

DISTRIBUTION OF PRIMATES (except *Macaca*) IN CHINA

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Abstract

This Paper intends to present a summary on distribution of primates in China from a viewpoint of dynamic zoogeography, except macaques (*Macaca*) which has been given by a resume recently. None or very rare fossil forms of *Presbytis*, *Nycticebus* and *Rhinopithecus* have been found in China. The known fossil records and historically ancient-literatural informations of *Hylobates* indicate a much wider range of the gibbon in Pleistocene and historical time. Currently, most of the primates are suffering local extirpation and thus result in shrink of range in terms of geographical distribution.

Key words Gibbon (*Hylobates*), Slow loris (*Nycticebus*), Golden monkey (*Rhinopithecus*), Leaf monkey (*Presbytis*), Geographical distribution, Historical distribution

Introduction

A paper dealing with distribution of macaques (*Macaca*) in China has been presented by the authors (Zhang et al., 1991). The present paper could be treated as its continuation to complete the description on all the groups of primates in China from the same view point of the previous paper, the dynamic zoogeography.

Except Macaques (*Macaca*), the primates in China are belonging to 3 Families 12 species.

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1. Lorisdae *Nycticebus* 2 species.
2. Cercopithecidae *Rhinopithecus* 1 or 2 species.
- Presbytis* 4 species.
3. Pongidae *Hylobates* 4 species.

Unlike the macaques which extends to warm-temperature zone of North China, all of them are distributed mainly restrictedly in tropical or southern subtropical zone of Southern China.

The limited factors to northward dispersal of living primates in China have been suggested to be (1) temperature, (2) food supply relative to vegetation types and (3) amount of daylight. The decline of the extant primate fauna from south to north in eastern China, may be having a general correlation to these factors (Zhang et al., 1981). Traced back to Quaternary and historical time, the geographical range of fossil species of the primates in China indicates a complex course rather than a simple history as a movement of southward flinch during Quaternary. Each group of them exhibits different amplitude of the movement but indicates a general tendency corresponding the climate change (Table 1).

Table 1 Distribution and change of the primates in China (based on information from Huang 1979, Zhang 1988)

表 1 中国灵长类的分布和变化(根据黄万波1979, 张荣祖1988年资料)

North China 华北	Pleistocene 更新世			Holocene historical time 全新世历史时期	Recent 近 代
	Early	Middle	Later		
	<i>Macaca</i>	<i>Macaca</i>		<i>Macaca</i>	<i>Macaca</i> (relic)
Central China 华中	<i>Macaca</i>	<i>Macaca Rhinopithecus</i>	<i>Macaca Rhinopithecus</i>	<i>Hylobates Macaca Rhinopithecus</i>	<i>Macaca Rhinopithecus</i> (relic)
Central South China 华南中部	<i>Hylobates Macaca</i>	<i>Hylobates Macaca Rhinopithecus</i>	<i>Macaca Rhinopithecus</i>	<i>Hylobates Macaca Rhinopithecus</i>	<i>Macaca</i>
South China 华南	<i>Macaca</i>	<i>Hylobates Presbytis Macaca Rhinopithecus</i>	<i>Hylobates Macaca Rhinopithecus</i>	<i>Hylobates Macaca Rhinopithecus</i>	<i>Hylobates Presbytis Macaca Nycticebus</i>

Except the Hou (macaques), the Yuan (gibbon) was another famous subject occurring in ancient Chinese literature and county gazettes, while the others (golden monkey, Leaf monkey, Slow loris) are less or rare mentioned. Since serious deforestation and disappearance of natural habitats and considerable human impact including over hunting in last decades, the current populations of the all primate species dealt with in this paper have been considered to be in very endangered situation, as their strong dependency on natural broadleaf-forest habitats.

Distribution Change and Current Situation

1. Slow loris(*Nycticebus*)

Nycticebus is an element of Indo-China fauna and has two species ranging in the

eastern part of Indo-Chinese peninsula, *N. coucang* is distributed in a wider area throughout the region from Assam to Mindanao and onto the islands of the Sunda Shelf. The northern most extension of the species reaches into southern Yunnan and western Guangxi in China(fig. 1).

The first specimen of *N. coucang* was obtained by Chang Linchun (former Fan Memorial Institute of Biology Survey, Beijing) in the 1933 from Jianshui, and firstly its local name of "bee monkey" (*fenghou* in Chinese) because of stealing honey from honeycombs has been known. In the 1950s, this monkey is easy to be found in a wider area to the south of 23°N (in east)-25°N (in west) of Yunnan. As another local name "lazy Monkey" (*Lanhou*) indicating its slow motion and day-sleep habit cause it to suffer much damage by easy-hunting. But most serious diaster was due to deforestation during last decades. Currently, this monkey can be rare found in Jinping, Luchun, Pi-

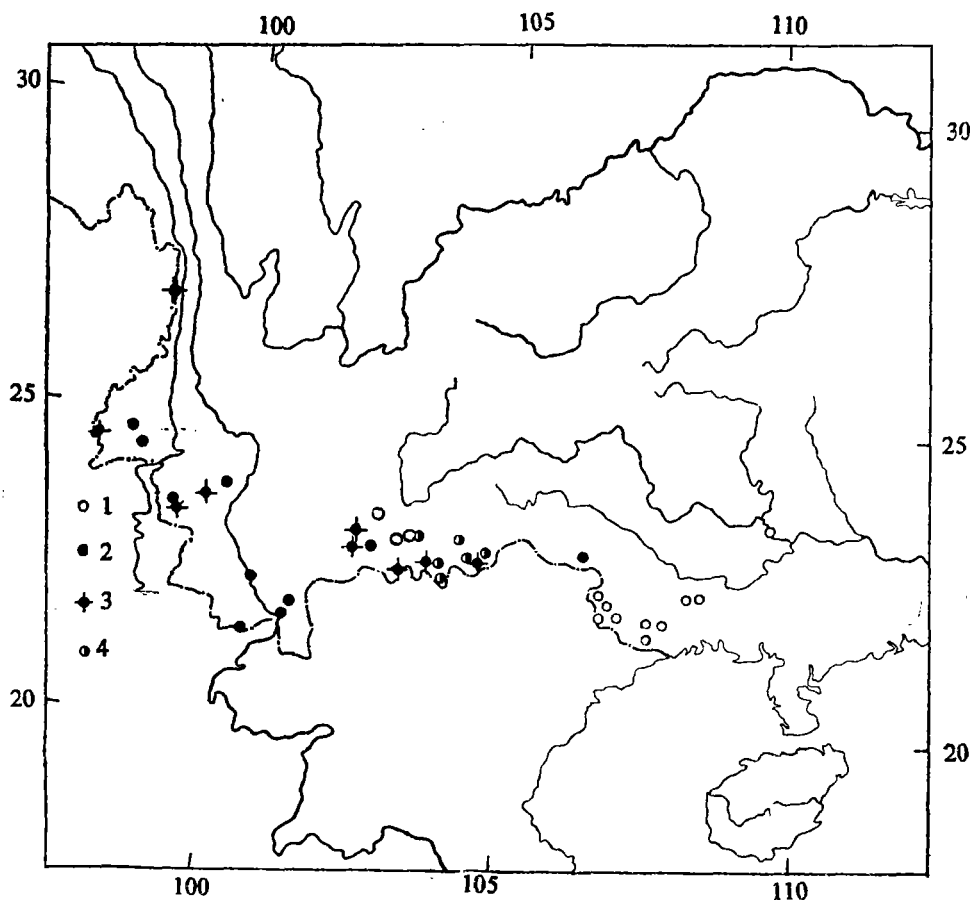


Fig.1 Current distribution of *Nycticebus* in China

图1 中国蜂猴的现代分布

- N. coucang*, 1—Recorded before, probably extirpated or very rare以前的记录, 也许已灭绝或很稀少,
2—Recorded before and still remain amount of population 以前的记录, 现在仍有一定数量的种群,
3—Protected by reserves 受到保护留下的种群,
N. pygmaeus, 4.

* According an unpublished paper written by Shaw Tsen-Hwang.

ngbian and Hekou. The individuals of population could be no more than a few hundreds (Ma et Wang, 1988). In Nu River Preserve which is located in Gaoligong Mt., western Yunnan, this slow loris is being protected (Division of Natural Conservation, MEPA of China 1989). In Guangxi, this monkey was recorded by a few captures from Longzhou, Ningming, Pingxiang, Guiping, Wuxuan from 1950s to the beginning of 1960s, no more has been discovered afterward. One has been captured from Jingxi much later (Wu, 1983).

N. pygmaeus ranges overlappingly with *N. coucang* but being restricted to the east of Mekong river approximately (Fig. 1). Five captures of this species in the 1986 have been got from Wenshan, Mengzi, Maguan (Quan et al., 1987), Daweishan and Pingbian (Ma et al., 1987). It is a very rare species in China.

One fossil gen. *Lorisiformes* of Pliocene has been found in Lufeng, central Yunnan (Qi, 1979).

2. Golden monkey (*Rhinopithecus*)

Prior to Ellerman and Morrison-Scott (1950), most Chinese writers have treated three forms of Golden monkey as three subspecies of *R. roxellana*, while some of them agreed that the *bieti* is an effective species. There are distributed separately in northwestern Yunnan (*bieti*), Guizhou (*brelichi*) and Sichuan (*roxellana*). Another species of the genus, *R. avunculus* ranges isolately in Tongking, northern Vietnam.

A fossil form *tingianus* of this genus found in Middle and Late Pleistocene deposit in China has been considered either a full species or a subspecies of the living species *roxellana* or *brelichi* by different scholars (Jablonski et Pan, 1988). Chinese scholars incline to treat it to be a subspecies of *roxellana* (Hwang, 1979; Wang et al., 1982). The known fossil localities of the species are distributed within the current range of living forms (Fig. 2).

Disjunctive distribution of the living species is characteristic of relictism. Their occurrence in middle mountainous or subalpine environment within horizontal subtropical zone has been explained as a result of the recent uplift of the Tibet plateau (Jablonski et Pan, 1988). With this change, apart from their morphologic differentiation, the habitats and habits of the three forms also exhibit distinct geographical diversity (Table, 2).

Golden monkey (*R. roxellana*)

Golden monkey (*R. r. roxellana*) ranges separately into three portions e. g. northern Hengduan Mts. Qinling Mt. and Daba Mts. (Fig. 2). In northern Hengduan Mts. this monkey is distributed in 16 counties in western Sichuan and 3 counties in Southern Gansu with the most abundant population. In most places of these areas this monkey share habitats with Giant Panda. Since 1963 to 1979, ten nature preserves with priority to Giant Panda have been established, the golden monkey also shares the protection in seven of them. One preserve named Baihe particular to the golden monkey has been established in Nanping, northeast Sichuan in 1963.

In Qinling Mts, Shaanxi province, before 1950s, the range of this monkey was much wider, along the ridge between Han River and its tributary Dingan River, the juncture of Taibai, Fuping, Yangxian, Zhouzhi, Ningshan. A field survey in 1976 estimated the total population of the golden monkeys in these areas was more than

Table 2 Comparison of ecological characteristics of the three subspecies of *R. roxellana* (According Pan et al, 1985; Mu et al, 1982; Chen et al, 1983; Quan et al, 1981; Shi et al, 1982)

表 2 金丝猴的3个亚种生态特性比较(根据潘文石等, 1985; 木文伟等, 1982; 陈服官等, 1983; 全国强等, 1981; 史东仇等, 1982)

Vertical distribution(m) 垂直分布(米)	<i>bieti</i>	<i>roxellana</i>		<i>brelichi</i>
	3350—4000	Hengduan Mt. 横断山	Qinling Daba Mt. 秦岭大巴山	1400—1800
		2000—3000	1400—2600	
Annual mean Temperature (°C)年均温	4.7	6.3	10—13	9—11
Vegetation 植被	coniferous forests 针叶林	mixed conif.-broadleaved F. 针阔混交林	Broadleaved F. 阔叶林	Broadleaved F. 阔叶林
Food condition 食物条件	Stable 稳定	Seasonal variation 季节变化	Seasonal variation 季节变化	Stable 稳定
Group size 群数量	2—40—100 or more	1—20—60	1—20—300	2—8—30—100
Seasonal change of group size 群数量的季节变化	no	present	—	no
Sexual ratio of adults(male:female) 成体性比(雄:雌)	1:2	1:2	1:2:7 1:1.6	—
Age structure (Adults:subadults:Juveniles) 年龄结构(成体:亚成体:幼体)	1:1:5	2:1	1:3 1:9:1	—

2000. Due to deforestation, highway construction and overhunting, the animals remain about 1000 taking refuge protected in the northern slope of Qin Mt. in Zhouzhi (Cheng et al., 1982).

In Daba Mts, the golden monkeys ranging in Shennongjia, the highest peak of the mountains. The group size of the monkeys ranging from several dozen up to 300—400 were apparently encountered (Tan, 1985). A natural preserve has been established particularly for protection of the monkeys in the peak, three groups with more than 500 individuals have been observed in 1980 (Hu Hongxin et al., 1980*).

Guizhou golden monkey (*R. r. brelichi*) ranges mainly in Guizhou province. The first report of this monkey was given by Thomas in 1903 (Allen, 1935). An early gazette (1909) mentioned that, this animals could be found in Tongren, Sinan and Shiqian, northeastern Guizhou. Trapping this animals for zoo was carried out since the beginning of 1960s from the area of Fanjing Mt, the highest peak of Wuling Mts., where was the only place with rather abundant population. In 1978 a preserve for pr-

* A study on *Rhinopithecus r. roxellana*. (unpublished)

tection of the monkeys particularly has been established in Fanjing Mts. The individual number of *brelichi* have been estimated about 200 in 1970s (Quan et al, 1981) and about 300—500 until the beginning of 1980s (Xie et al, 1982). A report said, this animal could be also found in Jinfu Mts. Nanchuan in Sichuan province, to the north of Fanjing Mts (Hu Jinchu, 1982).

Yunnan golden monkey (*R. r. bieti*) is distributed only in Yunnan province. Since first discovering in 1871 from Deqen (Atuntze), northwestern Yunnan and nominated in 1887 (Allen, 1938), near hundred years, no more information of this golden monkey has been obtained, except several skins purchased from the same area in 1962 (Li et al., 1981). A field survey carried out in 1979 by Kunming Institute of Zoology, Academia Sinica, has reconfirmed the existing of the animals. As known before (Allen, 1938) *R. r. bieti* is distributed in an area limited in the range between Jinsha River and Lancang River, extending from 26°30'N to 31°N. There is no evidence to indicate recent change of the distribution.

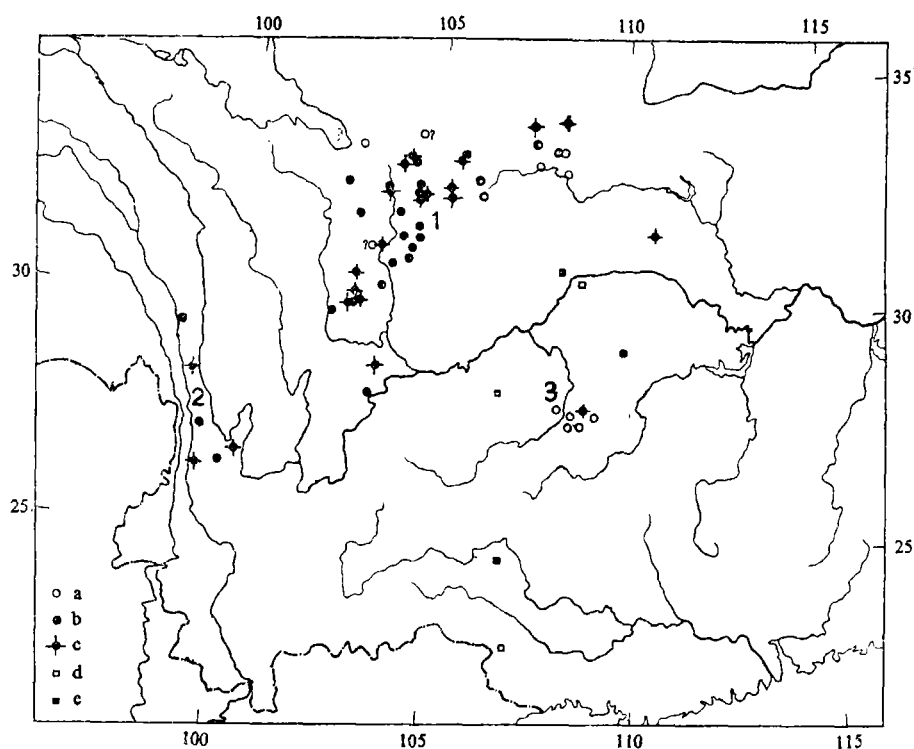


Fig.2 Current distribution of *Rhinopithecus roxellana*

图2 金丝猴的现代分布

1. *R. r. roxellana* 2. *R. r. bieti*, 3. *R. r. brelichi*

a. Recorded before, probably extirpated 以前的记录, 也许已灭绝;

b. Recorded before and still remain certain amount of population 以前的记录, 现在仍有一定数量的种群;

c. Protected by reserves. 受到保护留下的种群;

d. Fossil found in age of Mid-Pleistocene 更新世中期发现的化石;

e. Fossil found in age of Mid-late Pleistocene 更新世中晚期发现的化石。

(Fossil records cited from Wang 1982, Jablonski et Pan 1988).

3. Leaf monkey (*Presbytis*)

In East Asia today, the *Presbytis* comprises a diverse, widespread, sixteen species and as a biggest genus of Colobinae. Four of these species have their ranges mainly located in Indo-Chinese peninsula and extend to southern China, where they reach the northmost margin of their range. Except *P. francoisi* spreading locally to subtropical zone, they are limited within tropic zone. All of them range in allopatric pattern in China.

A fossil *Presbytis* of Late middle Pleistocene has been found in Luoding of Guangdong province (Huang et al, 1988). A local name of heiyehou (black leaf monkey) has been noted in county gazette of Yongning, Guangxi in 1937. It is a mere record known in ancient literature until now*.

Black Leaf Monkey (*P. francoisi*)

P. francoisi have a distribution, occurring from central Laos, through northern Vietnam northward to Southern China. In China the distribution of the monkeys covers an area through more than twenty counties in western Guangxi and four counties in southwest corner of Guizhou. An isolated fragment of its range is located at another corner in three counties of northeastern Guizhou (Fig. 3) Two subspecies *P. f. francoisi* and *P. f. leucocephalus* have been recognized. The range of *francoisi* is much wider, but eventually fragmentary, while the *leucocephalus* confines in a rather small area between Zuo River and Ming River tributaries of Xi River. The total numbers of

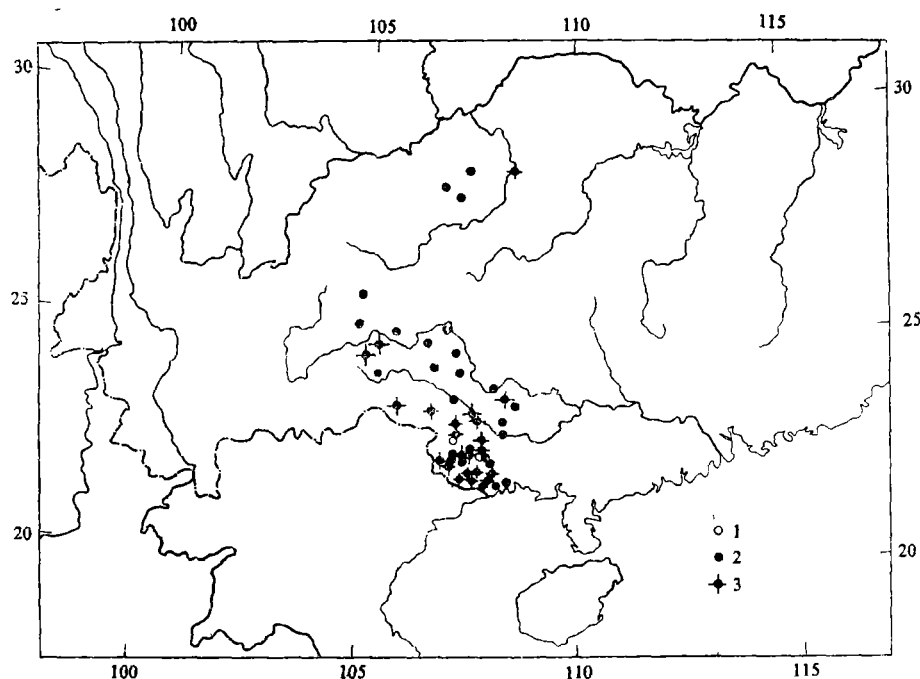


Fig.3 Current distribution of *Presbytis francoisi* in China

图3 黑叶猴的现代分布

1. Recorded before, probably extirpated, 以前的记录, 现在也许已灭绝;
2. Recorded before and still remain certain amount of population, 以前的记录, 现在仍有一定数量的种群;
3. Protected by reserves, 受到保护留下的种群。

* Information provided by South China Institute of Endangered Animal (Guangzhou).

francoisi and *leucocephalus* are estimated about 4000—5000 and 400 respectively in Guangxi (Wu, 1987).

Capped Langur (*Presbytis pileata*)

Capped langurs are distributed mainly in Assam and Burma. The first true specimen of this species collected by Li et Lin (1983) from the area of Dulong River upper reach of Enmeikai River. It is likely a northeast most distributional record of this monkey (Fig. 4).

Himalayan Langur (*Presbytis entellus*)

Himalayan langurs are distributed in Indian continent and island Srilanka. The northmost margin of the range extends to southern flat of Himalaya (Fig. 4)

Along Chinese-Nepal border, the langur is living in evergreen forests below 2800m. It has been recorded in the areas of Zhangmu, Yadong Kamaqu, Jilong and Motuo (Fig. 4), in Xizang (Tibet), China (Fang et al., 1986).

Phayre's Leaf monkey (*Presbytis phayrei*)

Phayre's leaf monkeys range mainly throughout Burma, Thailand and Vietnam. In China, this monkeys were collected firstly from the area of Namting River, Yingjiang and Hongmushu Pass, Tengchong and nominated by synonym of *P. obscura* (Li et Lin, 1983). Since the end of 1950s. it has been reported from the area of Honghe Prefecture (Zhang et al., 1958), Xishuangbanna Jingdong, Baoshan Luxi, Tengchong Yingjiang (Li

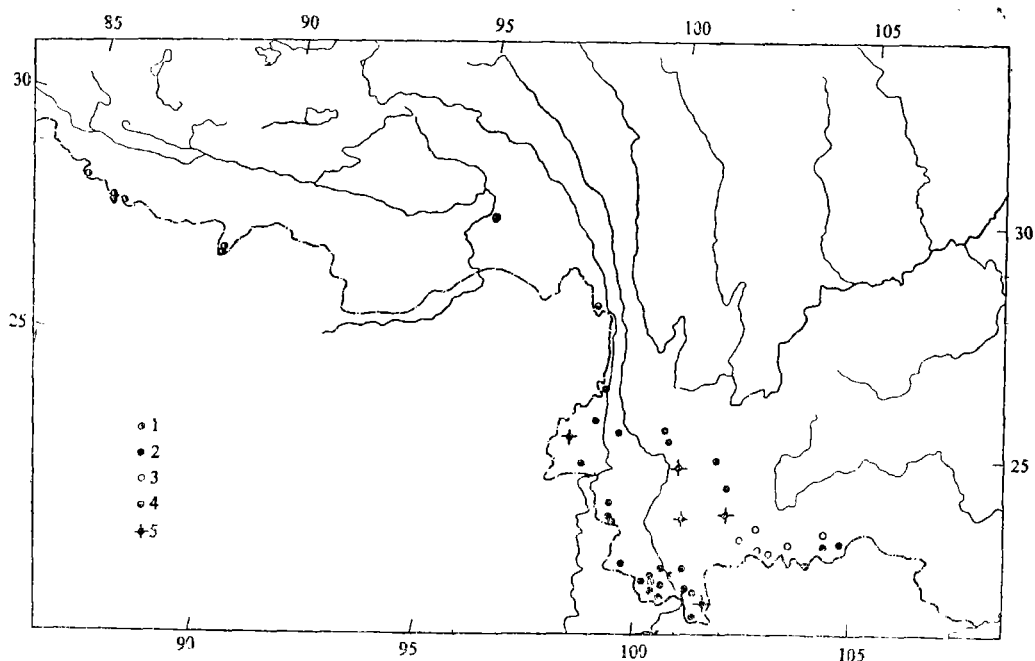


Fig.4 Current distribution of *Presbytis entellus*, *P. phayrei* and *P. pileatus* in China
图4 长尾叶猴等在中国的现代分布

P. entellus: 1.

P. phayrei: 2—Recorded before and still remain certain amount of population,
以前的记录, 现在仍有一定数量的种群;

3—Recorded before, probably extirpated, 以前的记录, 现在也许已灭绝;

5—Protected by reserve, 受到保护留下的种群;

P. pileatus: 4

et Lin, 1983), and Cangyuan (Yang, 1986)*. According a field survey in Honghe Prefecture, this monkeys could be extirpated in most places and remain a few relics in Jinping, Yuanyang and Luchuan (Fig.4). About 11,500—17,000 individuals of phayre's leaf monkey in Yunnan have been estimated (Ma et Wang, 1988).

4. Gibbon (*Hylobates*)

Being an endemic genus of southeast Asia and comprising five—six species, the gibbon has a range confined largely to Indo-Chinese peninsula and its adjacent islands in an allopatric pattern. Four species of them, *H. hoolock*, *H. concolor*, *H. leucogenys* and *H. lar* extend northward into China, the northmost margin of their present distribution (Ma et al, 1988). The limitation is coinciding with habitat of tropical rain forest or monsoon rain forest and succeeded vertically by evergreen broadleafed subtropical forests. So far, the fossils of gibbon discovered in China could be referred to the extant two species, *H. hoolock* and *H. concolor* (Chen, 1986; Gu, 1986). The fossil evidence shows that the gibbons ranged much further northward to the area of Yangtze River around 31°N, during Early and Middle Pleistocene corresponding to tropic climate of that time. The fossil records of Late Pleistocene have been found mostly to be confined to the south of 25°N, when the tropic climate zone almostly withdraw out of the continent (Fig. 5).

The massive migration of human population from north China to central China

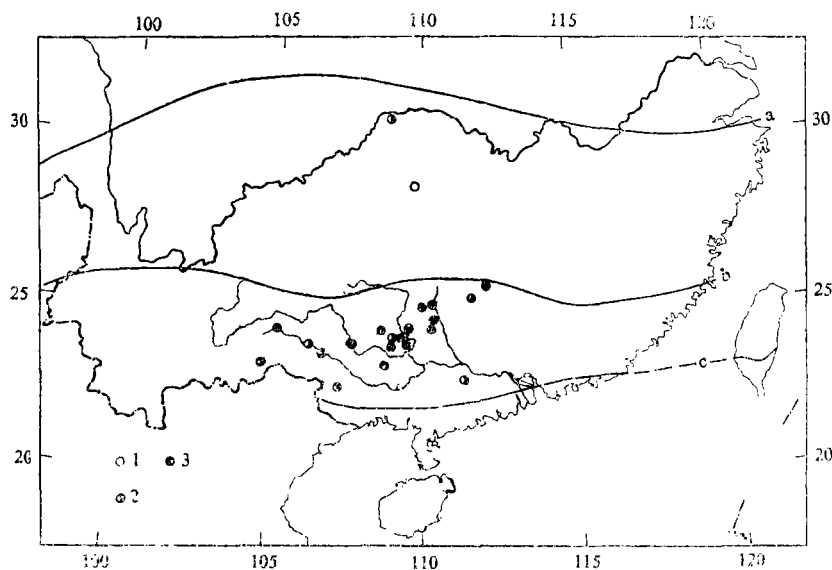


Fig.5 Distribution of fossil *Hylobates* in China location of fossil recorded

图5 长臂猿化石在中国的分布

1. Early Pleistocene, 更新世初期; 2. Middle Pleistocene, 更新世中期;
3. Late Pleistocene, 更新世晚期

Northern limit of the tropical zone, 热带的北限

- a. Early Pleistocene, 更新世初期; b. Middle Pleistocene, 更新世中期;
- c. Late Pleistocene, 更新世晚期

(Cited from Liu et al., 1984; Gu, 1986; Chen, 1986 and Huang et al., 1988).

* Yang Dehua: Report on population of six rare mammals in Yunnan (unpublished).

since Song Dynasty (960—1126 A. D.) followed by serious deforestation might be the major cause of the flinch and disjunction of the gibbon's range in the area of middle reach of Yangtze River (Gao et al., 1981). In the south, reviewing from the description of county gazettes, the following summary could be led and shown in Fig. 6 .

1. The gibbons disappeared locally since 18 century and were extirpated totally in the end of 19 century in central east part and coast areas of Guangdong and Guangxi provinces. Most places of northern Guangdong, the gibbon could remain until the beginning of 20 century. Only a few places, such as Wuhua, Yangshan, Lianxian, the statement of Yuan occurred continually in 1930s.

2. In Guangxi, until 1910s—1940s, the Yuan has been mentioned in county gazettes covering a wide area, and disappeared since the late 19 century.

3. In Hainan, the Yuan noted in the gazettes could be traced back to 17 century and last to 1940s, while according interview with local hunters, the Yuan existed in at least five counties (Qiongzong, Dongfang, Baisha, Ledong, Changjiang) until 1960s. Now, only two isolated small populations remain in two isolated high peaks respectively in Changjiang and Ledong.

Hoolock gibbon (*Hylobates hoolock*)

The first published distribution record of Hoolock gibbon on border of Burma and western Yunnan was given by J. A. Anderson (1879). R.A. Andrews collected first series of specimens on Namting River and at Hongmushu Pass also on the border in 1917 (Allen, 1938). Since the beginning to middle of 1960s, series of specimens have been collected from the mountains of Tengchong by Kunming Institute of Zoology, Institute of Zoology (Beijing), Chinese Academy of Sciences and Beijing Natural Historical Museum. Yet two captures have been got from Ruili by Kunming Zoo (1984).

Current range (Fig. 6) of the gibbon was known confining to west of the Nujiang (Salween river) in Yingjiang, Tengchong, Ruili, Lianghe, Baoshan, Longchuan, Longlin, Lushui Luxi (Ma et Wang, 1986; Fooden et al., 1981) and living fragmentary in 34 localities with 47—54 groups and 176—209 individuals estimated (Yang et al., 1987). Several other estimates of the gibbon's population have been made, no more than 50 (Tan, 1985), 100—200 (Haimoff et al., 1987), 155—188 (Yang et al., 1987) and 100—150 (Ma et al., 1988). Probably, the population in Ruili and Longlin could be extirpated locally (Ma et Wang, 1988).

Black gibbon (*H. concolor*)

Dao (1983) and Ma et Wang (1986) have reviewed that 'pale-checked *leucogenys* must be treated as an effective species and two more new subspecies, *Jingdongensis* and *furvogaster* has been suggested by Ma et Wang. However, except *leucogenys*, we would like conservatively to agree with previous thinking of two subspecies *concolor* and *hainanus*, existing in *H. concolor*.

H. c. concolor is distributed broadest among Chinese gibbons, covering an area from northwestern Vietnam to Wuliang Mt. (24°50'N) and area of Lincang and Yongde (23°40'). An isolated sole group containing 5 individuals lived in Wayao, Baoshan (25°28'N), was killed totally in 1960. A Survey organized by Yunnan Forest Bureau during February—November, 1985, has reported that this gibbons occur in 44 places within 15 counties, but no detail information. Tan (1985) has stated that there were

6—7 groups of this gibbon in Wuliang Mt. and 4 groups in Ailao Mt. Recently, it has been confirmed that in Ailao Mt., the population of this gibbon remains less than 5 groups and 20 individuals. Ma et al. (1988) estimated that the area from Ailao Mt. to the border of Yunnan, where 40—60 black gibbon can be remaining and protected by 3 reserves in Huanglian Mt. Luchuan, Wuliang Mt. and Ailao Mt. (Fig. 6).

H. c. hainanus was distributed wider over most of the area in Hainan island (Fig. 6). But it only remains two isolated populations, one in Bawangling Nature Reserve with four social groups totalling 21 individuals, another in Limu Mt. with unknown situation (Lin et al., 1984, 1989).

White-Cheeked Black gibbon (*H. leucogenys*)

H. leucogenys is characterized by distinctly morphology and distributed in an over-

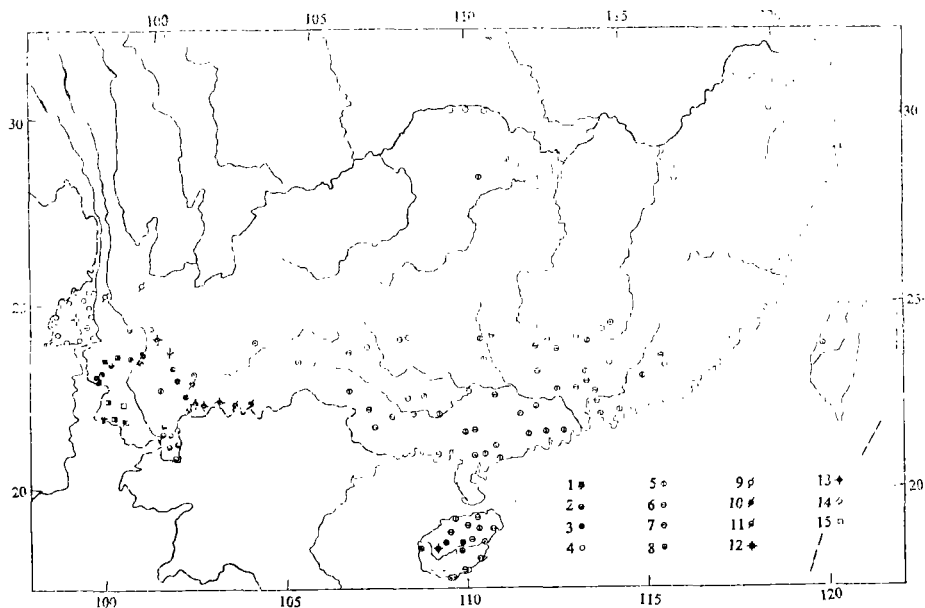


Fig.6 Historical and current Distribution of *Hylobates* in China

图6 中国长臂猿在历史上和现代的分布

Historical distribution* (the records in Fujian, Zhejiang, and Taiwan are not very confirmed), 历史上的分布(福建、浙江的记录, 台湾记录不很可靠)

Before 18ct: 7, before 19ct: 5, before 20ct 50s: 6, before 20ct 60s: 8

*Information provided by South China Institute of Endangered Animal (Guangzhou), 华南濒危动物研究所提供资料(广州)

Current distribution 现代分布

H. lar: 1—Recorded before and remain certain amount of population, 过去的记录, 现在仍有一定数量的种群;

12—Protected by reserve, 保护区内受到保护的种群;

15—Recorded before, probably extirpated, 过去的记录, 现在可能已灭绝;

H. leucogenys: 2—Recorded before and remain certain amount of population, 过去的记录, 现在仍有一定数量的种群;

11—Recorded before, Probably extirpated, 过去的记录, 现在可能已灭绝;

H. concolor: 3—Recorded before and remain certain amount of population, 过去的记录, 现在仍有一定数量的种群;

10—Recorded before, probably extirpated, 过去的记录, 现在可能已灭绝;

13—Protected by reserve, 受到保护留下的种群;

H. hoolock: 4—Recorded before and remain certain amount of population, 过去的记录, 现在仍有一定数量的种群;

9—Recorded before, probably extirpated, 过去的记录, 现在可能已灭绝

14—Protected by reserve, 受到保护留下的种群;

lapping range with *H. concolor* (Dao, 1983; Ma et Wang, 1986). This species of gibbon is relatively wider distributed in Indo-China, and occurs in Southmost area between Lancang River (Meiqong) and Yuan river (Red river) and Southeast corner Xishuangbanna south most Yunnan (Fig. 6). Said by local people before 1960s, this gibbon was not very difficult to be found in the area to the west of Yuan river and easy to hear its song in Xishuangbanna even near by big settlements (Gao et al., 1962). But since the beginning of 1980s, this gibbon probably, had disappeared totally in the area of Yuan river (Ma et al., 1987) and living in relic condition in Xishuangbanna due to serious deforestation and massive rubber plantation. An estimate of current total population in China is less than 100 (Ma et al., 1988), only one tenth of previous estimate of more than 1000 in 1960s (Tan, 1985).

White-hand or lar gibbon (*H. lar*)

The lar gibbon is mainly distributed in Thailand, Malaysia, Sumatra and Burma. A subspecies *H. l. yunnanensis* (Ma et Wang, 1986) inhabits in southwestern most Yunnan. The first series of specimens of this gibbon was obtained in Menglian, in 1964. Until now, this gibbon has been Known in 14 localities within Ximeng, Cangyuan and Menglian (Fig. 6). Based on a field survey in 1983, the total population of *H. lar* in China was estimated about 30—40 individuals (Ma et al., 1986, 1987).

Conservation

All the species of primates dealt with by this paper are treated to be top priorities of protection by Chinese government. According to the criteria of priority rating for conservation action set by the action plan plan for Asia primate conservation 1987—91 (IUCN/SSC) and actually current situation, they are referred to very distinct species (*Hylobates*, *Presbytis* and *Nycticebus*) and monotypic genus (*Rhinopithecus*) in terms of taxonomic uniqueness and must be assigned to a higher level in terms of degree of threat than the plan's suggestion of a general situation in Asia.

Endangered: *Rhinopithecus r. roxellana*, *Presbytis* spp, *Nycticebus* spp.

Highly endangered: *Hylobates* spp., *Rhinopithecus r. brelichi*, *R. r. bieti*.

There are 20 reserves focusing particularly on protecting of these primates.

<i>Presbytis francoisi</i>	Area(ha.)	level of management	
1. Chongzuo (Guangxi)	30000	County	1981
2. Daxin (Guangxi)	24000	County	1980
3. Fusui (Guangxi)	8000	County	1981
4. Nonggang (Longzhou, Guangxi)	8000	National	1979
<i>Rhinopithecus roxellana</i>			
5. Shennongjia (Hubei)	77333	National	1986
6. Baihe (Nanping, Sichuan)	20000	Provincial	1965
7. Fanjing (The juncture of Yinjiang, Jiangkou and Songtao, Guizhou)	38743	National	1986
8. Baimaxue Mt, (Deqen, Yunnan)	180000	National	1981
9. Yulonghabaxue Mt. (The juncture of Lijiang and Zhongdian, Yunnan)	52000	Provincial	1981

Hylobates concolor

10. Bawang Ridge(Changjiang, Hainan)	2133	Provincial	1980
11. Dawei Mt.(The juncture of Hekou and Pingbian, Yunnan)	14000	National	1981
<i>Hylobates hoolock</i>			
12. Tongbiguan (Yingjiang-Yunnan)	54000	Provincial	1981
<i>Hylobates concolor</i>			
13. Wuliang Mt.(Jingdong, Yunnan)	20000	Provincial	1981
<i>Nycticebus coucang</i>			
14. Laojun Mt.(The juncture of Maguan and Malipo, Yunnan)	4000	Provincial	1981
<i>Hylobates concolor</i>			
15. Huanglian Mt.(Luchun Yunnan)	14000	Provincial	1981
<i>Hylobates hoolock, Nycticebus coucang</i>			
16. Gaoligong Mt.(The juncture of Baoshan,Tengchong and Lushui, Yunnan)	124000	National	1981
<i>Hylobates concolor, Presbytis phayrei</i>			
17. Ailao Mt.(The juncture of Shuangbai Xinping, Chuxiong and Zhenyuan, Yunnan)	55000	Provincial	1981
<i>Presbytis phayrei</i>			
18. Tianchi(Yunlong, Yunnan)	7000	Provincial	1981
<i>Presbytis phayrei, Nycticebus coucang</i>			
19. Wei yuan(Jinggu, Yunnan)	8000	Provincial	1981
<i>Rhinopithecus roxellana, Nycticebus coucang</i>			
20. Nujiang(The juncture of Fugong, Bijiang and Gongshan, Yunnan)	422000	Provincial	1981
(From DNC/NEPA 1989)			

Conclusion

1. A very general review could be led from our preliminary examination of the fossil and historical records available up to date that most of the primates in China is characterized by a general tendency of southward flinch in terms of geographical distribution and taking fluctuation corresponding with the change of climatic zones. They withdrew southward most considerably during the period of Late Pleistocene.

2. The golden monkey (*Rhinopithecus roxellanae*) is an endemic species of China. The fragmentation of its range has been considered to be brought by the recent uplift of Qinghai-Xizang (Tibet) Plateau and resulted in taxonomic and ecological diversification.

3. All of the primates described by this paper are typical forest character species being very susceptible to habitat change by deforestation.

4. The preserves established particularly for the primates in China stand at island environment surround usually by considerable impact of human activities. Study on island biogeography of the preserves must be developed.

References

- Allen, G. M. 1938 The mammals of China and Mongolia, Part 1, N. Y., Am. Mus. of Nat. Hist. 299—304.
- Chen Fuguan, Min Zhilan, Gan Qufei, Luo Shiyu, Xie Wenzhi 1982. Resources and Protection of Golden monkeys in Qin mountains. *Chinese Wildlife* 2, 7—10.
- Chen Fuguan, Min Zhilan, Luo Shiyu, Xie Wenzhi 1983 An observation on the behaviour and some ecological habits of the Golden monkey (*Rhinopithecus roxellanae*) in Qin mountains. *Acta Theriologica Sinica* 3(2):141—146.
- Chen Xingbin 1986 New materials of Pleistocene mammalian fossil found in Hunan Province. *Vertebrate Palasiatica* 24(3):242—244.
- Dao Van Tien 1983 On the north Indo-Chinese Gibbons (*Hylobates concolor*) (Primates, Hylobatidae) in North Vietnam. *Jour. Hum. Evol.* 12, 367—372.
- Division of Natural Conservation, National Environmental Protection Agency (DNC/NEPA) of China 1989 A List of the Nature Reserves in China. Environmental Science Press. 1—112. Beijing.
- Ellerman, J. R., T. C. S. Morrison-Scott 1951 Checklist of Palaearctic and Indian mammals, 1758—1946. *Brit. Mus. (Nat. Hist.)*, London.
- Feng Zuojian, Cai Guiquan, Zheng Changlin 1986 The mammals of Xizang. Science Press, Beijing. 1—411.
- Fooden, J., Quan Guoqiang, Luo Yining 1987 Gibbon distribution in China. *Acta Theriologica Sinica* 7(3):161—167.
- Gao Yaoting, Wen Huanran, He Yeheng 1981 The change of historical distribution of Chinese Gibbon (*Hylobates*). *Zoological Research* 2(1):1—8.
- Gu Yumin 1986 Preliminary research on the fossil gibbon of Pleistocene, China. *Acta Anthropologica Sinica* 5(3):208—219.
- Haimoff, E. H., Yang Xiaojun, He Swingjing, Chen Nan 1987 Conservation of gibbon in Yunnan Province, China. *Oryx* 21:168—173.
- Hu Jinchu, Wang Youzi 1982 Sichuan Fauna economics, vol. 2:78—95. Sichuan Science and Technology Press, Chengdu.
- Huang Wanbo 1979 On the age of the cave-faunas of South China. *Vertebrate Palasiatica* 17(4):325—343.
- Huang Wanbo, Song Fangyi, Gua Xingfu, Chen Dayuan 1988 First discovery of *Megalopsis guangxiensis* and *Alligator sinensis* in Guangdong. *Vertebrate Palasiatica* 26(3):227—231.
- Jablonski, N. G., Pan Yuerong 1988 The evolution and palaeobiogeography of monkeys in China. In the palaeoenvironment of East Asia from the Mid-Tertiary, *Oceanography Palaeozoology and Palaeoanthropology* (P. Whyte, ed.). Centre of Asian Studies, Univ. of Hong Kong. 849—867.
- Kao Yuchting (Guo Yaoting), Lu Changkwun, Chang Chich, Wang Song 1962 Mammals of the Hsi-Shuan-Pan-Na area in Southern Yunnan. *Acta Zoologica Sinica* 14(2):180—196.
- Li Zhixiang, Lin Zhengyu 1983 Classification and distribution of living primates in Yunnan, China. *Zoological Research* 4(2):111—120.
- Li Zhixiang, Ma Shilai, Hua Chenghui, Wang Yinxian 1981 Distribution and habit of Golden monkey in Yunnan. *Zoological Research* 2(1):9—18.
- Liu dongsheng, Ding Menglin 1984 The characteristics and evolution of the palaeoenvironment of China since the Late Tertiary. The Evolution of the East Asia Environment, vol. Geology and Palaeoclimate. 11—40. Centre of Asian Studies, Univ. of Hong Kong.
- Liu Zhenghe, Yu Simian, Yuan Xicai 1984 Resources of the Hainan Black Gibbon and its present situation. *Chinese Wildlife* 6:1—4.
- Liu Zhenghe, Zhang Yungzu, Jiang Haisheng, Chariles Southwick 1989 Population Structure of *Hylobates concolor* in Bawanglin Nature Reserve, Hainan, China. *American Journal of Primatology* 19:247—254.
- Ma Shilai, Wang Yingxiang 1988 the taxonomy and distribution of the gibbons in southern China and its adjacent region with distribution of three new subspecies. *Zoological Research* 7(4):393—416.
- Ma Shilai 1988 The recent distribution, status and conservation of primates in China.

Acta Theriologica Sinica 8(4):250—260.

- Ma Shilai, Li Chongyun, Liu Guocai, 1987 The fauna and zoogeographical region of mammals in Honghe area. In "Report of bio-resources survey in Honghe", Yunnan. Institute of Kunming 1, Zoology et al. (eds) Yunnan National Press, Kunming. 33—40.
- Mu Wenwei, Yang Dehua 1982 A primary observation on the group figures moving lines and food of *Rhinopithecus bieti* at the east side of Baima-Snow Mountain. *Acta Theriologica Sinica* 2(2):125—131.
- Pan Wenshi, Yong Yange 1985 Biology of Golden monkey. *Chinese Wildlife* 6:10—13.
- Quan Guoqiang, Jin Jingyu, Huang Jinsheng, Zhong Yufu 1987 A new record of primate species in Chi na. *Acta Theriologica Sinica* 7(2):158
- Quan Guoqiang, Wang Song, Zhang Yongzu 1981 Current situation and protection of the primates in China. *Acta Theriologica Sinica* 1(1):99—103.
- Quan Guopiang, Xie Jiahua 1981 Notes on *Rhinopithecus roxellanae brelichi* Thomas. *Acta Theriologica Sinica* 1(2):113—116.
- Shi Dongchou, Li Guihui, Hu Tieqing 1982 Preliminary study on ecology of Golden monkey. *Zoological Reserch* 3(2):105—110.
- Tan Bangjie 1985 The status of primates in China. *Primate Conservation* 5:63—81.
- Wang Linghong, Lin Yufen, Chang Shaowu 1982 Mammalian fossils found in northwest part of Hunan Province and their Significance. *Vertebrate Palasiatica* 20(4):350—358.
- Wu Minchuan 1987 Distribution and ecology of black leaf monkey in Guangxi. *Chinese Wildlife* 4:12—13, 19.
- Xie Jiahua, Liu Yiming, Yang Yeqin 1982 Preliminary survey of the ecological condition of the Guizhou golden monkeys. in "Scientific survey of the Fanjing"mountain Preserve". China Environmental Science Press, Beijing, 215—221.
- Yang Dehua, Zhang Jiaying, Li Chun 1987 Preliminary survey on the population and distribution of gibbons in Yunnan Province. *Primates*, 28(4):547—549.
- Zhang Yongzu 1988 Preliminary analysis of the Quaternary zoogeography of China based on distributional phenomena among land vertebrates. In "The Palaeoenvironment" of East Asia from the Mid-Tertiary". vol. 2 Oceanography, Palaeozoology and Palaeoanthropology (P. Whyte ed.). Centre of Asian Studies, Univ. of Hong Kong. 883—896.
- Zhang Yongzu, Quan Guoqiang, Zhao Tigong, C. H. Southwick 1991 Distribution of Macaques (*Macaca*) in China. *Acta Theriologica Sinica* 11(3):171—185.

中文摘要

灵长类(除猕猴属外)在中国的分布

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本文从动态动物地理学观点对中国灵长类(不包括猕猴)的分布进行了分析, 提出: (1) 中国灵长类自更新世时的分布呈现向南退缩的总趋势, 并随气候的变迁而波动, 晚更新世向南退缩最为明显; (2) 根据Jablonski等认为, 我国特有种金丝猴的不连续分布, 是由于青藏高原抬升的影响。作者总结了迄今所知的金丝猴生态地理分化特点, 对此假说未提出异议; (3) 由于除猕猴以外的我国灵长类生态上与森林环境有密切联系, 而森林被破坏直接对灵长类在我国分布区的缩小与岛状断裂影响最大, 近期可能绝灭的地点甚多。

关键词 长臂猿; 蜂猴; 金丝猴; 叶猴; 地理分布; 历史分布