataceae | <i>Barthea barthei</i> (Hance ex Benth.) Krasser | | |
| | <i>Blastus apricus</i> (Hand.-Mazz.) H.L. Li | | |
| | <i>Blastus dunnianus</i> H. Lév. | | |
| | <i>Melastoma dodecandrum</i> Lour. | | |
| | <i>Melastoma sanguineum</i> Sims | | |
| Menispermaceae | <i>Hypserpa nitida</i> Miers | | |
| | <i>Stephania longa</i> Lour. | | |

| Family | Species | Notes |
|-----------------|---|------------|
| Mimosaceae | <i>Acacia pennata</i> (L.) Willd. <i>Pithecellobium lucidium</i> Benth. | |
| Moraceae | <i>Artocarpus hypargyreus</i> Hance ex Benth. <i>Broussonetia kaempferi</i> Sieb. <i>Cudrania cochinchinensis</i> (Lour.) Kudo & Masam. <i>Ficus erecta</i> Thunb. <i>Ficus variolosa</i> Lindl. ex Benth. | Vulnerable |
| Myricaceae | <i>Myrica rubra</i> (Lour.) Sieb. & Zucc. | |
| Myrsinaceae | <i>Ardisia crenata</i> Sims <i>Ardisia mamillata</i> Hance <i>Ardisia primulifolia</i> Gardner & Champ. <i>Ardisia pusilla</i> A.DC. <i>Embelia parviflora</i> Wall. ex A. DC. <i>Embelia vestita</i> Roxb. <i>Maesa japonica</i> (Thunb.) Moritzi & Zoll. <i>Maesa perlarius</i> (Lour.) Merr. <i>Myrsine stolonifera</i> (Koidz.) E. Walker <i>Myrsine seguinii</i> H. Lévl | |
| Myrtaceae | <i>Baeckea frutescens</i> L. <i>Rhodomyrtus tomentosa</i> (Aiton) Hassk. <i>Syzygium buxifolium</i> Hook. & Arn. | |
| Olacaceae | <i>Schoepfia chinensis</i> Gardner & Champ. | |
| Oleaceae | <i>Jasminum elongatum</i> (Bergius) Willd. <i>Jasminum lanceolarium</i> Roxb. <i>Olea tsoongii</i> (Merr.) P.S. Green <i>Osmanthus marginatus</i> (Champ. ex Benth.) Hemsl. | |
| Papaveraceae | <i>Macleaya cordata</i> (Willd.) R. Br. | |
| Papilionaceae | <i>Dalbergia balansae</i> Prain <i>Millettia dielsiana</i> Harms <i>Millettia nitida</i> Benth. | Vulnerable |
| Pentaphragaceae | <i>Pentaphragax euryoides</i> Gardner & Champ. | |
| Piperaceae | <i>Piper hancei</i> Maxim. | |
| Polygalaceae | <i>Polygala fallax</i> Hemsl. | |
| Primulaceae | <i>Lysimachia congestiflora</i> Hemsl. | |
| Proteaceae | <i>Helicia cochinchinensis</i> Lour. <i>Helicia kwangtungensis</i> W.T. Wang <i>Helicia reticulata</i> W. T. Wang | |
| Ranunculaceae | <i>Thalictrum acutifolium</i> (Hand.-Mazz.) B. Boivin <i>Thalictrum umbricola</i> Ulbr. | |
| Rhamnaceae | <i>Berchemia floribunda</i> (Wall.) Brongn. <i>Sageretia lucida</i> Merr. <i>Sageretia thea</i> (Osbeck) M.C. Johnst. | |
| Rosaceae | <i>Eriobotrya fragrans</i> Champ. ex Benth. <i>Laurocerasus phaeosticta</i> (Hance) C. K. Schneid. <i>Laurocerasus phaeosticta</i> (Hance) C. K. Schneid. fo. <i>ciliospinosa</i> Chun ex T.T. Yu & L.T. Lo <i>Pygeum topengii</i> Merr. <i>Raphiolepis indica</i> (L.) Lindl. <i>Rosa laevigata</i> Michx. <i>Rubus columllaris</i> Tutcher <i>Rubus crassifolius</i> T.T. Yu & L.T. Lu <i>Rubus innominatus</i> S. Moore var. <i>aralioides</i> (Hance) T.T. Yu & L.T. Lu <i>Rubus lobatus</i> T.T. Yu & L.T. Lu <i>Rubus reflexus</i> Ker <i>Rubus rosifolius</i> Sm. <i>Rubus swinhoei</i> Hance <i>Rubus xanthoneurus</i> Focke <i>Spiraea japonica</i> L. f. var. <i>acuminata</i> Franch. <i>Stranvaesia davidiana</i> Decne. var. <i>undulata</i> (Decne.) Rehder & E.H. Wilson | |

| Family | Species | Notes |
|------------------|---|----------------------------|
| Rubiaceae | <i>Adina pilulifera</i> (Lam.) Franch. ex Drake <i>Gardenia jasminoides</i> J. Ellis <i>Hedyotis mellii</i> Tutcher <i>Hedyotis uncinella</i> Hook. & Arn. <i>Morinda nanlingensis</i> Y.Z. Ruan <i>Mussaenda esquirolii</i> H. Lévl. <i>Mussaenda pubescens</i> W. T. Aiton <i>Uncaria rhynchophylla</i> (Miq.) Miq. ex Havil. | endemic to Nan Ling region |
| Rutaceae | <i>Evodia glabrifolia</i> (Champ. ex Benth.) C.C. Huang <i>Evodia ruticarpa</i> (A. Juss.) Benth. <i>Toddalia asiatica</i> (L.) Lam. <i>Zanthoxylum ailanthoides</i> Siebold & Zucc. <i>Zanthoxylum myriacanthum</i> Wall. ex Hook. f. <i>Zanthoxylum nitidum</i> (Roxb.) DC. <i>Zanthoxylum scandens</i> Blume | |
| Sabiaceae | <i>Meliosma fordii</i> Hemsl. <i>Meliosma myriantha</i> Siebold & Zucc. <i>discolor</i> Dunn <i>Meliosma rigida</i> Siebold & Zucc. <i>Meliosma squamulata</i> Hance <i>Sabia discolor</i> Dunn <i>Sabia limoniacea</i> Wall. ex Hook. f. & Thomson <i>Sabia swinhoei</i> Hemsl. | |
| Sargentodoxaceae | <i>Sargentodoxa cuneata</i> (Oliv.) Rehder & E.H. Wilson | |
| Schisandraceae | <i>Kadsura coccinea</i> (Lem.) A.C. Sm. <i>Kadsura heteroclita</i> (Roxb.) Craib <i>Schisandra henryi</i> C.B. Clarke | |
| Scrophulariaceae | <i>Brandisia swinglei</i> Merr. <i>Paulownia fortunei</i> (Seem.) Hemsl. | |
| Stachyuraceae | <i>Stachyurus himalaicus</i> Hook. f. & Thomson ex Benth. | |
| Staphyleaceae | <i>Euscaphis japonica</i> (Thunb.) Kanitz | |
| Sterculiaceae | <i>Firmiana platanifolia</i> (L.f.) Marsili <i>Pterospermum heterophyllum</i> Hance | |
| Styracaceae | <i>Alniphyllum fortunei</i> (Hemsl.) Makino <i>Huodendron biaristatum</i> (W.W. Sm.) Rehder <i>Rehderodendron kwangtungense</i> Chun <i>Sinojackia henryi</i> (Dummer) Merr. <i>Styrax confusus</i> Hemsl. <i>Styrax tonkinensis</i> (Pierre) Craib ex Hartwich | |
| Symplocaceae | <i>Symplocos adenopus</i> Hance <i>Symplocos anomala</i> Brand <i>Symplocos cochinchinensis</i> (Lour.) S. Moore <i>Symplocos cochinchinensis</i> (Lour.) S. Moore subsp. <i>laurina</i> (Retz.) Noot. <i>Symplocos congesta</i> Benth. <i>Symplocos pseudobarberina</i> Gontsch. <i>Symplocos stellaris</i> Brand <i>Symplocos sumuntia</i> Buch.-Ham. ex D. Don <i>Symplocos wikstroemiifolia</i> Hayata | |
| Theaceae | <i>Adinandra bockiana</i> E. Pritz var. <i>acutifolia</i> (Hand.-Mazz.) Kobuski <i>Adinandra millettii</i> (Hook. & Arn.) Benth. & Hook. f. ex Hance <i>Camellia cordifolia</i> (F.P. Metcalf) Nakai <i>Camellia oleifera</i> Abel <i>Camellia semiserrata</i> C. W. Chi <i>Camellia sinensis</i> (L.) Kuntze <i>Cleyera pachyphylla</i> Chun ex H.T. Chang <i>Eurya acuminatissima</i> Merr. & Chun <i>Eurya acutisepala</i> Hu & L.K. Ling <i>Eurya impressinervis</i> Kobuski | |

| Family | Species | Notes |
|------------------------|--|--------------------------|
| | <i>Eurya loquaiana</i> Dunn | |
| | <i>Eurya macartneyi</i> Champ. | |
| | <i>Eurya metcalfiana</i> Kobuski | |
| | <i>Eurya nitida</i> Korthals | |
| | <i>Eurya rubiginosa</i> H.T. Chang var. <i>attenuata</i> H.T. Chang | |
| | <i>Eurya saxicola</i> H.T. Chang var. <i>puberula</i> H.T. Chang | |
| | <i>Eurya trichocarpa</i> Korth. | |
| | <i>Eurya weissiae</i> Chun | |
| | <i>Hartia crassifolia</i> S.Z. Yan | |
| | <i>Schima superba</i> Gardn. & Champ. | |
| | <i>Ternstroemia gymnanthera</i> (Wight & Arn.) Bedd. | |
| | <i>Tutcheria championii</i> Nakai | |
| | <i>Tutcheria greeniae</i> Chun | |
| Thymelaeaceae | <i>Daphne championii</i> Benth. | |
| | <i>Daphne papyracea</i> Wall. ex Steud. | |
| | <i>Wikstroemia nutans</i> Champ. ex Benth. | |
| Tiliaceae | <i>Tilia endochrysea</i> Hand.-Mazz. | |
| Ulmaceae | <i>Celtis tetrandra</i> Roxb. subsp. <i>sinensis</i> (Pers.) Y.C. Tang | |
| | <i>Trema cannabina</i> Lour. var. <i>dielsiana</i> (Hand.-Mazz.) C.J. Chan | |
| | <i>Trema tomentosa</i> (Roxb.) Hara | |
| Urticaceae | <i>Pellionia brevifolia</i> Benth. | |
| Verbenaceae | <i>Callicarpa brevipes</i> (Benth.) Hance | |
| | <i>Callicarpa cathaya</i> H.T. Chang | |
| | <i>Callicarpa integerrima</i> Champ. | |
| | <i>Callicarpa kochiana</i> Makino | |
| | <i>Callicarpa longipes</i> Dunn | |
| | <i>Callicarpa rubella</i> Lindl. | |
| | <i>Clerodendrum cyrtophyllum</i> Turcz. | |
| | <i>Clerodendrum fortunatum</i> L. | |
| | <i>Gmelina chinensis</i> Benth. | |
| | <i>Vitex quinata</i> (Lour.) F.N. Williams | |
| Vitaceae | <i>Cayratia japonica</i> (Thunb.) Gagnep. | |
| | <i>Parthenocissus feddei</i> (Levl.) C.L. Li | |
| | <i>Tetrastigma hemsleyanum</i> Diels & Gilg | |
| | <i>Vitis bryonifolia</i> Bunge | |
| | <i>Vitis davidii</i> (Rom. du Caill.) Foex. | |
| | <i>Vitis retordii</i> Rom. du Caill. ex Planch. | |
| Monocotyledonae | | |
| Araceae | <i>Alocasia macrorrhiza</i> (L.) Schott | |
| | <i>Arisaema erubescens</i> (Wall.) Schott | |
| Commelinaceae | <i>Pollia secundiflora</i> (Blume) Bakh. f. | |
| Cyperaceae | <i>Carex cruciata</i> Wahlenb. | |
| | <i>Carex harlandii</i> Boott | |
| | <i>Carex perakensis</i> C.B. Clarke | |
| | <i>Carex phacota</i> Spreng. | |
| | <i>Carex phyllocephala</i> T. Koyama | new record for Guangdong |
| | <i>Carex rara</i> Boott | |
| | <i>Carex scaposa</i> C.B. Clarke | |
| | <i>Carex truncatigluma</i> C.B. Clarke | |
| | <i>Eleocharis tetraquetra</i> Nees | |
| | <i>Gahnia javanica</i> Moritzi | |
| | <i>Gahnia tristis</i> Nees | |
| | <i>Lepidosperma chinensis</i> Nees & Meyen | |
| | <i>Scirpus ternatanus</i> Reinw. ex Miq. | |
| | <i>Trichophorum subcapitatum</i> (Thwaites & Hook.) D.A. Simpson | |

| Family | Species | Notes |
|---------------|--|-------|
| Dioscoreaceae | <i>Dioscorea bulbifera</i> L. | |
| Juncaceae | <i>Juncus effusus</i> L. | |
| Liliaceae | <i>Chionographis chinensis</i> K. Krause | |
| | <i>Liriope spicata</i> (Thunb.) Lour. | |
| | <i>Polygonatum cyrtoneura</i> Hua | |
| | <i>Smilax china</i> L. | |
| | <i>Tricyrtis macropoda</i> Miq. | |
| Orchidaceae | (see Table 2) | |

Table 2. Orchids recorded at Nanling National Nature Reserve from 25 June to 7 July 2000, with rank of abundance: "+" = 1 individual/clump, "++" = 2-5, "+++" = 6-10, "++++" = 11-15, "+++++" ≥16.

| Species | Habitat | Remarks |
|--|---|---|
| <i>Anoectochilus nanlingensis</i> Siu L.P. & Lang K.Y. | on rock/ forest floor with rich humus | terrestrial, new to science (Lang & Siu, 2002) |
| <i>Anoectochilus roxburghii</i> (Wall.) Lindl. | on forest floor with rich humus | terrestrial, Endangered |
| <i>Amitostigma gracile</i> (Blume) Schltr. | on damp slope in forest | terrestrial, new to Guangdong, southernmost record of species |
| <i>Arundina graminifolia</i> (D. Don.) Hochr. | on damp grassy slope | terrestrial |
| <i>Bulbophyllum levinei</i> Schltr. | on tree trunk in forest | epiphytic |
| <i>Bulbophyllum</i> (cf. <i>odoratissimum</i>) sp. | on rock beside stream | epiphytic |
| <i>Bulbophyllum</i> sp. | on tree trunk in forest | epiphytic |
| <i>Bulbophyllum</i> (cf. <i>retusiusculum</i>) sp. | on tree trunk in forest | epiphytic |
| <i>Calanthe</i> (cf. <i>triplicata</i>) sp. | on forest floor with rich humus | terrestrial |
| <i>Calanthe</i> sp. 1 | on forest floor with rich humus | terrestrial |
| <i>Calanthe</i> sp. 2 | on bamboo floor with rich humus | terrestrial |
| <i>Calanthe</i> sp. 3 | on forest floor beside stream with rich humus | terrestrial |
| <i>Calanthe</i> sp. 4 | on shrubland floor beside stream with rich humus | terrestrial |
| <i>Calanthe</i> sp. 5 | on forest floor with rich humus | terrestrial |
| <i>Cleisostoma paniculatum</i> (Ker-Gawl.) Garay | on tree trunk in forest | epiphytic |
| <i>Collabium formosanum</i> Hayata | on rock with humus in forest | terrestrial |
| <i>Cymbidium ensifolium</i> (L.) Sw. | on bamboo and tree mixed floor or on rock with rich humus | terrestrial, Endangered |
| <i>Cymbidium floribundum</i> Lindl. | on tree trunk | epiphytic, Endangered |
| <i>Cymbidium goeringii</i> (Rchb. f.) Rchb. f. | on forest floor with rich humus | terrestrial, Endangered |
| <i>Cymbidium kanran</i> Makino | on bamboo floor with rich humus | terrestrial, Endangered |
| <i>Cymbidium lancifolium</i> Hook. | on forest floor with rich humus | terrestrial |
| <i>Cymbidium sinense</i> (Andr.) Willd | on forest floor with rich humus | terrestrial, Endangered |
| <i>Cymbidium</i> sp. | on tree trunk in forest beside the stream | epiphytic |
| <i>Dendrobium</i> sp. 1 | on tree trunk | epiphytic |
| <i>Dendrobium</i> sp. 2 | on tree trunk | epiphytic |
| <i>Didymoplexis</i> sp. | on forest floor with rich humus | saprophytic, new genus to Mainland China |
| <i>Epigeneium fargesii</i> (Finet) Gagnep. | on tree trunk | epiphytic |
| <i>Eria</i> sp. | on tree trunk beside stream | epiphytic |
| <i>Galeola matsudai</i> Hayata | sprouting from fallen and rotten wood beside stream | saprophytic; new to Guangdong; known from Anhui, Taiwan & South Hunan |
| <i>Goodyera</i> sp. 1 | on forest floor and beside stream with rich humus | terrestrial |

| Species | Habitat | Remarks |
|---|---|--|
| <i>Goodyera</i> sp.2 | on rock with rich humus | terrestrial |
| <i>Habenaria dentata</i> (Sw.) Schltr. | on grassy slope | terrestrial |
| <i>Habenaria rhodocheila</i> Hance | on rock with rich humus, beside the stream | terrestrial |
| <i>Habenaria</i> sp. | on exposed slope with humus | terrestrial |
| <i>Herminium lanceum</i> (Thunb. ex Sw.) Vuijk | on damp mossy and rocky slope with rich humus | terrestrial |
| <i>Liparis nervosa</i> (Thunb. ex Murray) Lindl. | on forest floor with rich humus or forest edge | terrestrial |
| <i>Liparis</i> sp. | on rocky slope in forest | epiphytic |
| <i>Phaius flavus</i> (Blume) Lindl. | on forest floor with rich humus | terrestrial |
| <i>Phaius tankervilleae</i> (Banks ex L'Herit.) Blume | beside damp grassy slope | terrestrial |
| <i>Pholidota cantonensis</i> Rolfe | on tree trunk and rock | epiphytic |
| <i>Platanthera hologlottis</i> Maxim. | on forest floor, on rock with rich humus and in exposed areas | terrestrial, the southern most distribution in the world |
| <i>Platanthera</i> sp.1 | on damp slope | terrestrial |
| <i>Platanthera</i> sp.2 | on slope beside main road | terrestrial |
| <i>Platanthera</i> sp.3 | on slope with humus and sandy loam, | terrestrial |
| <i>Pleione</i> sp. | on mossy slope in forest | semi-epiphytic |
| <i>Spathoglottis pubescens</i> Lindl. | on damp grassy and shrubby slopes | terrestrial |
| <i>Spiranthes</i> (cf. <i>hongkongensis</i>) sp. | beside stream with sandy loam and humus | terrestrial |
| <i>Tainia</i> sp. | on slope at forest edge | terrestrial |
| unidentified orchid sp. 1 | on tree trunk in forest | epiphytic |

Mammals

- A large shrew, probably Himalayan Water Shrew *Chimarrogale himalayica*, disturbed from a stream bank, was seen on 1 July.
- Maritime Striped Squirrels *Tamiops maritimus* were seen or heard on 27 June, 2 July, 3 July, 4 July, and 6 July.
- One Pallas's Squirrel *Callosciurus erythraeus* was seen on 1 July, and another was heard on 6 July.
- One Red-hipped Squirrel *Dremomys pyrrhomerus* was seen on 3 July.
- On 3 July at Yangyi Keng, Longtanjiao four macaques (three adult or subadult, one juvenile) were seen. They had a short neck, dark back, greyish face, sandy-coloured head and flanks, pale underside and stump tail, and made hoarse contact calls. Macaque species identification can be problematic due to various hybrid combinations and local variants (Charles H. Southwick, University of Colorado, USA, *in litt.*, March 2003), but on the basis of the stump tail (ruling out *M. assamensis*) and the face coloration (ruling out *M. arctoides*) those seen were apparently *Macaca thibetana* (Jack Fooden, Field Museum of Natural History, USA, *in litt.*, March 2003).
- Three Indian Giant Flying Squirrels *Petaurista philippensis* and one Chinese Bamboo Rat *Rhizomys sinensis* were seen in a wildlife restaurant in Ruyuan town. These animals were probably caught in the Nanling area.
- The status of mammals was inferred (Table 3) based on various information sources including interviews with reserve staff, past records from Ruyuan and Yangshan Counties and Lianzhou City (Zhang Y. *et al.*, 1997, and references therein) and species in the specimen room at Dadongshan.

Table 3. The inferred status of mammals at Nanling National Nature Reserve, based on interviews with reserve staff and past distribution records (see text). “+” = rare, “++” = quite common, “+++” = abundant. “RY” = Ruyuan County, “LZ” = Lianzhou City, “YS” = Yangshan County. Sequence follows D.E. Wilson & Cole (2000). “**” = Reported from Babaoshan (Ruyang) by Woodward & Carey (1996).

| Scientific name | English name | Past records | Ruyang Director Mr. Li | Dadingshan Director Mr. Peng | Longtanjiao Director Mr. Qiu | Chengjia Director Mr. Feng | Dadongshan Director Mr. Deng | Specimen (Dadongshan) | Probable status |
|--|-----------------------|--------------------|---------------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|-----------------------|---|
| <i>Chimarrogale himalayica</i> | Himalayan Water Shrew | (Lianping) | (not asked) | (not asked) | (not asked) | (not asked) | (not asked) | | present |
| <i>Macaca arctoides</i> | Stump-tailed Macaque | (LZ, YS) | - | - | - | - | - | | insecure or extirpated |
| <i>Macaca assamensis</i> | Assam Macaque | | - | - | + | + | - | ? | uncertain; possibly confused with <i>M. thibetana</i> |
| <i>Macaca mulatta</i> | Rhesus Monkey | (YS, RY, LZ) | ++ | + | - | - | - | | present |
| <i>Macaca thibetana</i> | Père David’s Macaque | (RY, LZ, Yaoshan) | - | - | - (but seen on 4 Jul 2000) | - | ++ (3 groups, ~130 individuals) | ? | confirmed but insecure |
| <i>Canis lupus</i> | Grey Wolf | | - | - | - | + | - | | insecure or extirpated |
| <i>Cuon alpinus</i> | Dhole | (RY) | - | + | - | - | - | | insecure or extirpated |
| <i>Catopuma temminckii</i> (recorded as <i>Felis temmincki</i>) | Asiatic Golden Cat | (Lianping) | + | - | - | - | - | | extirpated |
| <i>Prionailurus bengalensis</i> (recorded as <i>Felis bengalensis</i>) | Leopard Cat | | + | + | + | + | + | — | insecure |
| <i>Neofelis nebulosa</i> | Clouded Leopard | (LZ, YS, Lianping) | + | + | - | - | + | | insecure or extirpated |
| <i>Panthera pardus</i> | Leopard | | - | - | + | - | + | | insecure or extirpated |
| <i>Panthera tigris</i> | Tiger | | + | - | - | + | + | | insecure or extirpated |
| <i>Herpestes javanicus</i> | Javan Mongoose | | - | - | - | - | - | — | insecure, absent or extirpated |
| <i>Herpestes urva</i> | Crab-eating Mongoose | | + | - | - | - | + | — | insecure |

| Scientific name | English name | Past records | Ruyang Director Mr. Li | Dadingshan Director Mr. Peng | Longtanjiao Director Mr. Qiu | Chengjia Director Mr. Feng | Dadongshan Director Mr. Deng | Specimen (Dadongshan) | Probable status |
|--|-----------------------------|--------------------|---------------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|-----------------------|------------------------|
| <i>Lutra lutra</i> | Eurasian Otter | | - | + (in reservoirs) | - | - | + (in reservoirs in the past) | | insecure or extirpated |
| <i>Amblonyx cinereus</i> | Oriental Small-clawed Otter | | - | - | - | - | + (in reservoirs in the past) | | extirpated |
| <i>Arctonyx collaris</i> | Hog Badger | | ++ | - | +++ | +++ | +++ | — | present |
| <i>Meles meles</i> | Eurasian Badger | (Lianping, LZ, YS) | + | - | - | - | - | — | insecure |
| <i>Melogale moschata</i> | Chinese Ferret-badger | | +++ | ++ | +++ | +++ | +++ | — | present |
| <i>Martes flavigula</i> | Yellow-throated Marten | | + | - | - | - | - | | insecure |
| <i>Mustela kathiah</i> | Yellow-bellied Weasel | (Yaoshan) | + | ++ | - | - | +++ | | present |
| <i>Ursus thibetanus</i> (recorded as <i>Selenarctos thibetanus</i>) | Asiatic Black Bear | (RY, LZ) | + | + | + | + | ++ (1999) | — | insecure |
| <i>Paguma larvata</i> | Masked Palm Civet | (Lianshan, YS) | ++ | + | - | + | +++ | — | present |
| <i>Prionodon pardicolor</i> | Spotted Linsang | | ++ | - | + | + | +++ | — | present |
| <i>Viverricula indica</i> | Small Indian Civet | (Lianping) | + | - | + | + | + | | insecure |
| <i>Sus scrofa</i> | Wild Boar | (Lianping) | ++ | ++ | ++ | ++ | +++ | — | present |
| <i>Moschus berezovskii</i> | Chinese Forest Musk Deer | (YS, RY) | + | - | + | + (1992) | + (1998) | | insecure |
| <i>Cervus unicolor</i> | Sambar | (LZ, Lianping, RY) | ++ | ++ | + | ++ | ++ | — | present |
| <i>Elaphodus cephalophus</i> | Tufted Deer | (YS) | + | - | - | - | ++ | — | insecure |
| <i>Muntiacus crinifrons</i> | Black Muntjac | | - | - | - | + (1998) | - | | insecure |
| <i>Muntiacus muntjak</i> | Indian Muntjac | (Lianping) | + | ++ | ++ | ++ | - | | present |
| <i>Muntiacus reevesi</i> | Reeves's Muntjac | (LZ) | ++ | - | ++ | ++ | ++ | — | present |
| <i>Naemorhedus sumatraensis</i> | Serow | (Lianping, LZ, YS) | + | + | + | ++ | + | | present |
| <i>Manis pentadactyla</i> | Chinese Pangolin | | + | + | + | + | + | — | insecure |

| Scientific name | English name | Past records | Ruyang Director Mr. Li | Dadingshan Director Mr. Peng | Longtanjiao Director Mr. Qiu | Chengjia Director Mr. Feng | Dadongshan Director Mr. Deng | Specimen (Dadongshan) | Probable status |
|---|---------------------------------------|---------------------|---------------------------|---------------------------------|---------------------------------|-------------------------------|---------------------------------|-----------------------|-----------------|
| <i>Callosciurus erythraeus</i> | Pallas's Squirrel | (Lianping, RY, YS) | +++ | ++ | - | - | ++ | — | confirmed |
| <i>Dremomys pyrrhomerus</i> | Red-hipped Squirrel | (Yaoshan, RY, YS) | - | - | - | - | - | — | confirmed |
| <i>Tamiops maritimus</i> (recorded as <i>T. swinhoei</i>) | Maritime Striped Squirrel | (Lianping, RY*, YS) | +++ | ++ | +++ | +++ | +++ | — | confirmed |
| <i>Petaurista philippensis</i> (or <i>P. petaurista</i>) | Indian (or Red) Giant Flying Squirrel | (Yaoshan, RY*, LZ) | +++ | + | ++ | +++ | +++ | — | present |
| <i>Rhizomys pruinosus</i> | Hoary Bamboo Rat | (LZ, YS, RY) | ++ | ++ | +++ | +++ | ++ | — | present |
| <i>Rhizomys sinensis</i> | Chinese Bamboo Rat | (LZ, YS, RY) | + | | | | ++ | — | insecure |
| <i>Hystrix brachyura</i> | Malayan Porcupine | | + | + | + | + | ++ | — | present |
| <i>Lepus sinensis</i> | Chinese Hare | (Lianping) | ++ | ++ | +++ | +++ | +++ | — | present |

- Numerous mammal species of conservation concern have been reported in recent years at Nanling, but a large proportion of these appear to be on the brink of extirpation if they have not already disappeared:
 - Tiger *Panthera tigris* is globally Endangered and nationally Class I Protected, and the South China population (sometimes considered a subspecies *P. t. amoyensis*) is Critically Endangered. The Nanling range is reported to be one of the last strongholds of the population; our interview results suggest that it may still have existed in low numbers at least up to the late 1990s. Two important prey species, Wild Boar *Sus scrofa* and Sambar *Cervus unicolor*, were reportedly present in significant numbers in all parts of Nanling National Nature Reserve.
 - Assam Macaque *Macaca assamensis*, Clouded Leopard *Neofelis nebulosa* and Black Muntjac *Muntiacus crinifrons* are Vulnerable globally and Class I Protected nationally. Assam Macaque was reported in two areas but has not been recorded from northern Guangdong (Zhang Y. *et al.*, 1997) and may have been confused with Père David's Macaque *Macaca thibetana*. Black Muntjac has not been recorded from the Nanling area but is recorded from Chebaling in north Guangdong, and black-coloured muntjacs have been reported from various reserves in Guangxi during KFBG surveys.
 - Stump-tailed Macaque, Dhole *Cuon alpinus*, Asiatic Golden Cat *Catopuma temminckii*, Eurasian Otter *Lutra lutra*, Asiatic Black Bear *Ursus thibetanus* and Serow *Naemorhedus sumatraensis* are Vulnerable globally and Class II Protected nationally.
 - Malayan Porcupine *Hystrix brachyura* is globally Vulnerable.
 - Rhesus Monkey *Macaca mulatta*, Père David's Macaque *Macaca thibetana*, Oriental Small-clawed Otter *Amblonyx cinereus*, Chinese Forest Musk Deer *Moschus berezovskii* and Chinese Pangolin *Manis pentadactyla* are considered at Lower Risk globally but are Class II Protected nationally, and are believed to be highly restricted and/or declining within the region.
 - The South China populations of Leopard *Panthera pardus* (assigned to the Critically Endangered subspecies *P. pardus orientalis*) and Grey Wolf *Canis lupus* are believed to be critically threatened. Leopard is Class I Protected nationally.
 - Yellow-throated Marten *Martes flavigula*, Spotted Linsang *Prionodon pardicolor*, Small Indian Civet *Viverricula indica*, Sambar *Cervus unicolor* and Indian Red Giant Flying Squirrel *Petaurista philippensis* are Class II Protected nationally.
- All sections of the reserve reportedly have species of conservation importance. On the basis of habitat size and quality it is likely that Ruyang is of special importance; it has been referred to as probably the most important mammal reserve in Guangdong (Yuan Xicai, South China Institute of Endangered Animals, pers. comm., 1997).

Birds

- Eighty-seven species of birds were recorded during this survey (Table 4). The birds of Babaoshan (Ruyang) have been relatively well inventoried by ornithologists from Hong Kong; Lewthwaite (1996) reported records of 221 bird species from 1987 to 1996. The present survey added only five new records to these: Black-browed Barbet *Megalaima oorti*, Grey-capped Pygmy Woodpecker *Dendrocopos canicapillus*, Bay Woodpecker *Blythipicus pyrrhotis*, Brown-cheeked Fulvetta *Alcippe poioicephala* and Scarlet-backed Flowerpecker *Dicaeum cruentatum*.
- The most frequently encountered species included Chestnut Bulbul *Hemixos castanonotus*, Grey-cheeked Fulvetta *Alcippe morrisonia*, Black-browed Barbet *Megalaima oorti*, Black Bulbul *Hypsipetes leucocephalus*, Grey Treepie *Dendrocitta formosae*, Striated Yuhina *Yuhina castaniceps* and Red-billed Leiothrix *Leiothrix lutea*.

Table 4. Birds recorded at Nanling National Nature Reserve, June-July 2000. Sequence follows Clements (2000).

| English name | Scientific name |
|----------------------------------|----------------------------------|
| Black Baza | <i>Aviceda leuphotes</i> |
| Crested Serpent Eagle | <i>Spilornis cheela</i> |
| Crested Goshawk | <i>Accipiter trivirgatus</i> |
| Chinese Sparrowhawk | <i>Accipiter soloensis</i> |
| Mountain Hawk Eagle | <i>Spizaetus nipalensis</i> |
| Common Kestrel | <i>Falco tinnunculus</i> |
| Chinese Bamboo Partridge | <i>Bambusicola thoracica</i> |
| Chestnut-winged Cuckoo | <i>Clamator coromandus</i> |
| Lesser Cuckoo | <i>Cuculus poliocephalus</i> |
| Drongo Cuckoo | <i>Surniculus lugubris</i> |
| Lesser Coucal | <i>Centropus bengalensis</i> |
| Mountain Scops Owl | <i>Otus spilocephalus</i> |
| Collared Owlet | <i>Glaucidium brodiei</i> |
| Asian Barred Owlet | <i>Glaucidium cuculoides</i> |
| Grey Nightjar | <i>Caprimulgus indicus</i> |
| Fork-tailed Swift | <i>Apus pacificus</i> |
| House Swift | <i>Apus affinis</i> |
| Red-headed Trogon | <i>Harpactes erythrocephalus</i> |
| Common Kingfisher | <i>Alcedo atthis</i> |
| Crested Kingfisher | <i>Megaceryle lugubris</i> |
| Blue-throated Bee-eater | <i>Merops viridis</i> |
| Dollarbird | <i>Eurystomus orientalis</i> |
| Great Barbet | <i>Megalaima virens</i> |
| Black-browed Barbet | <i>Megalaima oorti</i> |
| Grey-capped Pygmy Woodpecker | <i>Dendrocopos canicapillus</i> |
| Great Spotted Woodpecker | <i>Dendrocopos major</i> |
| Bay Woodpecker | <i>Blythipicus pyrrhotis</i> |
| Red-rumped Swallow | <i>Hirundo daurica</i> |
| Grey Wagtail | <i>Motacilla cinerea</i> |
| Short-billed Minivet | <i>Pericrocotus brevirostris</i> |
| Scarlet Minivet | <i>Pericrocotus flammeus</i> |
| Grey-chinned Minivet | <i>Pericrocotus solaris</i> |
| Collared Finchbill | <i>Spizixos semitorques</i> |
| Chestnut Bulbul | <i>Hemixos castanonotus</i> |
| Mountain Bulbul | <i>Hypsipetes mcclllandii</i> |
| Black Bulbul | <i>Hypsipetes leucocephalus</i> |
| Orange-bellied Leafbird | <i>Chloropsis hardwickii</i> |
| Brown Dipper | <i>Cinclus pallasii</i> |
| Blue Whistling Thrush | <i>Myophonus caeruleus</i> |
| White-browed Shortwing | <i>Brachypteryx montana</i> |
| Hill Prinia | <i>Prinia atrogularis</i> |
| Brownish-flanked Bush Warbler | <i>Cettia fortipes</i> |
| Mountain Tailorbird | <i>Orthotomus cuculatus</i> |
| Sulphur-breasted Warbler | <i>Phylloscopus ricketti</i> |
| Golden-spectacled Warbler | <i>Seicercus burkii</i> |
| White-spectacled Warbler | <i>Seicercus affinis</i> |
| Chestnut-crowned Warbler | <i>Seicercus castaniceps</i> |
| Rufous-faced Warbler | <i>Abroscopus albogularis</i> |
| Brown-chested Jungle Flycatcher | <i>Rhinomyias brunneata</i> |
| Small Niltava | <i>Niltava macgrigoriae</i> |
| Hainan Blue Flycatcher | <i>Cyornis hainanus</i> |
| Pale Blue Flycatcher | <i>Cyornis unicolor</i> |
| Plumbeous Water Redstart | <i>Rhyacornis fuliginosus</i> |
| Little Forktail | <i>Enicurus scouleri</i> |
| Slaty-backed Forktail | <i>Enicurus schistaceus</i> |
| White-crowned Forktail | <i>Enicurus leschenaulti</i> |
| Spotted Forktail | <i>Enicurus maculatus</i> |
| Greater Necklaced Laughingthrush | <i>Garrulax pectoralis</i> |

| English name | Scientific name |
|----------------------------------|-----------------------------------|
| Grey Laughingthrush | <i>Garrulax maesi</i> |
| Hwamei | <i>Garrulax canorus</i> |
| Red-tailed Laughingthrush | <i>Garrulax milnei</i> |
| Spot-breasted Scimitar Babbler | <i>Pomatorhinus erythrocnemis</i> |
| Streak-breasted Scimitar Babbler | <i>Pomatorhinus ruficollis</i> |
| Pygmy Wren Babbler | <i>Pnoepyga pusilla</i> |
| Rufous-capped Babbler | <i>Stachyris ruficeps</i> |
| Red-billed Leiothrix | <i>Leiothrix lutea</i> |
| White-browed Shrike Babbler | <i>Pteruthius flaviscapis</i> |
| Golden-breasted Fulvetta | <i>Alcippe chrysotis</i> |
| Brown-cheeked Fulvetta | <i>Alcippe poiocephala</i> |
| Grey-cheeked Fulvetta | <i>Alcippe morrisonia</i> |
| Striated Yuhina | <i>Yuhina castaniceps</i> |
| White-bellied Yuhina | <i>Yuhina zantholeuca</i> |
| Vinous-throated Parrotbill | <i>Paradoxornis webbianus</i> |
| Golden Parrotbill | <i>Paradoxornis verreauxi</i> |
| Black-throated Tit | <i>Aegithalos concinnus</i> |
| Great Tit | <i>Parus major</i> |
| Yellow-cheeked Tit | <i>Parus spilonotus</i> |
| Fork-tailed Sunbird | <i>Aethopyga christinae</i> |
| Fire-breasted Flowerpecker | <i>Dicaeum ignipectus</i> |
| Scarlet-backed Flowerpecker | <i>Dicaeum cruentatum</i> |
| Silver Oriole | <i>Oriolus mellianus</i> |
| Crow-billed Drongo | <i>Dicrurus annectans</i> |
| Bronzed Drongo | <i>Dicrurus aeneus</i> |
| Spangled Drongo | <i>Dicrurus hottentottus</i> |
| Red-billed Blue Magpie | <i>Urocissa erythrorhyncha</i> |
| Grey Treepie | <i>Dendrocitta formosae</i> |
| White-rumped Munia | <i>Lonchura striata</i> |

- Some of the species recorded are of particular conservation significance:
 - Brown-chested Jungle Flycatcher *Rhinomyias brunneata* and Silver Oriole *Oriolus traillii* are globally Vulnerable.
 - Black Baza *Aviceda leuphotes*, Crested Serpent Eagle *Spilornis cheela*, Crested Goshawk *Accipiter trivirgatus*, Chinese Sparrowhawk *Accipiter soloensis*, Mountain Hawk Eagle *Spizaetus nipalensis*, Common Kestrel *Falco tinnunculus*, Lesser Coucal *Centropus bengalensis*, Mountain Scops Owl *Otus spilocephalus* and Collared Owlet *Glaucidium brodiei* are Class II Protected nationally.
- Additional species of note were recorded by Lewthwaite (1996): White-necklaced Partridge *Arborophila gingica*, Cabot's Tragopan *Tragopan caboti* and Fairy Pitta *Aviceda leuphotes* are globally Vulnerable and Class II Protected in China; Besra *Accipiter virgatus*, Eurasian Sparrowhawk *Accipiter nisus*, Common Buzzard *Buteo buteo*, Bonelli's Eagle *Hieraetus fasciatus*, Eurasian Hobby *Falco subbuteo*, Peregrine Falcon *Falco peregrinus*, Silver Pheasant *Lophura nycthemera*, Greater Coucal *Centropus sinensis*, Collared Scops Owl *Otus bakkamoena*, Oriental Scops Owl *Otus sunia*, Eurasian Eagle Owl *Bubo bubo*, Brown Hawk Owl *Ninox scutulata* and Silver-backed Needletail *Hirundapus cochinchinensis* are also Class II Protected.
- The presence of many forest-dependent species indicated that some of the forest at Nanling has high integrity. However certain groups susceptible to hunting, such as pigeons and pheasants, were apparently depleted.

Reptiles and Amphibians

- Twenty-three species of amphibian (one newt and 22 anurans) and thirty-three species of reptile (nine lizards and 24 snakes) were recorded at Nanling during the survey (Table 5).

- The records of *Leptolalax pelodytoides*, *Amolops chunganensis*, *Philautus rhododiscus*, *Japalura szechwanensis*, *Tropidophorus hainanensis*, *Amphiesma bitaeniatum*, *Oligodon catenata*, *Opisthotropis cheni* and *Plagiopholis styani* are the first from Guangdong.
- Three frogs and one lizard species could not be firmly identified. One belongs to the genus *Megophrys*, while the others are provisionally identified as *Rana* (cf. *sangzhiensis*) sp., *Polypedates* (cf. *dennysi*) sp. and *Japalura* (cf. *szechwanensis*) sp. respectively.
- The most frequently encountered species included *Leptolalax pelodytoides*, *Megophrys mangshanensis*, *Amolops ricketti* and *Sphenomorphus incognitus*.
- In addition to these, the following species have been reported by Li (n.d.: 1996): *Megophrys lateralis*, *Bufo andrewsi*, *Rana nigromaculata*, *Platysternon megacephalum*, *Gekko subpalmatus*, *Eumeces chinensis*, *Scincella reevesii*, *Ramphotyphlops braminus*, *Boiga multomaculata*, *Dendrelaphis pictus*, *Elaphe carinata*, *Oligodon cinereus*, *Opisthotropis andersonii*, *Psammodynastes pulverulentus*, *Ptyas mucosus*, *Sibynophis chinensis*, *Sinonatrix percarinata*, *Xenochrophis piscator*, *Bungarus multicinctus*, *Naja atra* (as *N. naja*) and *Deinagkistrodon acutus*. The specimen rooms in the nature reserve were found to have *Tylotriton asperrimus*, *Takydromus sexlineatus*, *Elaphe mandarina*, *Elaphe taeniura*, *Opisthotropis balteata* and *Pseudoxenodon karlschmidti*.
- The Forestry Bureau at Yangshan had a live specimen of *Ophisaurus harti*, caught by a villager. This constitutes the first record for Guangdong, although the specimen was found outside the Nanling reserve.

Table 5. Amphibians and reptiles recorded in Nanling National Nature reserve from 25 June to 7 July 2000. Sequence follows Zhao E.-M. & Adler (1993).

| Species | Habitat | |
|--|-------------------|-------------|
| AMPHIBIA | | |
| <i>Pachytriton labiatus</i> | stream | |
| <i>Leptolalax pelodytoides</i> | stream | ✓, tadpoles |
| | ditch | ✓ |
| <i>Megophrys mangshanensis</i> | stream | ✓ |
| <i>Megophrys</i> sp. | bamboo | ✓ |
| <i>Vibrissaphora liui</i> | stream | tadpoles |
| <i>Bufo gargarizans</i> | forest | ✓ |
| | montane-grassland | ✓ |
| | montane forest | ✓ |
| | village | ✓ |
| <i>Bufo melanostictus</i> | paddy field | ✓ |
| <i>Amolops chunganensis</i> | stream | ✓ |
| <i>Amolops ricketti</i> | seep | ✓ |
| | stream | ✓, tadpoles |
| | riparian forest | ✓ |
| <i>Paa exilispinosa</i> | seep | ✓, tadpoles |
| | stream | ✓, tadpoles |
| | ditch | ✓, tadpoles |
| <i>Paa spinosa</i> | ditch | ✓ |
| | stream | tadpoles |
| <i>Rana adenopleura</i> | pond | ✓, tadpoles |
| <i>Rana fujianensis</i> | ditch | ✓, tadpoles |
| | pool | ✓, tadpoles |
| <i>Rana limnocharis</i> | pool | ✓ |
| | paddy field | ✓ |
| <i>Rana livida</i> | stream | ✓ |
| <i>Rana</i> (cf. <i>sangzhiensis</i>) sp. | forest | ✓ |
| <i>Rana schmackeri</i> | stream | ✓ |
| | ditch | ✓ |
| | pool | ✓ |

| Species | Habitat | |
|---|----------------------|----------------|
| <i>Rana versabilis</i> | forest | ✓ |
| | catchwater | ✓ |
| <i>Philautus rhododiscus</i> | pool | eggs, tadpoles |
| <i>Polypedates (cf. dennysi) sp.</i> | pool | tadpoles |
| <i>Polypedates megacephalus</i> | pond | tadpoles |
| <i>Microhyla heymonsi</i> | ditch | tadpoles |
| | pool | tadpoles |
| <i>Microhyla ornata</i> | pool | ✓ |
| REPTILIA | | |
| <i>Acanthosaura lepidogaster</i> | forest edge | ✓ |
| | riparian forest | |
| | forest | |
| <i>Calotes versicolor</i> | village | ✓ |
| <i>Japalura (cf. szechwanensis) sp.</i> | montane forest | eggs |
| | forest edge | ✓ |
| <i>Platyplacopus kuehnei</i> | forest | ✓ |
| | shrubland | ✓ |
| <i>Eumeces elegans</i> | shrubland | ✓ |
| | forest | ✓ |
| | forest edge | ✓ |
| | paddy field | ✓ |
| <i>Scincella modesta</i> | forest | ✓ |
| | forest edge | ✓ |
| <i>Sphenomorphus incognitus</i> | stream | ✓ |
| | forest | ✓ |
| | riparian forest | ✓ |
| <i>Sphenomorphus indicus</i> | shrubland | ✓ |
| | forest | ✓ |
| <i>Tropidophorus hainanensis</i> | riparian forest | ✓ |
| <i>Amphiesma bitaeniatum</i> | montane forest | ✓ |
| <i>Boiga kraepelini</i> | shrubland | ✓ |
| | forest edge | ✓ |
| <i>Calamaria pavimentata</i> | forest edge | ✓ |
| <i>Cyclophiops major</i> | forest | ✓ |
| | plantation edge | ✓ |
| | shrubland | ✓ |
| <i>Dinodon falvozonatum</i> | forest edge | ✓ |
| <i>Elaphe frenata</i> | forest edge | ✓ |
| <i>Elaphe porphyracea</i> | forest edge | ✓ |
| <i>Enhydris plumbea</i> | paddy field | ✓ |
| <i>Lycodon subcinctus</i> | shrubland | ✓ |
| <i>Macropisthodon rudis</i> | forest edge | ✓ |
| | shrubland/plantation | ✓ |
| | plantation edge | ✓ |
| <i>Oligodon catenata</i> | stream bank | ✓ |
| <i>Oligodon chinensis</i> | forest | ✓ |
| | shrubland | ✓ |
| <i>Opisthotropis latouchii</i> | ditch | ✓ |
| <i>Opisthotropis cheni</i> | ditch | ✓ |
| | forest edge | ✓ |
| <i>Pareas chinensis</i> | forest edge | ✓ |
| <i>Plagiopholis styani</i> | forest edge | ✓ |
| <i>Pseudoxenodon macrops</i> | montane forest | ✓ |
| <i>Ptyas korros</i> | paddy field | ✓ |
| <i>Sinonatrix aequifasciata</i> | stream | ✓ |
| <i>Zaocys dhumnades</i> | stream | ✓ |
| | forest/stream | ✓ |
| | shrubland | ✓ |

| Species | Habitat | |
|-------------------------------------|-----------------|---|
| <i>Calliophis kelloggi</i> | forest | ✓ |
| <i>Ophiophagus hannah</i> | forest | ✓ |
| <i>Protobothrops mucrosquamatus</i> | forest | ✓ |
| <i>Trimeresurus stejnegeri</i> | riparian forest | ✓ |
| | forest | ✓ |
| | shrubland | ✓ |

- A number of the species recorded are of particular conservation interest:
 - The unidentified species (*Megophrys* sp., *Rana* (cf. *sangzhiensis*) sp. and *Japalura* (cf. *szechwanensis*) sp.) are of potential interest. *Japalura szechwanensis* is known from north Guangdong, Sichuan, Guizhou and Guangxi;
 - *Paa spinosa* has declined sharply due to habitat loss and over-collection (Zhao, 1998);
 - *Zaocys dumnades* and *Ophiophagus hannah* have greatly declined due to over-collection (Zhao, 1998);
 - *Philautus rhododiscus* is known only from north Guangdong, Guangxi and Fujian;
 - *Amphiesma bitaeniatum* is known only from north Guangdong, Guangxi, Yunnan and Burma;
 - *Opisthotropis cheni* is only known from a small number of sites in Guangdong and Hunan.
- Of other species reported previously or found in the specimen collection:
 - *Platysternon megacephalum* is globally Endangered, due mainly to over-collection (Zhao, 1998);
 - *Tylototriton asperrimus* is Class II Protected nationally, and thought to be declining (Zhao, 1998);
- The presence of many forest and forest stream species indicate that the Nanling still has high quality habitats. However no chelonians were found during this survey, although *Platysternon megacephalum* has been reported.

Fish

- Twenty-three species of freshwater fish were recorded from the five sections of Nanling National Nature Reserve (Table 5). The stream catfish *Pterocryptis* sp. is new to science; a specimen from Longtanjiao, collected on 3 July at 350 m, has been assigned as a paratype (Ng and Chan, in preparation). Four species (*Discogobio* sp., *Vanmanenia* (cf. *lineata*) sp., *Pterocryptis* sp. and *Rhinogobius* sp.) could not be identified to species level; they may prove to be of scientific interest.
- The most widely distributed species in the Nanling area were *Zacco platypus* and *Acrossocheilus parallens*.

Table 6. Freshwater fish recorded from Nanling, June-July 2000. Sequence of families follows Nelson (1994).

| Species |
|--|
| <i>Zacco platypus</i> |
| <i>Opsariichthys bidens</i> |
| <i>Rhodeus ocellatus</i> |
| <i>Acrossocheilus elongatus</i> |
| <i>Acrossocheilus parallens</i> |
| <i>Parasinilabeo assimilis</i> |
| <i>Discogobio</i> sp. |
| <i>Spinibarbus hollandi</i> |
| <i>Onychostoma barbata</i> |
| <i>Onychostoma barbatula</i> |
| <i>Onychostoma gerlachi</i> |
| <i>Onychostoma leptura</i> |
| <i>Pseudorasbora parva</i> |
| <i>Vanmanenia</i> (cf. <i>lineata</i>) sp. |
| <i>Vanmanenia pingchowensis</i> |
| <i>Pseudogastromyzon fangi</i> |
| <i>Pseudogastromyzon changtingensis tungpeiensis</i> |
| <i>Schistura fasciolata</i> |

Species

Schistura incerta
Pterocryptis sp.
Glyptothorax fukiensis fukiensis
Rhinogobius giurinus
Rhinogobius sp.

- A number of species are of conservation concern:
 - The four unidentified species may prove to be of conservation importance;
 - *Parasinilabeo assimilis* and *Pterocryptis* sp. are restricted in range; besides these *Acrossocheilus parallens*, *Onychostoma barbata*, *O. barbatula*, *V. pingchowensis*, *Pseudogastromyzon fangi* and *P. changtingensis tungpeiensis* are also restricted to South China;
 - *Acrossocheilus elongata* is rarely collected in KFBG's surveys.
- Species richness was relatively high and the site is of considerable conservation interest. More species are expected to be present in this mountain range.
- The streams in Ruyang appeared to support the highest fish diversity in Nanling. Dadingshan was also species-rich.

Dragonflies

- A large total of 91 species was recorded over the 12-day survey period (Table 6). This included at least seven previously undescribed species, of which two (*Chlorogomphus shanicus* and *Chloropetalia soarer*) were subsequently described by K.D.P. Wilson (2002).
- Highest species numbers were recorded near the Dadingshan summit, at Longtanjiao and at Mao Ping in Dadongshan.
- Forest species comprised a large proportion of species encountered, as indicated by the good representation of families such as Diphlebiidae, Calopterygidae, Euphaeidae, Megapodagrionidae, Synlestidae, Platystictidae, Platycnemididae, Chlorogomphidae and Corduliidae (Silsby, 2001). Many of the gomphids, aeshnids, macromiids (listed with corduliids in Table 6 for consistency with earlier reports) and libellulids recorded are also forest-associated species.

Table 6. Dragonflies at Nanling, 26 June to 7 July 2000. The abundance values given below represent number of specimens taken per species, and do not reflect the total number observed in the field for every species.) Sequence of families follows Schorr et al. (2001a, 2001b).

Species

Archineura incarnata
Caliphaea consimilis
Calopteryx melli
Mnais andersoni
Neurobasis chinensis chinensis
Vestalis smaragdina veluta
Rhinocypha drusilla
Ceriagrion fallax fallax
Philoganga robusta
Philoganga vetusta
Anisopleura qingyuanensis
Bayadera bidentata
Bayadera brevicauda continentalis
Bayadera melanopteryx
Agriomorpha fusca

Species

Rhipidolestes sp. nov.
Rhipidolestes truncatidens
Calicnemia sinensis
Calicnemia sp. nov.
Coeliccia cyanomelas
Indocnemis orang
Drepanosticta hongkongensis
Protosticta beaumonti
Protosticta taipokauensis
Prodasineura autumnalis
Megalestes heros
Megalestes sp. nov.
Sinolestes edita
Anaciaeschna jaspidea
Anax guttatus
Boyeria sinensis
Cephalaeschna klotsi
Planaeschna suichangensis
Polycanthagyna melanictera
Chlorogomphus papilio
*Chlorogomphus shanicus**
*Chloropetalia soarer**
Anotogaster gregoryi
Anotogaster kuchenbeiseri
Anotogaster sieboldii
Epopthalmia elegans
Idionyx carinata
Idionyx claudia
Macromia (cf. *fulgidifrons*) sp.
Macromia malleifera
Macromia sp. nov.
Amphigomphus hansonii
Asiagomphus pacificus
Anisogomphus anderii
Davidius fruhstorferi junior
Fukienogomphus prometheus
Gomphidia kruegeri kruegeri
Lamelligomphus camelus
Lamelligomphus chaoi
Leptogomphus divaricatus
Leptogomphus perforatus
Megalogomphus sommeri
Merogomphus paviei
Nihonogomphus simillimus
Ophiogomphus sinicus
Shaogomphus sp. ?
Sieboldius alexanderi

Species

Sieboldius deflexus
Sinogomphus sp.
Sinogomphus telamon
Stylogomphus chunliuae
Brachythemis contaminata
Crocothemis servilia
Libellula sp. n.
Lyrithemis tricolor
Nannophya pygmaea
Orthetrum chrysis
Orthetrum glaucum
Orthetrum japonicum internum
Orthetrum luzonicum
Orthetrum melania
Orthetrum pruinatum neglectum
Orthetrum sabina sabina
Orthetrum triangulare triangulare
Pantala flavescens
Pseudothemis zonata
Sympetrum baccha
Sympetrum darwinianum
Sympetrum infuscatum
Sympetrum parvulum
Sympetrum speciosum taiwanum
Tramea virginia
Trithemis aurora
Trithemis festiva
Zygonyx asahinai
Zygonyx takasago

* New species (K.D.P. Wilson, 2002)

recorded on 5 July (evening)

Butterflies

- A high total of 108 species was recorded over the 12-day period (Table 7). The average daily species total was 22 species. The figure was higher at Peng Shan and Hongqiao, Dadingshan, with 41 species recorded on 1 July, probably due to the presence of a variety of open habitats supporting sun-loving species.
- The most abundant species were the papilionid *Graphium chironides* and the pierid *Talbotia naganum*.
- One species, *Celaenorrhinus choui*, previously known from Hainan, potentially represents a new provincial record. Two other species (*Athyma jina* and *Dodona* (nr. *ouida*) sp.) not recorded from Guangdong by Chou (1994), Bascombe (1995) or Chen X. (1997) were recorded by members of the Hong Kong Lepidopterists' Society (HKLS) at Nanling in 1999 (Hong Kong Lepidopterists' Society, 2003).
- Chen X. (1997) recorded 302 butterfly species from Nanling National Nature Reserve. Of these, 83 species were found during this survey. Five additional species (*Drapa hanria*, recorded from China for the first time, *Thoressa latris*, *Celastrina argiola*, *Polygonia c-album* and *Pseudergolis wedah*. were

recorded from Nanling by HKLS in 1999 (Hong Kong Lepidopterists' Society, 2003). Twenty-five new records in the present survey bring the recorded Nanling butterfly fauna to over 330 species.

Table 7. Butterflies recorded at Nanling, 26 June to 7 July 2000. Sequence of families follows Bascombe (1995). # Nomenclature follows Chou (1994).

| Species |
|--|
| <i>Abraximorpha davidii</i> |
| <i>Ampittia virgata</i> |
| <i>Apostictopterus fuliginosus</i> # |
| <i>Astictopterus jama</i> |
| <i>Bibasis miracula</i> |
| <i>Capila</i> sp. |
| <i>Celaenorrhinus aurivittatus</i> |
| <i>Celaenorrhinus choui</i> * |
| <i>Choaspes benjaminii</i> |
| <i>Erionota torus</i> |
| <i>Halpe homolea</i> |
| <i>Hasora anura</i> |
| <i>Hasora badra</i> |
| <i>Hasora vitta</i> |
| <i>Isoteinon lamprospilus</i> |
| <i>Pamara guttata</i> |
| <i>Polytremis lubricans</i> |
| <i>Satarupa monbeigi</i> |
| <i>Tagiades litigiosus</i> |
| <i>Bhutanitis (Paranticopsis) macareus</i> |
| <i>Graphium agamemnon</i> |
| <i>Graphium chironides</i> |
| <i>Graphium cloanthus</i> |
| <i>Graphium doson</i> |
| <i>Graphium sarpedon</i> |
| <i>Papilio (Chilasa) agestor</i> |
| <i>Papilio bianor</i> |
| <i>Papilio helenus</i> |
| <i>Papilio memnon</i> |
| <i>Papilio nephelus</i> |
| <i>Papilio paris</i> |
| <i>Papilio protenor</i> |
| <i>Eurema blanda</i> |
| <i>Eurema brigitta</i> |
| <i>Eurema hecabe</i> |
| <i>Ixias pyrene</i> |
| <i>Pieris canidia</i> |
| <i>Pieris (Talbotia) naganum</i> |
| <i>Prioneris thestylis</i> |
| <i>Abisara echerius</i> |
| <i>Abisara fylloides</i> |
| <i>Arhopala paramuta</i> |
| <i>Chrysozephyrus scintillans</i> |
| <i>Curetis acuta</i> |
| <i>Dodona eugenes</i> |
| <i>Dodona (near ouida)</i> sp. |
| <i>Euaspa tayal</i> |
| <i>Heliophorus epicles</i> |
| <i>Howarthia chenii</i> |
| <i>Mahathala ariadeva</i> |
| <i>Rapala nissa</i> |
| <i>Spindasis lohita</i> |
| <i>Spindasis syama</i> |
| <i>Taraka hamada</i> |

Species

Udara dilecta
Zemerus flegyas
Abrota ganga
Aemona amathusia
Argynnis (Childrena) childreni
Argynnis (Damora) sagana
Argyreus hyperbius
Athyma cama
Athyma jina
Athyma nefte
Athyma selenophora
Bhagadatta austenia
Cethosia biblis
Charaxes marmax
Cyrestis thyodamas
Dichorragia nesimachus
Euploea midamus
Euploea mulciber
Euthalia aconthea
Euthalia hebe
Euthalia lubentina
Euthalia nara
Euthalia patala
Euthalia undosa
Helcyra subalba
Hestina assimilis
Kallima inachus
Polygonia (Kaniska) canace
Lethe syrcis
Lethe trimacula
Lethe (Neope) muirheadii
Libythea celtis
Mandarinia regalis
Neope yama
Neorina patria
Neptis clinia
Neptis hylas
Parantica sita
Limenitis (Parathyma) sulphitia
Penthema adelma
Neptis (Phaedyma) aspasia
Polyura athamas
Polyura narcaea
Polyura nepenthes
Precis (Junonia) orithya
Sephisa chandra
Sephisa princeps
Stibochiona nicea
Stichophthalma howqua
Symbrenthia brabira
Tanaecia julii
Ypthima lisandra
Ypthima motschulskyi
Ypthima praenubila

* Potentially a new record for Guangdong.

- Forest-dependent or forest-associated butterfly species were particularly well represented at Nanling, with approximately 50% of all species recorded falling into this category.

Summary of flora and fauna

- The present survey found that whereas extensive cover of mature forest could be found at Ruyang, vegetation elsewhere was fairly fragmented. Patches of mature forest could be found only in relatively inaccessible valleys and at higher altitudes, connected by a matrix of lower-altitude young secondary forest.
- The present survey recorded 491 vascular plant species, including an orchid new to science (*Anoectochilus nanlingensis*), a new orchid genus to Mainland China (*Didymoplexis* sp.) and several new provincial records. The results suggest the flora at Nanling National Nature Reserve is moderately rich, and includes a number of species of conservation importance including five nationally endangered orchids and several globally Vulnerable species. The orchid flora was of particular interest at Dadingshan, where five terrestrial *Cymbidium* species were found.
- The mammal fauna of Nanling is of great interest, with a large number of globally Threatened species reported in the recent past including Tiger, several other large carnivores, primates and ungulates, making it among the most important sites for conservation of Guangdong mammals. Unfortunately there is great doubt surrounding the present status of most of these species, and up-to-date information is urgently required.
- Over 220 species of birds have been recorded at Nanling in recent years; 87 species were recorded during the present midsummer survey. Species of note included globally Vulnerable Brown-chested Jungle Flycatcher and Silver Oriole, as well as many nationally Protected species.
- Twenty-three amphibian and 33 reptile species were recorded from Nanling during the survey; the revised totals for the reserve are some 26 and 55 respectively. These are exceptionally high species numbers for KFBG surveys.
- Twenty-three fish species were recorded, including one new to science. Many are endemic to South China. Richness was moderately high, especially at Ruyang and Dadingshan.
- The dragonfly fauna was exceptionally rich, with 91 recorded, including at least seven previously undescribed species. Highest species numbers were recorded near the Dadingshan summit, at Longtanjiao and at Mao Ping in Dadongshan. A high proportion of species found were forest specialists.
- One hundred and eight butterfly species were recorded, a high figure, and about half of species recorded were forest-associated. Together with recent records by Chen X. (1997) and of Hong Kong Lepidopterists' Society, over 330 species have been recorded in recent years.
- The survey findings underline the transitional location of Nanling, with temperate or central-subtropical species at their southernmost limit and tropical taxa at their northernmost.
- Nanling was expected to be of national biodiversity significance by MacKinnon *et al.* (1996). The present findings suggest it is still of national significance, although this status is vulnerable if degradation continues to deplete forest integrity.

Threats and problems

- Logging has been a severe problem at Nanling. The reserve had been one of Guangdong's major timber production areas, resulting in fragmentation of the remaining natural forest. Extensive areas have been degraded to *Cunninghamia lanceolata* (China Fir) plantations, open shrubland and young secondary forest. Logging and establishment of new plantations have been officially banned in the National Nature Reserve since its establishment but small-scale illegal logging was still evident in 2000.
- The growing of *Wasabia japonica* (Wasabi) in the montane forest at Dadingshan had caused some tree cutting and canopy thinning, and the understorey was completely destroyed in these areas near the management station. The resultant changes in the forest microclimate and reduction of habitat complexity are likely to have been highly deleterious to forest biodiversity. The operation was reportedly funded by a businessman who hired villagers from neighbouring villages of Yangshan County to grow the plants. The practice reflects a lack of conservation management at the site, and the

need to protect the interests of conservation and the local community against incursions by outside interests.

- Over-collection of wild plants (e.g. terrestrial Cymbidiums, Dendrobiums and *Anoectochilus roxburghii*) with ornamental value and medicinal uses was evident in the reserve. Minority people at Dadongshan still depended on the forest timber to make their makeshift camps, and bamboo poles were collected at Dadongshan and Dadingshan, subject to a quota or permit system; the direct and indirect impacts of this forest-based activity could not be assessed during the survey.
- The hydroelectric stations at Dadongshan, Longtangjiao and Chengjia had caused disruption of streams and some flooding of forests. On the other hand a small lake habitat had been created at Dadongshan.

Opportunities

- Extensive mature forest could be found at Ruyang. At Dadingshan, Dadongshan, Longtanjiao and Chengjia, although rather fragmented, the forest was largely connected by tall shrubland. Such more-or-less continuous vegetation provides important habitat for various important fauna. More detailed survey of large animals using infrared cameras would be useful to fill gaps in knowledge of the distribution and status of large animals in the area. Similarly, further surveys of orchids and other groups would be valuable to clarify distribution and status. Such knowledge would guide conservation in the region.
- A number of highly threatened orchid species, particularly terrestrial Cymbidiums, could still be found during the present survey, showing that collection has not been exhaustive in the reserve to date. *In-situ* conservation measures and monitoring of these valuable gene pools of the small remaining populations should be implemented.
- In many cases good forest patches are separated by degraded habitats; linking these good forests through restoration would greatly increase the ecological value of the reserve. Except in the most degraded vegetation types, such as open grassland and old plantation, restoration could occur naturally by regeneration as the diverse flora and fauna in the region should provide sufficient sources of seeds and dispersal agents. Where active reforestation is necessary, it should use an assembly of species similar to the natural forest of the region. The diverse flora of the region contains a lot of species useful for reforestation, forestry and horticulture. Sustainable and non-destructive collection of seeds and nursing saplings may provide long-term and stable income for the nature reserve and the villagers. Various institutes in South China (e.g. South China Agricultural University, KFBG) could contribute techniques needed for establishment of tree nurseries.
- Babaoshan in Ruyang has great potential to develop ecotourism and/or environmental education. Lodging is already available at the reserve management station and there are good roads and paths in the reserve. The approach taken so far seems quite sensitive to environmental conservation. Facilities such as educational signs, maps and litter bins would help improve the quality and sustainability of the visitor experience.
- Local knowledge held by the minority people could be valuable in enhancing reserve management and developing ecotourism and educational work. It is important to enlist their input and work with them to reduce their impact on the good forests. A good beginning would be a thorough investigation into the knowledge and perspectives of the indigenous Yao and other people.
- MacKinnon *et al.* (1996) recommended joining Nanling with Mangshan in Hunan to form a large conservation unit of global conservation importance. Whether or not management is unified the forest habitats in these reserves could be linked up through reforestation, and close cooperation could ensure illegal and disruptive activity is kept to a minimum.

Acknowledgements

The editors wish to thank the Guangdong Forestry Department for their cooperation and assistance, and all participants of the survey team, including field staff at Nanling National Nature Reserve. We also

thank Bill Bleisch, Ramesh Boonratana, Jack Fooden, Charles Southwick and Sian Waters for advice on macaque identification. This work has been funded by KFBG.

References

- Anon., 1959-2001. *Flora Reipublicae Popularis Sinicae*. Tomus 2-80. Science Press, Beijing. (in Chinese)
- Anon., 1996-2001. *Flora of China* Vol. 4, 15, 16, 17, 18, & 24. Science Press, Beijing, and Missouri Botanic Garden Press, St. Louis.
- Anon., 2002a. *Flora of China Checklist*. Published on the Internet: <http://mobot.mobot.org/W3T/Search/foc.html> [accessed 1 May, 2002]
- Anon., 2002b. *Flora of China Manuscript*. Published on the Internet: <http://flora.huh.harvard.edu/china/> [accessed 1 May, 2002]
- Bascombe, M.J. 1995. Check list of the butterflies of South China. *Memoirs of the Hong Kong Natural History Society* 20: 1-206.
- Chen, S.-C. (ed.), 1999. Angiospermae Monocotyledoneae Orchidaceae (2). *Flora Reipublicae Popularis Sinicae*. Tomus 18. Science Press, Beijing, 463 pp. (In Chinese.)
- Chen, T. and Zhang, H., 1994. The floristic geography of Nanling mountain range, China: I. Floristic composition and characteristics. *Journal of Tropical and Subtropical Botany* 2(1): 10-23. (In Chinese with English abstract.)
- Chen, X., 1997. A research on butterflies in National Nanling Nature Reserve. *Natural Enemies of Insects* 19(1): 26-40. (In Chinese with English abstract.)
- Chou, I., 1994. *Monographia Rhopalocerorum Sinensium*. Henan Scientific and Technological Publishing House, Zhengzhou, 2 vol., 854 pp. (In Chinese.)
- Clements, J.F., 2000. *Birds of the World: A Checklist, Fifth Edition*. Ibis Publishing Company, California, 867pp.
- Corbet, G.B. and Hill, J.E., 1992. *The Mammals of the Indomalayan Region: a Systematic Review*. Oxford University Press, New York, 488 pp.
- Feng, Z.J., Li, Z.H., Li, P.T. and Ye, X.B., 1998. Resources of seed plant in Nanling National Nature Reserve. *Journal of South China Agricultural University* 19(2): 60-63. (In Chinese with English abstract.)
- Guangdong Forestry Department and South China Institute of Endangered Animals, 1987. *Colour Guide of Wildlife in Guangdong Province*. Guangdong Science and Technology Press, Guangzhou, 139 pp. + 300 colour plates. (In Chinese.)
- Hong Kong Lepidopterist's Society, 2003. Website <http://hkls.org/activ.htm>. [Accessed February 2003]
- Hua, W.L. and Yan, Q.W., 1993. *Protected Animals in China*. Shanghai Scientific and Technological Education Publishing House, Shanghai, 618 pp. (In Chinese with English abstract.)
- Inskipp, T., Lindsey, N. and Duckworth, W., 1996. *An Annotated Checklist of the Birds of the Oriental Region*. Oriental Bird Club, Sandy, Bedfordshire, U.K., 294 pp.
- IUCN, 2002. *2002 IUCN Redlist of Threatened Species*. Published on the Internet: <http://www.redlist.org/> [Accessed on 10 October, 2002]

- Lang, K.-Y. (ed.), 1999. Angiospermae Monocotyledoneae Orchidaceae (1). *Flora Reipublicae Popularis Sinicae*. Tomus 18. Science Press, Beijing, 551 pp. (In Chinese.)
- Lang, K.-Y. and Siu, L.-P., 2002. A new species of *Anoectochilus* Blume (Orchidaceae) from China. *Acta Phytotaxonomica Sinica* 40(2), 164-166. (In Chinese.)
- Lewthwaite, R.W., 1996. Forest birds of Southeast China: observations during 1984-1996. *Hong Kong Bird Report* 1995: 150-203.
- Li, Z.C., n.d. Preliminary research of amphibians and reptiles in Long Tanjiao nature protected location of Guangdong Province. *Acta Herpetologica Sinica* Vol. 4-5: 330-332.
- Li, Z.C., 1996. Herpetofauna of Dadongshan Nature Reserve with description of two new records in Guangdong. *Journal of South China Normal University (Natural Science)* 1996(2): 80-83.
- MacKinnon, J., Meng, S., Cheung, C., Carey, G., Zhu, X. and Melville, D., 1996. *A Biodiversity Review of China*. World Wide Fund for Nature (WWF) International, WWF China Programme, Hong Kong, 529 pp.
- Nelson, J.S., 1994. *Fishes of the World, 3rd edition*. John Wiley & Sons, New York, 600 pp.
- Ng, H.H. and Chan, B.P.L., in preparation. The catfish genus *Pterocryptis* (Siluridae) in southern China, with the description of a new species.
- Schorr, M., Lindeboom, M. and Paulson, D., 2001a. *List of Odonata of the World (Part 1, Zygoptera and Anisozygoptera)*. July 2001 version. Published on the Internet: <http://www.ups.edu/biology/museum/worldodonates.html>
- Schorr, M., Lindeboom, M. and Paulson, D., 2001b. *List of Odonata of the World (Part 2, Anisoptera)*. April 2001 version. Published on the Internet: <http://www.ups.edu/biology/museum/worldanisops.html>
- Silby, J., 2001. *Dragonflies of the World*. The Natural History Museum and CSIRO Publishing.
- State Forestry Administration and Ministry of Agriculture, 1999. *State Protection List of Wild Plants*. (In Chinese.)
- The Plant Names Project, 2002. *International Plant Names Index*. Published on the Internet: <http://www.ipni.org/> [accessed 1 May, 2002].
- Tsi, Z.-H. (ed.), 1999. Angiospermae Monocotyledoneae Orchidaceae (3). *Flora Reipublicae Popularis Sinicae*. Tomus 19. Science Press, Beijing, 485 pp. (In Chinese.)
- Wang, M. and Fan, X., 2002. *Butterflies Fauna Sinica: Lycaenidae*. Henan Scientific and Technological Publishing House, Zhengzhou. (In Chinese.)
- Wang, X.P. et al. (eds.), in press. *Plants of the Chinese Region – Status Survey and Conservation Action Plan. Appendix 1 Red Lists*. IUCN/SSC China Plant Specialist Group.
- Wilson, D.E. and Cole, F.R., 2000. *Common Names of Mammals of the World*. Smithsonian Institution Press, Washington and London, xiv + 204 pp.
- Wilson, K.D.P., 2002. Notes on Chlorogomphidae from southern China, with descriptions of two new species (Anisoptera). *Odonatologica* 31(1): 65-72.
- Woodward, T.J. and Carey, G.J., 1996. *Where to Watch Birds and Other Wildlife in Hong Kong and Guangdong*. Privately published, Hong Kong, 197 pp.

- Wu, H.L., Shao, K.T. and Lai, C.F. (eds.), 1999. *Latin-Chinese Dictionary of Fishes' Names*. Sueichan Press, Taiwan, 1,028 pp. (In Chinese and English.)
- Xing, F.X. and Yu, M.E., 2000. *Wild Plants of Shenzhen, China*. China Forestry Press, Beijing, 299 pp. (In Chinese.)
- Zhang, J. (ed.), 1997. *Nature Reserves of Guangdong Province*. Guangdong Tourism Publishing House, Guangzhou, 384 pp. (In Chinese.)
- Zhang, W. (ed.), 1998. *China's Biodiversity: A Country Study*. China Environmental Science Press, Beijing, 476 pp.
- Zhang, Y. et al. 1997. *Distribution of Mammalian Species in China*. China Forestry Publishing House, Beijing, 280 pp. (In Chinese and English.)
- Zhao, E., 1998. *China Red Data Book of Endangered Animals*. Science Press, Beijing, xiv + 330 pp. + IV plates. (In Chinese and English.)
- Zhao, E., Chang, H.W., Zhao, H. and Adler, K., 2000. Revised Checklist of Chinese Amphibia & Reptilia. *Sichuan Journal of Zoology* 19(3): 196-207. (In Chinese.)
- Zhao, E.-M. and K. Adler, 1993. *Herpetology of China*. Society for the Study of Amphibians and Reptiles, Oxford, Ohio, U.S.A., 522 pp.

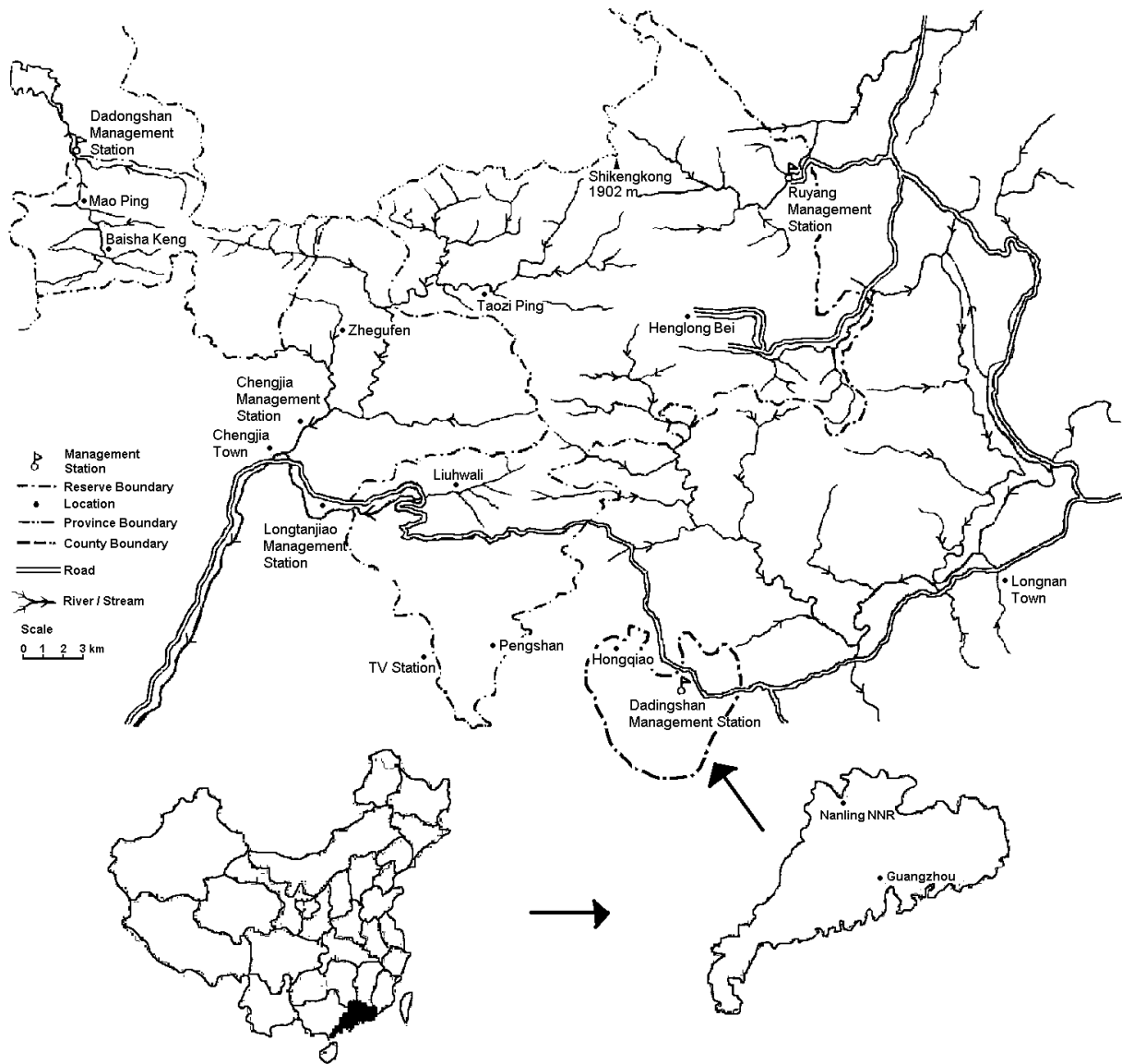


Figure 1. Map showing location of Nanling National Nature Reserve, Northwest Guangdong, China.