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Distribution and status of the Chinese grouse *Bonasa sewerzowi*

Yue-Hua Sun

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After the first discovery of the endemic Chinese grouse *Bonasa sewerzowi* in 1876 in the province of Gansu, the species has been found in several areas in China; most recently it was discovered in the county of Jiali in Tibet in 1997. Its distribution area should now be defined as Gansu, Qinghai, Sichuan, Yunnan and Tibet, corresponding to the distribution area of mountain conifer forest in central China between the altitudes of 2,400 and 4,300 m a.s.l. The habitat requirements of the Chinese grouse include two main factors; one is the presence of coniferous trees which are used for cover, and the other is the presence of deciduous trees and shrubs which are used for food. Due to intensive cutting of virgin forests during the past decades, the habitats of the Chinese grouse are heavily isolated and fragmented nowadays. However, due to present and future conservation measures in China, I believe in a better future for the species.

Key words: Bonasa sewerzowi, Chinese grouse, distribution, status

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The Chinese grouse *Bonasa sewerzowi* is an endemic species inhabiting high mountain coniferous forests in central China. Until the 1990s, it was widely believed to be near extinct (Zhao, Zheng, Wang & Xu 1990). The Chinese grouse was first described from Gansu in 1876 by Przewalski. In the past 20 years, the known distribution range of the species has been enlarged by about 26% compared with the distribution map made in 1978 (Cheng, Tan, Lu, Tang, Bao & Li 1978), and now comprises an area of 155,000 km² (Fig. 1). The present information suggests the range of the species to consist mainly of areas in eastern Tibet and northern Yunnan, including Deqin (Deqen) and Zhongdian in Yunnan (Xu 1983, He & Ceng 1987), and Leiwuqi (Riwoqu), Mangkang (Markam), Changdu (Qamdo), Jiangda (Jomda), Gongjue (Gonjo) (Li 1996), and Jiali in Tibet (Lu 1997).

The most recently discovered site in the county of Jiali (Lu 1997) is situated 350 km west of the previously known range. This site is at the western edge of the mountain conifer forest in Tibet (Ministry of Forestry of China 1990), and most probably, it is therefore also at the western edge of the distribution area of Chinese grouse in Tibet. I suggest that the distribution of Chinese grouse in Tibet should be considered to include the mountain conifer forest along several rivers, the Jinsha River (the upper part of the Yangtse River), the Lancangjiang, Nujiang and Yigongzangbu Rivers. I al-

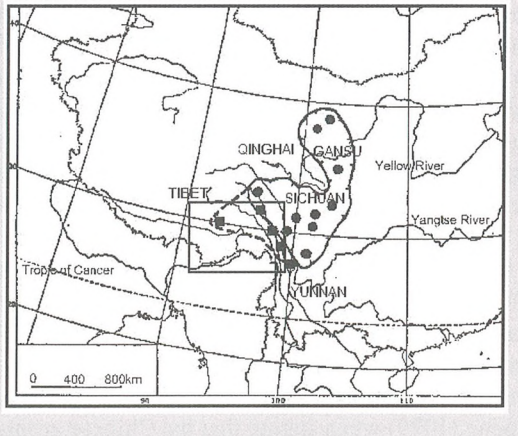


Figure 1. Distribution of Chinese grouse with indications of the former distribution areas according to Cheng (1978; ●) and new distribution areas outside its former range (■). The dotted line delineates the new distribution area, which is situated mainly in Tibet, and the square the area shown in more details in Figure 2.

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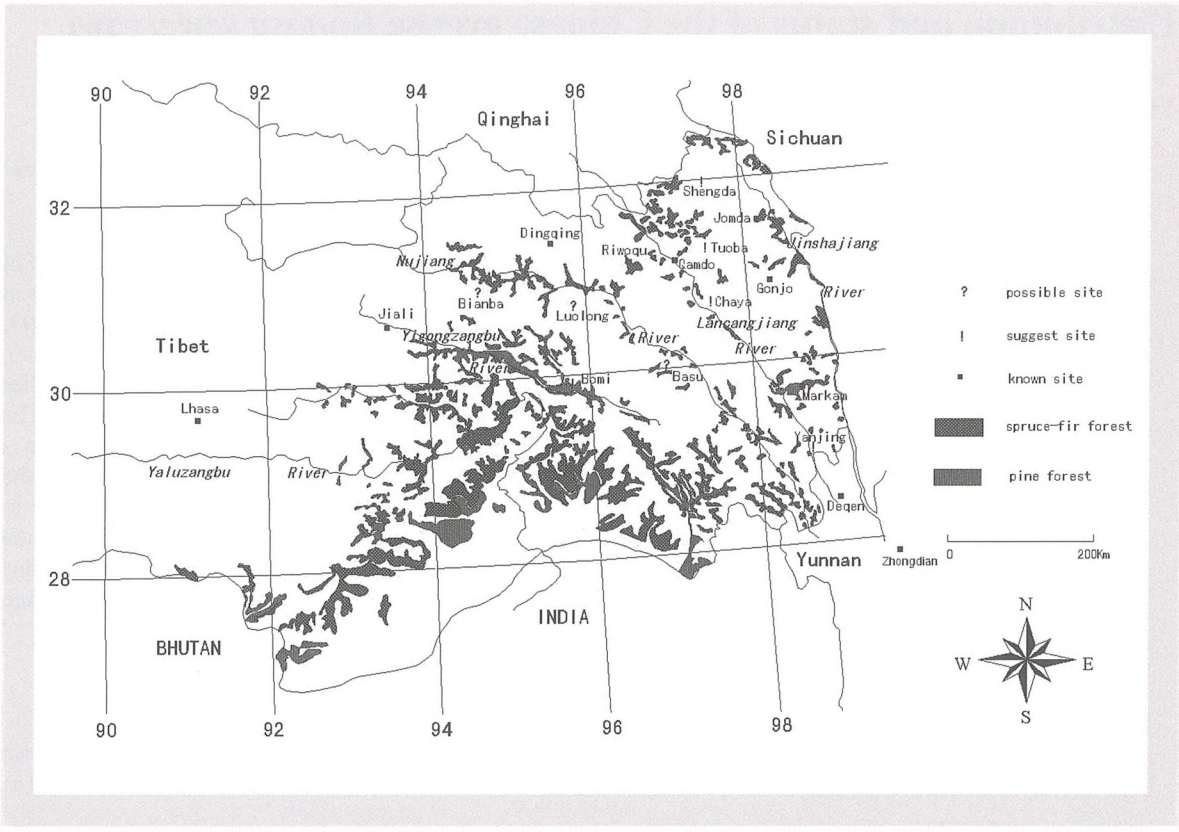


Figure 2. Forest distribution map in Tibet with indications of known Chinese grouse distribution areas (■, Riwoqi, Markam, Qamdo, Jomda, Gonjo and Jiali), suggested distribution areas (!; Tuoba, Shengda, Chaya, Yanjing and Bomi), and possible distribution areas (?; Bianba, Luolong and Basu). The spruce/fir areas along the Yaluzangbu River could also be considered as a potential distribution area.

so believe that Tuoba, Shengda, Chaya (Zhag'yab), Yanjing and Bomi could be occupied by Chinese grouse, and Bianba, Luolong and Basu at the upper parts of the Nujiang River may also be inhabited by the species (Fig. 2). Suitable spruce/fir forest areas (mainly *Abies spectabilis* and *Picea likiangensis*) exist along the Yaluzangbu River. However, because few scientific investigations have been conducted in this area, it should only be considered as a potential distribution area at this time. A thorough survey of the area is urgently needed.

I suggest that the distribution of the Chinese grouse should be considered to correspond to the distribution of mountain conifer forest at altitudes between 2,400 and 4,300 m a.s.l. in Gansu, Qinghai, Sichuan, Yunnan and Tibet in central China. Johnsgard (1983) quoted Cheng (1979) when stating that the Chinese grouse is generally found at altitudes above 1,000-1,200 m a.s.l. Actually Cheng (1979) did not mention this species specifically; he described the general fauna in the higher parts of the temperate forests, including goldcrest *Regulus regulus* and tree creeper *Certhia familiaris*. In my opinion the Chinese grouse cannot be found at such low altitudes.

Population density

The Chinese grouse has previously been thought to be uncommon and declining in numbers throughout its range (Li 1996). In the provinces of Qinghai and Gansu, the population density has been reported to be 1.2-3.5 birds/km^2 (Liu & Wang 1987). Furthermore, population densities have been estimated at 9 birds and 1.5-3.0 pairs/km^2 in Yunnan (Xu 1983, He & Ceng 1987) and 0.27-2.0 birds/km^2 at the Baihe Natural Reserve in Sichuan (Shi 1986).

All these estimates are based on line transect censuses. But as the timing and methods have been quite different, the results might not be mutually comparable and should only be considered as approximates. A similar

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estimate from Lianhuashan in Gansu was 1.2 birds/km² (Wang 1990), in the area where we later made radio-tracking studies. Our results, using the territory plotting method during the breeding season in spring, yielded an average density of about 25.8 birds/km² during 1995-1998 (Y-H. Sun & Y. Fang, unpubl. data), and showed that the population was stable. As the Chinese grouse is a relatively secretive and quiet bird, the line transect method may not be very reliable, especially during the non-breeding season.

As male Chinese grouse hold territories of only 1.4-3.2 ha (Sun & Fang 1997), it is possible to have a high density of birds in good habitats. He & Ceng (1987) reported that 4-6 pairs were found in alpine willow shrubs within an area of less than one hectare around 3,400-3,600 m a.s.l. in Zhongdian, Yunnan. My impression is that the population density at Lianhuashan in Gansu, where the forest was slightly disturbed in the past, is higher than that in old conifer forest, such as the virgin forest in Jiuzhaigou. I suggest that all the estimates mentioned above that are based on the line transect method should be considered as underestimates.

Habitat requirements

Stresemann, Meise & Schönwetter (1938) reported that the Chinese grouse inhabit the mixed woods and juniper woods of the northern Himalayas. The habitat in northwestern Yunnan was described as the alpine conifer forest and willow shrubs between 3,400 m and 3,900 m a.s.l. (Xu 1983). In the habitat of the Chinese grouse at Jiali, Tibet, the dominant coniferous tree was cypress *Sabina tibetica*, interspersed with deciduous trees such as *Quercus aquifolioddles*, and shrubs of willow *Salix* spp. and birch *Betula platyphylla* (Lu 1997).

Based on this, I suggest that the habitat requirements of Chinese grouse include two main factors: one is the cover provided by coniferous trees, such as spruce, fir or cypress in different areas; the other is food provided by deciduous trees and shrubs, mainly of willow. Based on our ecological study at Lianhuashan, second-growth forest served in part as winter habitat for Chinese grouse. However, all the nests we found were in the conifer forest or mixed conifer-deciduous forest, suggesting that second-growth forest itself could

Table 1. Names of reserves, coordinates, locations and sizes of protected areas within the distribution range of the Chines grouse (CG).

Province	Reserve name	Coordinates	Location	Total size (ha)	Forest size (ha)	CG recorded
Gansu	Qilianshan	36°45'-38°30'N 98°55'-103°23'E	Zhangye	26534231	424548	+
	Zhulingou	36°42'N 103°18'E	Yongdeng	6306	1892	+
	Lianhuashan	34°32'-35°34'N 103°44'-103°48'E	Kangle	12551	3765	+
	Guozhagou	34°29'-34°33'N 103°08'-103°11'E	Zhuoni	2687	806	+
	Gahai-Zecha	34°08'-34°18'N 102°18'-102°20'E	Luqu	247431	14150	+
	Baishuijiang	32°36'-32°59'N 104°17'-105°25'E	Wen	213750	42750	
Qinghai	Beishan	36°50'N-102°10'E	Huzhu			+
	Mengda	35°42'-35°50'N 102°36'-102°43'E	Xunhua	9544		+
Sichuan	Jiuzhaigou	32°55'-33°16'N 103°46'-103°59'E	Jiuzhaigou	60000		+
	Baihe	33°11'-33°17'N 104°02'-104°12'E	Jiuzhaigou	20000		+
	Wolong	30°45'-31°25'N 102°52'-103°24'E	Wenchuan	200000		+
	Tangjiahe	32°32'-32°41'N 104°37'-104°53'E	Qingchuan	40000		
	Wanglang	32°49'-33°02'N 103°55'-104°10'E	Pingwu	27700		
	Huanglongsi	32°41'-32°54'N 103°44'-104°08'E	Songpan	40000		
	Xiaozhaizigou	32°02'-32°08'N 103°48'-103°58'E	Beichuan	6000		
	Fengtongzhai	30°19'-30°47'N 102°48'-103°03'E	Baoxing	40000		+
Yunnan	Baimaxueshan	27°47'-28°36'N 98°57'-99°21'E	Deqing	180000		+
	Habaxueshan	27°10'-27°23'N 100°02'-100°14'E	Zhongdian	21907		+

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not serve as year-round habitat for Chinese grouse (Y-H. Sun & Y. Fang, unpubl. data).

Present status and current conservation measures

Based on the forest distribution map of China (Ministry of Forestry of China 1990) it is evident that most Chinese grouse habitats were connected in the past. However, due to intensive forest cutting of the virgin forest during the past decades, these habitats are now isolated and fragmented. In the province of Gansu, for example, the total area covered by conifer forest declined by 28% from 7,191 km^2 to 5,171 km^2 from the start of the survey conducted during 1984-1988 to the end of the survey conducted during 1989-1993 (Editing Committee 1995).

The Chinese grouse has been listed in Category I in the National Protected Animals since the 1960s and is also listed in the China Red Data Book of Endangered Animals (Zheng & Wang 1998). At present, some protected areas have been established within the distribution area of the species (Table 1).

The natural reserves in Sichuan were designed to protect the giant panda *Ailuropoda melanoleuca* (Mackinnon, Sha, Cheung, Carey, Zhu & Melville 1996). However, the design also helps the Chinese grouse and the local forest ecosystem. Reserves are considered to be critical for the survival of the species, and their present effectiveness is judged to be high. Some reserves situated within the species' distribution range have not yet been surveyed for Chinese grouse. Surveys should be conducted in these reserves, and the connectivity of habitats between the protected areas should be documented.

Protecting virgin forest in the species' distribution range is critical for the protection of the Chinese grouse. Our investigations suggest that the Chinese grouse is able to survive in selectively cut forests (Sun, Fang, Jia, Wang, Klaus & Scherzinger 1999), but the density of the species is affected by selective cutting of forest. The problem is that we do not know to what degree selective cutting affects the density of Chinese grouse. The most straightforward way to achieve this information would be to conduct surveys in the habitats before and after selective cutting of forest at different levels of intensity, and the results of such surveys could be used for conservation measures.

Although the newly discovered sites have enlarged the known distribution range of the Chinese grouse, the actual distribution area has probably become greatly reduced since the advent of large-scale forest clearances in historic times, especially in Sichuan and Gansu. In recent times, the habitat has become still more fragmented, and the species has disappeared from parts of its range. So, we must first conduct surveys in the reserves where the species might be found, and then study the connectivity of the reserves to the present protected areas. Additional areas of significance for the species' survival and conservation should then be identified and protected.

The Chinese government stopped cutting the virgin forest in Sichuan and Gansu in October 1998 after a big flood that summer. I believe that the Chinese grouse will benefit from this decision and I foresee a better future for the species in this region.

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