

# A review of the distribution of Black Eagle *Ictinaetus malaiensis* in mainland China

ZHU LEI, YANG XIAO-NONG, HAO GUANG, HUANG QIN, LIU TIAN-TIAN, DAI ZI-YUE, WEI QIAN,  
RICHARD W. LEWTHWAITE & SUN YUE-HUA

The Chinese distribution of Black Eagle *Ictinaetus malaiensis* was traditionally restricted to Fujian, Taiwan and Yunnan. In the past two decades the number of birdwatchers throughout China has greatly increased, resulting in wider coverage of forest sites, and consequently more sightings of this species have been documented. We found several accounts where observations have been overlooked, leading to an underestimate of the distribution of the species in mainland China. Our review indicates that it occurs in eight continental provinces, one autonomous region and on the islands of Hainan and Taiwan, and at present its range extends over more than 20,000 km<sup>2</sup>; the lowest altitude at which it has been recorded is 70 m in Anhui and the highest is 3,250 m in Yunnan

## INTRODUCTION

The Black Eagle *Ictinaetus malaiensis* is a large diurnal raptor that inhabits mountain forests of tropical and subtropical Asia (Clark 1994, Ferguson-Lees & Christie 2006). It is placed in the family Accipitridae and is the only species of the genus *Ictinaetus*. Two subspecies are currently recognised: *I. m. malaiensis* from eastern Myanmar to southern China, through south-eastern Asia and south to Indonesia, and *I. m. perniger* of the Indian subcontinent and Sri Lanka. The subspecies differ mainly in size, the nominate being larger (Stresemann & Amadon 1979, Clark 1994, Ferguson-Lees & Christie 2001). Although widespread and not globally threatened at present, it is an uncommon to rare resident of forested hills and mountains, frequenting forest edge and clearings and second growth over most of its range, with a global population estimated to be around 10,000 individuals and thought to be decreasing owing to ongoing deforestation (BirdLife International 2014). The species's long, broad, paddle-shaped wings and widely splayed primary tips enable the bird to glide very slowly above tree-level or in and out of the upper canopy, and create a highly distinctive wing shape, allowing it to be identified relatively easily in the field compared to other large raptors (Naoraji 2006, Brazil 2009, Rasmussen & Anderton 2012).

To date there have been relatively few studies of the Black Eagle and most have focused on its breeding biology (e.g. Soleha 2000, Chiu & Lim 2003, Lim & Hut 2005, Lin 2005, Naoraji 2006, Lin & Lin 2010, Samarawickrama *et al.* 2011). To our knowledge, there are no specific accounts in the literature of this species in mainland China. With reports compiled from numerous observers we present a review of its current distribution in mainland China.

## DISTRIBUTION IN CHINA

The earliest record of the Black Eagle in China which we have traced is a specimen collected in central Hainan on 8 April 1899 by an unknown person and now preserved as part of the Paul D. Bergen Chinese Collection at the American Museum of Natural History (AMNH 417528, information from GBIF <http://www.gbif.org>). This specimen appears to have escaped the attention of ornithologists at the time and was not mentioned in Peters's (1931) account of the species's distribution. The honour of publishing the first Chinese records fell jointly to Yamashina (1940), who reported a specimen collected by Kanzano at Chiayi, Tainan, Taiwan, in August 1935, and Jordans & Niethammer (1940), who 'saw' one at Guadun, north-west Fujian, on 7 May 1938 ('saw' may possibly mean 'shot and examined' in accounts of this time). The specimen from Taiwan (YIO-09752) is preserved at the Yamashina Institute of

Ornithology, Japan, and photographs of the specimen can be found on the institute's online database (<http://decochan.net/>). This record and the record from Fujian formed the basis for the species account in Cheng (1955).

The next two records to emerge were reported from Hainan, involving a specimen without date or specific locality (Tang & Li 1957) and an undated specimen from Wuzhi Shan (GIEBD-SYU 1983). These have recently been traced by Jin-yu Lei to specimens held at Wuhan University Museum and the South China Institute of Endangered Animals, Guangzhou, which are labelled Diaoluoshan, 4 April 1957, and Wuzhi Shan, 5 December 1963, respectively.

Although three Black Eagles had been collected in Hainan by 1963, the island is not mentioned in the species account of this eagle in Cheng (1987), which instead restricted the range to Taiwan in August–May and Fujian in May with the comment that it is 'very rare'. The reasons for Cheng's (1987) omission of Hainan may be two-fold: (1) he simply overlooked or discounted Tang & Li's (1957) record and/or (2) he did not include GIEBD-SYU's (1983) record in line with his stated policy of not consulting works published after the end of 1982. As a result, these Hainan records were missed by many authors, with the notable exception of Zhao (1995) and Zheng & Wang (1998). Another influential work, *The birds of China* (Meyer de Schauensee 1984), whose preparation involved the examination of collections in North America, also failed to mention the Hainan specimens described above, but recorded the species from Yunnan in August in addition to listing Taiwan and Fujian, a treatment that was apparently followed by Clark (1994).

In the 1980s and 1990s, new records of this eagle were reported from Wuyanling, Zhejiang, on 15 April 1987 (King & Zheng 1988); Emei Shan, Sichuan, on 27 February 1986 (Robson 1989, C. Robson *in litt.*); and Chebaling Nature Reserve, north Guangdong, between 26 December 1995 and 2 June 1996 (Lewthwaite 1996). In addition, MacKinnon & Phillipps (2000) recorded this species from south-east Xizang (Tibet). The latter authors included Guangdong records, but overlooked those from Hainan, Zhejiang and Sichuan. Thus by 2000 Black Eagle had been recorded from Taiwan, Fujian, Hainan, Yunnan, Zhejiang, Sichuan, Guangdong and Xizang, although no single author reported this distribution.

Since 2000, and especially for the years covered by *China Bird Reports 2003–2007*, reporting of Black Eagle in China has greatly increased. Table 2 lists a large increase in records of the species in the period 2002–2012, including the first records for Jiangxi in 2002, Anhui in 2005 and Shaanxi in 2009.

With regard to Sichuan, Black Eagle is not listed in standard works on the province such as Li (1995) and Zhang (1997). As already noted, it was first recorded from Emei Shan in the 1980s (Robson 1989). This record was followed by a sighting in the south

of the province at Yangsiba in April or May 1997 by a team working on the Sichuan Partridge *Arborophila rufipectus* in Mabian and Leibo counties (Dowell *et al.* 1997). The next records were at Wawu Shan National Forestry Park: one found by Björn Anderson on 6 May 2004 (*China Bird Report* 2004), single birds on 25 January 2008 and 30 April 2009 (*China Bird Report* unpublished data) and a courting pair on 23 April 2011 which were observed engaging in typical courtship behaviour by HG, YX-N and ZL. Elsewhere, one was seen near Jiuzhaigou Nature Reserve on 26 May 2012 (Tsai Muchi verbally to ZL, 25 June 2012), which is the northernmost record in the province.

Taken together, present-day records indicate that Black Eagle occurs uncommonly but is widely distributed in southern China. It ranges in the east from northern Zhejiang to southern Anhui and southern and eastern Jiangxi and through much of Fujian to northern and central Guangdong. There is a break in distribution in Guangxi, where it is unrecorded, but it appears again in Yunnan where it is distributed across the southern and western flanks of the province, and from there north through Sichuan to the southern Qinling Mountains in Shaanxi. Outside these areas, it has been recorded in southern Tibet from Nyala east to Motuo (Medog) and in Hainan and Taiwan. The lowest altitude at which it has been recorded is 70 m at Guba village, Jingchuan county, Xuancheng, Anhui, and the highest is 3,250 m at the Pianma Yaojiaping pass, Gaoligong Shan Nature Reserve, Yunnan. It presumably also occurs, but has so far not been found, in the broadleaf forests of Chongqing, Guizhou and Guangxi, and possibly also in Hunan and Hubei provinces (Figure 1). A published record at Sanjiangyuan Nature Reserve, north-west Qinghai (Ma *et al.* 2003), is regarded as unsubstantiated in view of the unsuitable habitat of the area (high alpine meadowland above 4,000 m) and lack of supporting detail.

## DISCUSSION

In the past, published records were often overlooked by later authors. This pattern still continues. As Table 1 shows, Gao (2002) included Hainan within the range of Black Eagle, but not

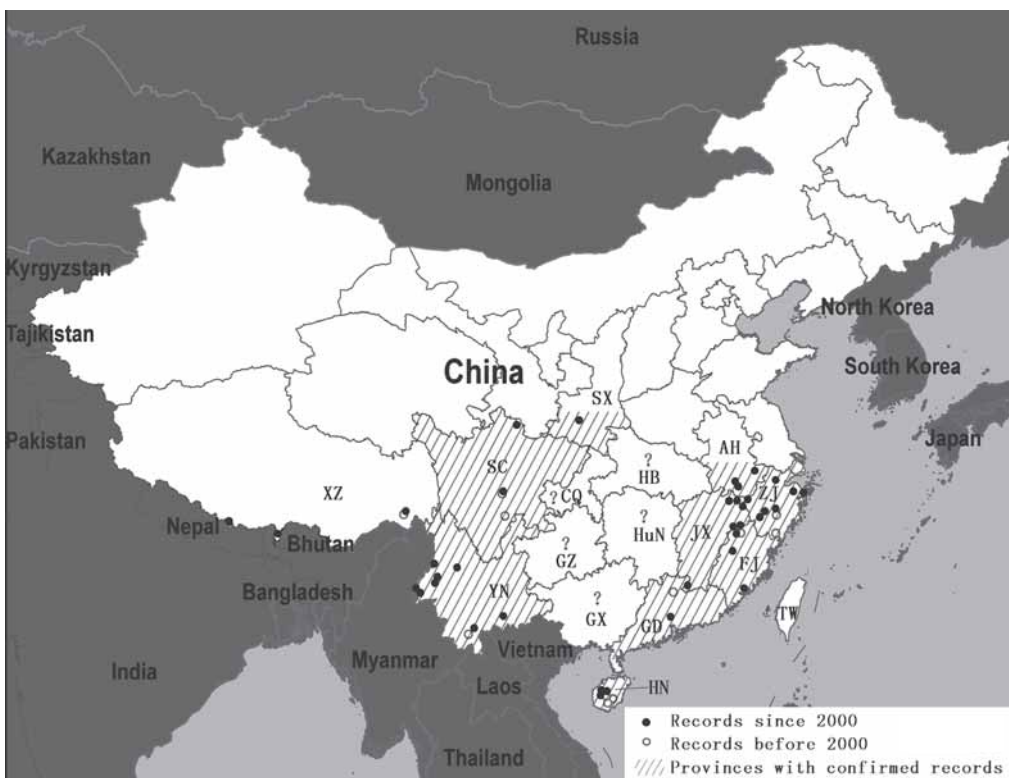
Guangdong or Xizang, while Zheng (2005) listed Guangdong, but not Hainan or Xizang. Other authors, such as Zhu *et al.* (2008) and Brazil (2009) in their treatment of this species in eastern China, overlooked or discounted new records published in *China Bird Reports*. Prior to the publication of the present paper, the most comprehensive statement on the distribution of this eagle in China could be found in the latest edition of Zheng (2011), which gave its range as Zhejiang, Fujian, Jiangxi, Guangdong, Yunnan, Xizang, Hainan and Taiwan, but omitted records published in *China Bird Reports* from Sichuan and Anhui.

Until recently, our knowledge of the distribution of birds in China was almost wholly derived from specimen records. These include large collections of birds made between the 1860s and the 1930s which are now preserved in museums in Europe, Russia, North America and Japan. Even larger collections were made between the 1920s and the 1980s and are kept in institutions in Beijing and other major Chinese cities. Reliance on specimen records leads to some species being under-recorded or totally unrecorded, because of the difficulty of obtaining material. Birds of open country or wetland are much easier to collect than forest species like Black Eagle. Indeed, Lin (2010) noted that this eagle is rarely poached in Taiwan. As we have detailed above, only five Black

**Table 1.** The distribution of *Ictinaetus malaiensis* given in major ornithological works on China.

References	Distribution and Status*
Cheng 1955	Fujian (May), Taiwan (Aug.)
Cheng 1976	Fujian, Taiwan
Meyer de Schauensee 1984	Fujian (May), Taiwan (A, Aug.), Yunnan (Aug.)
Cheng 1987	Fujian (May), Taiwan (Aug. – Mar.)
Zhao 1995	Fujian, Hainan, Taiwan
Zheng & Wang 1998	Fujian, Hainan, Taiwan
MacKinnon & Phillipps 2000	Fujian, north Guangdong, south-east Xizang, Taiwan, Yunnan
Gao 2002	Fujian (R), Hainan (P), Taiwan (R), Yunnan (R)
Zheng 2005	Fujian (R), north Guangdong (R), Taiwan (R), Yunnan (R)
Zhu <i>et al.</i> 2008	Fujian (R)
Zheng 2011	Fujian (R), Guangdong (R), Hainan (R), Jiangxi (R), Taiwan (R), Xizang (R), Yunnan (R), Zhejiang (R)

\* = original authors' treatment of the status of *Ictinaetus malaiensis* in different provinces. A = accidental, P = passage migrant, R = resident



**Figure 1.** Current distribution of *Ictinaetus malaiensis* in mainland China.

AH = Anhui, FJ = Fujian, GD = Guangdong, GX = Guangxi, GZ = Guizhou, HB = Hubei, HN = Hainan, HuN = Hunan, JX = Jiangxi, SC = Sichuan, SX = Shaanxi, TW = Taiwan, XZ = Xizang, YN = Yunnan, ZJ = Zhejiang; ? = currently no record.

**Table 2.** Sightings of *Ictinaetus malaiensis* in mainland China since 2000.

Location	Coordinates	Elevation (m)	Date	No.	Source
Wuyuan, Shangrao, Jiangxi	29.200°N 117.667°E	250	1 Dec. 2002	2	RWL
Baihualing, Gaoligong Shan NR, Yunnan	25.283°N 98.800°E	1,400	17 Apr. 2003	1	CBR 2003
Xuzhuang, Xiamen, Fujian	24.700°N 117.983°E	?	19 Apr. 2003	1	<i>ditto</i>
Wuyi Shan NR, Qianshan, Jiangxi	27.833°N 117.733°E	500	23 May 2004	2	CBR 2004
Jiulian Shan NR, Longnan, Jiangxi	24.567°N 114.450°E	600	24 May 2004	1	<i>ditto</i>
Wawu Shan NFP, Hongya, Sichuan	29.650°N 102.933°E	2,700	6 May 2004	1	<i>ditto</i>
Gutian Shan NR, Kaihua, Zhejiang	29.250°N 118.133°E	500	5 Mar. 2005	1	Chen <i>et al.</i> 2012
Xia Chayu, Linzhi, Xizang	28.483°N 97.000°E	1,743	16 May. 2005	1	J. T. Dong pers. comm.
Jiasha, Gejiu, Yunnan	23.283°N 102.983°E	1,700	27 July 2005	1	CBR 2005
Guniujiang NR, Qi'men, Anhui	30.000°N 117.450°E	900	11 Aug. 2005	1	Wang 2010 **
Bawangling NR, Hainan	19.117°N 109.083°E	?	10 Nov. 2005	2	CBR 2005
Wuyi Shan NR*, Wuyi Shan, Fujian	27.550°N 117.450°E	?	6 Dec. 2005	2	<i>ditto</i>
Dahaoping, Tengchong, Yunnan	24.967°N 98.733°E	2,300	4 Jan. 2006	1	CBR 2006
Nabang, Yingjiang, Yunnan	24.733°N 97.550°E	300	10 Jan. 2006	2	<i>ditto</i>
Husa, Longchuan, Yunnan	24.433°N 97.867°E	1,400	15 Jan. 2006	1	<i>ditto</i>
Jingchuan, Xuancheng, Anhui	30.683°N 118.483°E	70	22 Jan. 2006	1	Wang 2010
Yadong, Xigaze, Xizang	27.417°N 88.917°E	2,958	18 Jul. 2006	1	CBR 2006
Longqi Shan NR, Jiangle, Fujian	26.583°N 117.183°E	?	1 Jan. 2007	1	CBR 2007
Qi'men, Huangshan, Anhui	29.850°N 117.483°E	110	8 Jul. 2007	1	Wang 2010
Baima Shan NFP, Lishui, Zhejiang	28.617°N 119.133°E	1,300	13 Mar. 2007	1	Y. F. Zheng pers. comm.
Siming Shan, Ningbo, Zhejiang	29.717°N 121.067°E	800	22 Jun. 2007	1	C. Li pers. comm.
Cang Shan NFP, Dali, Yunnan	25.800°N 100.117°E	3,000	21 Aug. 2007	1	RWL
Longdong NFP, Guangzhou, Guangdong	23.200°N 113.350°E	?	8 Dec. 2007	1	CBR 2007
Tiantong Shan NFP, Ningbo, Zhejiang	29.783°N 121.800°E	150	26 Aug. 2008	1	S. Q. Bo pers. comm.
Yinggeling NR, Hainan	19.050°N 109.533°E	?	20 Sep. 2008	1	K. S. Lee pers. comm.
Jingdezhen, Jiangxi	?	?	26 Dec. 2008	2	P. Holt pers. comm.
E'xianling NR, Dongfang, Hainan	19.000°N 109.083°E	?	17 Jan. 2009	1	K. S. Lee pers. comm.
Qinling Mountains, Shaanxi	?	?	27 May 2009	1	H. Jännes pers. comm.**
Zhangmu, Nyalam, Xizang	28.000°N 86.000°E	?	23 Aug. 2009	1	CBR unpublished data
Yangjifeng NR, Guixi, Jiangxi	27.917°N 117.317°E	?	13 Dec. 2009	2	<i>ditto</i>
Laiyanghe NR, Simao, Yunnan	22.533°N 101.167°E	?	18 Dec. 2009	1	<i>ditto</i>
Guodong village, Jinhua, Zhejiang	28.800°N 119.817°E	225	10 Apr. 2010	1	HQ
Jiulong Shan NR, Lishui, Zhejiang	28.333°N 118.900°E	852	30 Apr. 2010	1	<i>ditto</i>
Baishaguan, Shangrao, Jiangxi	29.067°N 118.033°E	141	27 Nov. 2010	1	<i>ditto</i>
Pianma, Gaoligong Shan NR, Yunnan	25.967°N 98.667°E	3,250	11 Aug. 2011	1	D. Liang pers. comm.
Jiuzhaigou NR*, Sichuan	33.100°N 103.867°E	1,900	26 May 2012	1	M. C. Tsai pers. comm.
Wuchao Shan NFP, Hangzhou, Zhejiang	30.183°N 120.000°E	400	3 Oct. 2012	2	B. Song pers. comm.

Notes: Only the first record at each location is listed. NFP = national forestry park, NR = nature reserve; ? = lack of data; CBR = China Bird Report; \* = World Natural Heritage Site; \*\* = first provincial record.

Eagle specimens are known from China, and of these only two reached the attention of Cheng (1955, 1976, 1987).

By the time China reopened to the world in the 1980s after a lengthy period of isolation, the shoot-to-identify era had passed. The publication of colour field guides and the availability of affordable, high-quality optical and audio equipment enabled competent birdwatchers to identify birds in the field with confidence. New records of Black Eagle based on sightings were published from Sichuan, Guangdong and south-east Tibet (Robson 1989, Lewthwaite 1996, MacKinnon & Phillipps 2000). A further rapid increase in sightings of this raptor in other provinces of southern China has been evident since about 2000 (Table 2), a trend which has also been observed in other bird species throughout China (e.g. Li *et al.* 2012, Zhu *et al.* 2012). The publication of MacKinnon & Phillipps (2000) was a milestone event, leading to a huge increase in birdwatching activities in China. According to Ma

*et al.* (2012), the number of birdwatchers in mainland China rose from about 600 in 2000 to more than 20,000 in 2010. Another significant event was the publication of *China Bird Reports* annually for the years 2003–2007 (Chinese Ornithological Society 2004–2008), which provided a peer-reviewed platform for birdwatchers to publish their records. Amateur birdwatchers, rather than professional ornithologists or researchers, have provided the great majority of new records, and their efforts have helped shed new light on our understanding of the distribution of birds within this vast country (Li *et al.* 2012, Ma *et al.* 2012). Important records, of course, require solid documentation, preferably supported by photographs, video footage or sound recordings, or at least in the form of detailed written descriptions.

Several Chinese authors have recently interpreted new distributional data as range expansions or range shifts resulting from climate change (Du *et al.* 2009, Chen *et al.* 2012). However, we

take the view that our knowledge of the avifauna of China is still far from complete and that many, and perhaps even most, new records simply reflect increased observer activity and better reporting of species which were overlooked, under-reported or simply not reported in the past, or which occur in areas that were previously not well surveyed. For example, Light-vented Bulbul *Pycnonotus sinensis* has traditionally been regarded as an Oriental species (Shaw 1936, Fishpool & Tobias 2005). Consequently, Li *et al.* (2012) noted the northward expansion of the species based on an analysis of data from the *China Bird Reports* (China Ornithological Society 2004–2008). In fact, one adult female Light-vented Bulbul was collected on 6 May 1935 at Tangku (now Tanggu), Hebei, on the coast of Bohai Bay (Shaw 1936). This specimen indicates that the recent increase in observations of the species in northern China is probably due to more increased birdwatching activity than a real range shift.

It is worth mentioning the emergence of 'observer bias' when considering new information on bird distribution in China. In the case of the Black Eagle, there is obviously a large gap between its confirmed western and eastern distribution in China (Figure 1). Li *et al.* (2012) noted the very uneven geographic distribution of birdwatchers in China. On the one hand, the eastern economically developed provinces with higher numbers of birdwatchers often have more bird records. On the other hand, the western provinces (e.g. Sichuan and Yunnan) with higher avian biodiversity attract more visiting birdwatchers who record and report more birds. Thus, the current Black Eagle's distribution pattern in mainland China more or less coincides with the observations of what was been noticed by Li *et al.* (2012).

## CONSERVATION STATUS

Thiollay (1998) suggested that the Black Eagle might be severely affected by forest fragmentation in tropical Asia. Brazil (2009) listed it as a rare breeding species in eastern mainland China with fewer than 100 pairs. In our view, the rise in the number of records of this eagle in mainland China in recent years very probably reflects wider coverage of suitable forest sites and better reporting rather than an actual increase in numbers. As Table 2 shows, 20 out of 37 sightings since 2000 have occurred in nature reserves or national forestry parks, which indicates that these protected sites still hold sufficient forest habitat to support this large raptor. As a top predator, it might be a good indicator of habitat quality and environmental change. It was designated nationally 'Near Threatened' by Zheng & Wang (1998) based on the sparse records and restricted range, but was not included in Wang & Xie (2009).

In order to assess the conservation status of species in China more accurately, Jiang & Luo (2012) proposed new designations, derived from a combination of distribution area, life history, ecological function, anthropogenic interference and special use data. By applying these new criteria, Jiang *et al.* (2013) assessed the Black Eagle as nationally 'Threatened' based on its known distribution and by applying the principle that the status of top predators should be upgraded. Even so, our results indicate that it occurs in eight continental provinces, one autonomous region and on the islands of Hainan and Taiwan, and at present its range extends over more than 20,000 km<sup>2</sup>. Thus it does not approach the thresholds for globally 'Vulnerable' under the range size criterion, even if it was a species entirely confined to China (BirdLife International 2014). Nevertheless, considering its decreasing global population, its vulnerable habitat and its foraging habits, perhaps specialised on squirrels (Gunawardena 2006), we suggest that the status of this raptor in mainland China could be better evaluated as Near Threatened according to IUCN criteria (IUCN 2001). Unfortunately, there is currently no long-term monitoring of its

population in mainland China and data are insufficient for population trend evaluations over such a large landmass. A long-term monitoring programme which could involve volunteers should be instigated for this raptor (Si & Ding 2011, Wu *et al.* 2012, Ma *et al.* 2012).

## ACKNOWLEDGEMENTS

We thank Liu Yang at Sun Yat-sen University and Paul Holt for revising early drafts, two anonymous referees and Brian Sykes for further improvements, Thomas Trombone and Paul Sweet of the American Museum of Natural History for data on and photographs of the April 1899 Hainan specimen, Lei Jin-yu for locating specimens at Wuhan and Guangzhou, Ko Wei-sum of the Hong Kong Bird Watching Society (HKBWS) for assistance with *Hong Kong Bird Report* papers, Liang Dan at Southwest Forestry University in Kunming for sharing recent sightings at Gaoligong Shan National Nature Reserve, Yunnan, and Tang Song-hua at the Institute of Zoology, Chinese Academy of Science, for access some references. We also thank Tsai Mu-chi of National Taiwan University, Hannu Jännes and Craig Robson of Birdquest, Lu Gang of Kadoorie Farm and Botanic Garden (China Programme), Lee Kwok-shing of HKBWS, Zheng Yong-fu, Li Chao and Song Bing of Zhejiang Wildbird Society, Bo Shun-qi of Wild Bird Society of Shanghai, Dong Jiang-tian of Shenzhen Bird Watching Society and Luo Ping-zhao of Chengdu Bird Watching Society for providing locations of Black Eagle records in Sichuan, Shaanxi, Hainan, Zhejiang province and Xizang Autonomous Region, respectively.

## REFERENCES

- BirdLife International (2014) Species factsheet: *Ictinaetus malayensis*. Downloaded from <http://www.birdlife.org> on 26/06/2014.
- Brazil, M. (2009) *Birds of east Asia*. London: Christopher Helm.
- Chen S. H., Huang, Q., Fan Z. Y., Chen C. S. & Lu W. W. (2012) The update of Zhejiang bird checklist. *Chinese Birds* 3: 118–136.
- Cheng T. H. (1955) *Checklist of birds in China*. Beijing: Science Press. (In Chinese.)
- Cheng T. H. (1976) *Checklist of birds in China*. Second edition. Beijing: Science Press. (In Chinese.)
- Cheng T. H. (1987) *A synopsis of the avifauna of China*. Beijing: Science Press.
- China Ornithological Society (2004) *China Bird Report 2003*. Beijing: China Ornithological Society.
- China Ornithological Society (2005) *China Bird Report 2004*. Beijing: China Ornithological Society.
- China Ornithological Society (2006) *China Bird Report 2005*. Beijing: China Ornithological Society.
- China Ornithological Society (2007) *China Bird Report 2006*. Beijing: China Ornithological Society.
- China Ornithological Society (2008) *China Bird Report 2007*. Beijing: China Ornithological Society.
- Chiu S. C. & Lim K. C. (2003) The first breeding record of the Black Eagle *Ictinaetus malayensis* in Malaysia. *Suara Enggang* 11: 14–16.
- Clark, W. S. (1994) Species account: Indian Black Eagle. P.192 in J. del Hoyo, A. Elliott & J. Sargatal, eds. *Handbook of the birds of the world*, 2. Barcelona: Lynx Edicions.
- Dowell, S. D., Dai B., Martins, R. P. & Williams, S. R. (1997) Sichuan Hill-partridge forest conservation report: report on the 1997 field season. Unpublished report to World Pheasant Association and Sichuan Forest Department.
- Du Y., Zhou F., Shu X. L. & Li Y. L. (2009) The impact of global warming on China avifauna. *Acta Zoo. Sinica* 34: 664–674. (In Chinese.)
- Ferguson-Lees, J. & Christie, D. A. (2001) *Raptors of the world*. London: Christopher Helm.
- Fishpool, L. & Tobias, J. (2005) Family Pycnonotidae (bulbuls). Pp.124–250 in J. del Hoyo, A. Elliott & D. A. Christie, eds. *Handbook of the birds of the world*, 10. Barcelona: Lynx Edicions.

- Gao W. (2002) *Ecology of Falconiformes in China*. Beijing: Science Press.
- GIEBD-SYU (Guangdong Institute of Entomology and Biology Department of Sun Yat-Sen University). (1983) *Birds and mammals of Hainan island*. Beijing: Science Press. (In Chinese.)
- Gunawardena, K. (2006) A nest of the Black Eagle *Ictinaetus malayensis* in Sri Lanka. *BirdingASIA* 6: 23–27.
- IUCN (2001) *IUCN Red List categories and criteria*. Version 3.1. Gland, Switzerland and Cambridge: IUCN Species Survival Commission.
- Jiang Z. G. & Luo Z. H. (2012) Assessing species endangerment status: progress in research and an example from China. *Biodiversity Science* 20: 612–622. (In Chinese.)
- Jiang Z. G., Luo Z. H., Tang S. H., Fang H. X., Li C. W. & Meng Z. B. (2013) *Assessment report on threatened status of terrestrial vertebrates in China*. Beijing: China Environmental Science. (In Chinese.)
- Jordans, A. & Niethammer, G. (1940) Eine Vogelausbeute aus Fukien. *Verhandl. Orn. Ges. Bayern* 22: 98–136.
- King, B. & Zheng G. M. (1988) Preliminary list of the birds of Wuyanling Nature Reserve in southern Zhejiang Province. *Hong Kong Bird Report* 1987: 93–102.
- Lewthwaite, R. W. (1996) Forest birds of southeast China: observations during 1984–1996. *Hong Kong Bird Report* 1995: 150–203.
- Li G. Y. (1995) *The colour handbook to the bird of Sichuan*. Beijing: Chinese Forestry Publishing House. (In Chinese.)
- Li X. Y., Liang L., Gong P., Liu Y. & Liang F. F. (2012) Birdwatching in China reveals bird distribution changes. *Chinese Science Bull.* doi: 10.1007/s11434-012-5458-7
- Lim W. S. & Hut T. S. S. (2005) Observation of Black Eagle *Ictinaetus malayensis* in Plawangan-Turgo Nature Reserve, Gunung Merapi mountain, Indonesia. Pp.48–56 in J. Abu, M. H. N. Chong, A. C. Sebastian & Y. C. Aik. *Proceeding of the 4th Symposium on Asian raptors 2005*. Kuala Lumpur: Committee for the 4th Symposium on Asian Raptors 2005.
- Lin W. H. (2005) Habitat use and breeding ecology of Black Eagle *Ictinaetus malayensis* in northern Taiwan. Pp.35–41 in J. Abu, M. H. N. Chong, A. C. Sebastian & Y. C. Aik. *Proceeding of the 4th symposium on Asian raptors 2005*. Kuala Lumpur: Committee for the 4th Symposium on Asian Raptors 2005.
- Lin W. H. (2010) *Ictinaetus malayensis*. Pp.606–609 in L. L. Severinghaus, Z. S. Ding, W. H. Fang, W. H. Lin, M. C. Tsai & C. W. Yen, eds. *The avifauna of Taiwan*, 1. Taiwan: Council of Agriculture, Executive Yuan. (In Chinese.)
- Lin W. H. & Lin W. C. (2010) Diet survey of the Indian Black Eagle during the breeding season: a case study in northeast Taiwan. P.13 in L. L. Severinghaus, & S. M. Lin. *The 4th symposium on ecology of raptors in Taiwan: program and abstracts*. Taipei: Raptor Research Group of Taiwan. (In Chinese.)
- Ma Q., Su H. L. & Li D. Q. (2003) Investigation of avifauna distribution in the water origin of Three Rivers Nature Reserve. *J. Beijing Forestry University* 25: 51–54. (In Chinese.)
- Ma Z. J., Cheng Y. X., Wang J. Y. & Fu X. H. (2012) The rapid development of birdwatching in mainland China: a new force for bird study and conservation. *Bird Conserv. Internatn.* 13: 259–269.
- MacKinnon, J. & Phillipps, K. (2000) *A field guide to the birds of China*. Oxford: Oxford University Press.
- Meyer de Schauensee, R. (1984) *The birds of China*. Washington DC: Smithsonian Institution Press.
- Naoroji, R. (2006) *Birds of prey of the Indian subcontinent*. London: Christopher Helm.
- Peters, J. L. (1931) *Check-list of birds of the world*, 1. Cambridge Mass: Museum of Comparative Zoology.
- Rasmussen, P. C. & Anderton, J. C. (2012) *Birds of South Asia: the Ripley guide*. Second edition. Washington DC, Michigan & Barcelona: Smithsonian Institution, Michigan State University & Lynx Edicions.
- Robson, C. (1989) Omei Shan, Sichuan, China. *Oriental Bird Club Bull.* 9: 16–21.
- Robson, C. (2008) *A field guide to the birds of South-East Asia*. London: New Holland.
- Samarawickrama, P., Ariyasiri, K., Menike, U., Samarasingha, N. & Meegaskumbura, M. (2011) Observations of Black Eagle (*Ictinaetus malayensis*) nesting in Sri Lanka. *Tigerpaper* 38: 1–4.
- Shaw, T. H. (1936) *The birds of Hopei province*. Peiping: Fan Memorial Institute of Biology.
- Si X. F. & Ding P. (2011) History, status of monitoring land birds in Europe and America and countermeasures of China. *Biodiversity Science* 19: 303–310. (In Chinese.)
- Soleha, D. (2000) Reproductive behavior of Black Eagle (*Ictinaetus malayensis*) in the southern slope of Mount Merapi, Yogyakarta. P.208 in D. Prawiradilaga *Proceedings Asian Raptor research conservation: the 2nd symposium on raptors of Asia, Grand Aquila, Indonesia, 25–27 July 2000*. Indonesian Committee for the Second Symposium of Asian Raptor Research and Conservation, Cibinong, Indonesia.
- Stresemann, E. & Amadon, D. 1979. *Ictinaetus malayensis*. P.378 in E. Mayr & G. W. Cottrell, eds. *Check-list of birds of the world*, 1. Second edition. Cambridge, Mass.: Museum of Comparative Zoology.
- Tang T. Y. & Li T. H. (1957) Preliminary report on the Hainan Vertebrate Survey. *Chinese J. Zool.* 1: 246–249. (In Chinese.)
- Thiollay, J.-M. (1998) Current status and conservation of Falconiformes in tropical Asia. *J. Raptor Res.* 32: 40–55.
- Wang S. & Xie Y. (2009) *China species red list*, 2. Beijing: Higher Education Press.
- Wang J. (2010) Five new birds records from Anhui province, China. *J. Huangshan University* 12: 52–53. (In Chinese.)
- Wu W. W., Xu H. G., Wu J. & Cao M. C. (2012) The impact of climate change on birds: a review. *Biodiversity Science* 20: 108–155. (In Chinese.)
- Yamashina, Y. (1940) Notes on some birds of Formosa. *Tori* 10: 665–672.
- Zhang J. F. (1997) *A manual to identify Sichuan birds*. Beijing: China Forestry Publishing House. (In Chinese.)
- Zhao Z. J. (1995) *A handbook of the birds of China*, 1. Changchun: Jilin Science and Technology Press. (In Chinese.)
- Zheng G. M. & Wang Q. S. (1998) *China Red Data Book of endangered animals: Aves*. Beijing: Science Press. (In Chinese.)
- Zheng G. M. (2005) *A checklist on the classification and distribution of the birds of China*. Beijing: Science Press.
- Zheng G. M. (2011) *A checklist on the classification and distribution of the birds of China*. Second edition. Beijing: Science Press.
- Zhu X., Jiang H. L. & Lu Y. C. (2008) *A complete taxonomic checklist and geographic reference of bird species and subspecies in eastern China*. Beijing: Science Press. (In Chinese.)
- Zhu L., Zhang J., Qiu J., Wei Q., Dong L. & Sun Y. H. (2012) Long-tailed Duck *Clangula hyemalis* and Red-breasted Goose *Branta ruficollis*: two new birds for Sichuan, with a review of their distribution in China. *Forktail* 28: 138–142.
- ZHU Lei & SUN Yue-Hua**, Key Laboratory of Animal Ecology and Conservation Biology, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, China. Email: sunyh@ioz.ac.cn (corresponding author)
- YANG Xiao-Nong & HAO Guang**, Dept. of Biology and Science, Sichuan Agricultural University, Ya'an, 625014, China
- HUANG Qin**, Zhejiang Museum of Natural History, Hangzhou, 310014, China
- LIU Tian-Tian**, Graduate University of the Chinese Academy of Sciences, Beijing, 100049, China
- DAI Zi-Yue & WEI Qian**, China Bird Watch, Beijing, 100026, China
- Richard W. LEWTHWAITE**, Hong Kong Bird Watching Society, Hong Kong