

CHINA

# 中国羚牛

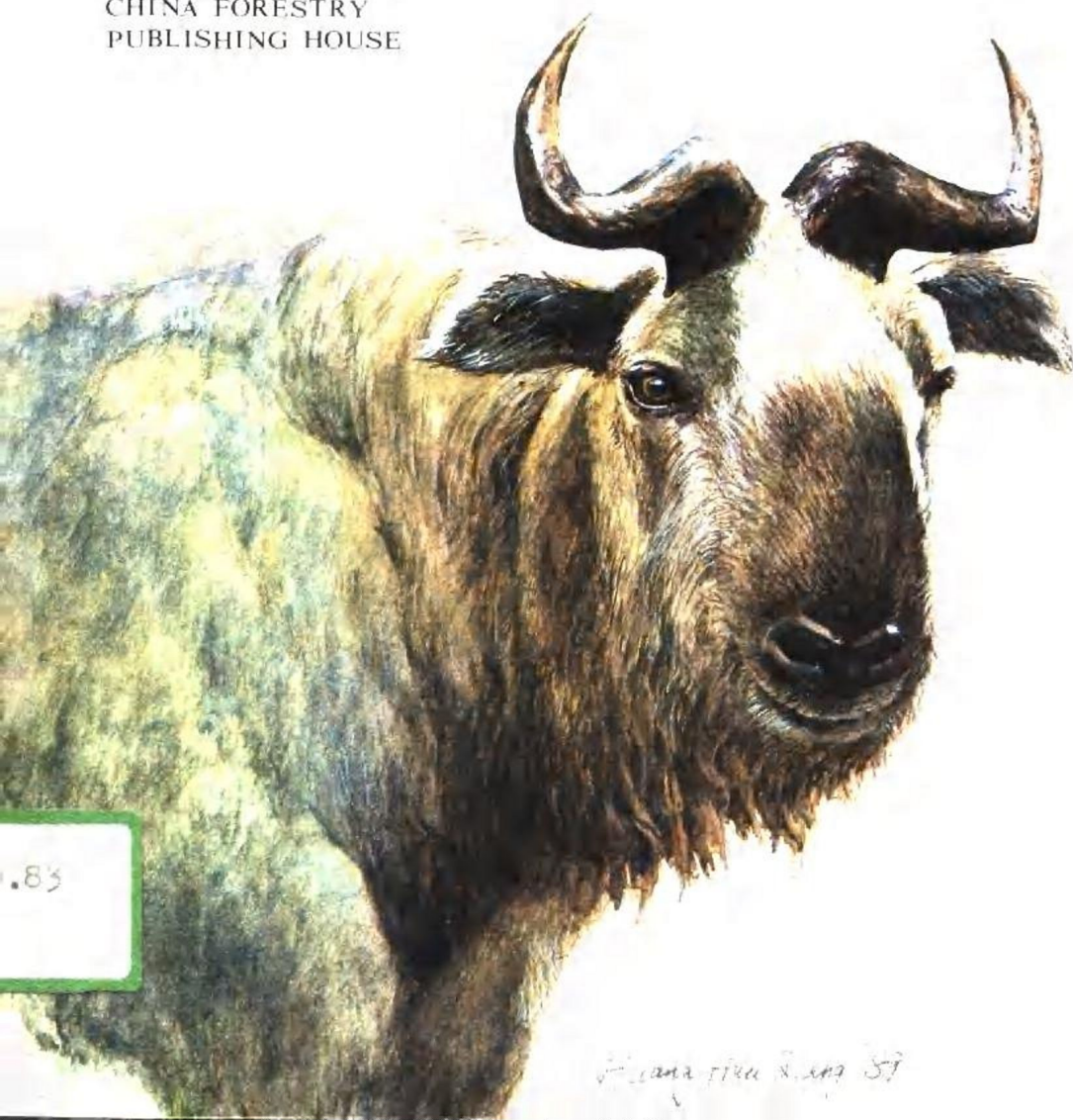
THE CHINESE TAKIN

吴家炎等 著

Wu Jiayan

中国林业出版社

CHINA FORESTRY  
PUBLISHING HOUSE



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# 中 国 羚 牛

吴家炎 等 编著

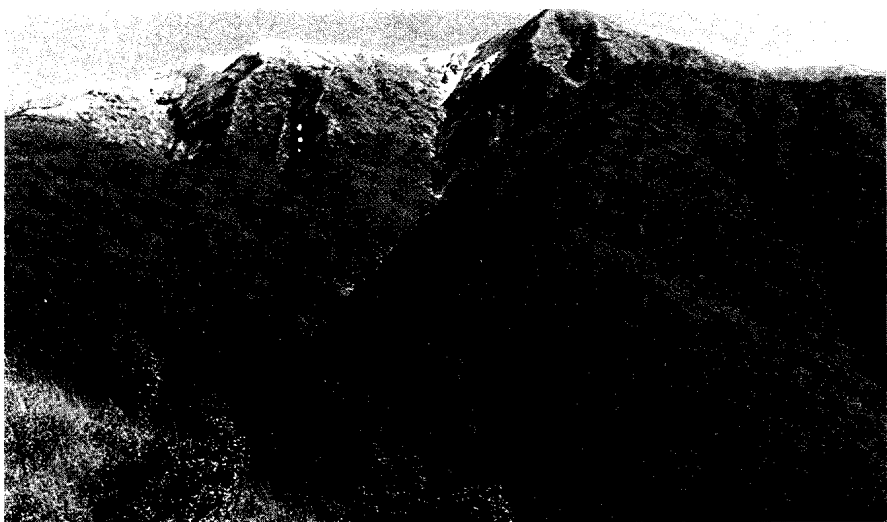
中国林业出版社出版 (北京西城区刘海胡同7号)  
新华书店北京发行所发行 中国科学院印刷厂印刷

787×1092 毫米 20开本 10.2印张 插页3页 21千字

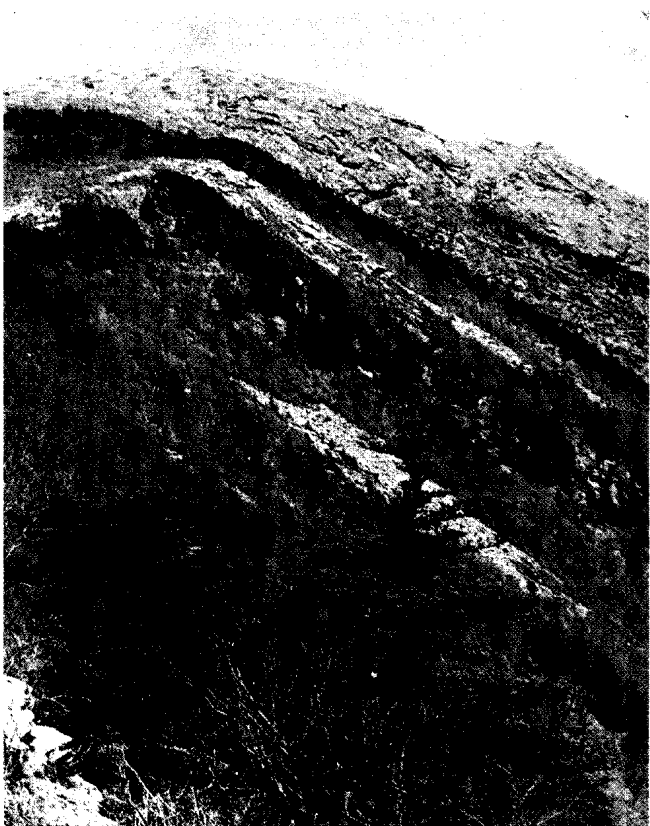
1990年2月第一版 1990年2月第一次印刷

印数1—1,500册 定价:10.50元

ISBN 7-5038-0516-1/Z·0047



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羚牛四川亚种的一只“独牛”

羚牛秦岭亚种的一个小族群





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四岁左右的雄性羚牛



单独行动的羚牛

觅食于混交林中的羚牛群







交配中的羚牛，其行为似羊。



一只约三岁的羚牛

冬季的粪便



夏季的粪便





羚牛 不丹亚种及其生境

# 前言

羚牛 (*Budorcas taxicolor* Hodgson 1850), 英名“Takin”, 属偶蹄目 (Artiodactyla)、牛科 (Bovidae), 为我国一类大型珍贵动物。仅产于亚洲大陆的印度、尼泊尔、不丹、缅甸及中国。在我国它的分布仅限于陕西、四川、甘肃、云南、西藏, 实际上是沿秦岭、岷山、邛崃山、凉山、高黎贡山、喜马拉雅山高海拔的山区地带分布, 与大熊猫 (*Ailurupoda melanoleuca*)、金丝猴 (*Rhinopithecus roxellanae*) 一道, 被称为我国高山林型三大珍贵动物之一。

羚牛起源于亚洲大陆北部, 其化石发现在山西榆社、河北泥河湾的上新世及河南安阳殷墟全新世的地层中。是少数古动物之一。

我国是这种珍贵动物资源最大的拥有国, 其分布区域最大, 亚种最多, 它的四个亚种(秦岭亚种 *B.t. bedfordi*、四川亚种 *B.t. tibetana*、指名亚种 *B.t. taxicolor*、不丹亚种 *B.t. whitei*)皆产于我国, 特别是秦岭亚种及四川亚种是我国的特有亚种, 国际自然与自然资源保护联盟 (IUCN) 公布的红皮书上列为珍贵 (Rare) 级, 由于对其情况所知甚少, 被称为“探险家羡慕的目标”。

羚牛的形态结构介于牛羊之间, 在分类上与北美麝牛 (*Ovibos moschatus*) 单独或统一于特殊的族群内。研究它们的结构机能与环境变化的关系, 不仅可以探索其分类进化及亲缘关系, 在理论上具有重要价值, 而且还可通过研究生态生物学, 血相学及解剖学进一步了解驯养及杂交的可能性, 从而为保护及利用提供新的途径, 在实践上也有一定意义。

从1964年开始, 陕西省动物研究所初步观察了秦岭羚牛模式产地太白山的羚牛生态, 1975年在秦岭地区珍贵动物调查中又重点调查了



秦岭主要产区羚牛的数量, 1979年为了了解西藏羚牛分布与生态在西藏东南部发现了羚牛不丹亚种的分布, 1981年调查并规划了陕西省柞水羚牛保护区, 1982—1983年进行了羚牛骨骼系统的解剖研究, 1984—1986年间在分布分类、内脏解剖、血液生物化学、染色体组型、寄生虫调查等方面进行了一系列的研究工作, 前后断续历经了20年的调查研究。

研究课题是在陕西省科学院、林业部保护司、科技司的支持下进行的。在研究及本书编写过程中, 中国科学院动物研究所汪松、高耀亭、罗泽珣, 黑龙江省自然资源研究所马逸清, 陕西师范大学王廷正, 四川南充师范学院胡锦涛, 山西大学王福麟, 上海师范大学盛和林, 中国科学院昆明动物研究所王应祥, 广东科学院昆虫研究所徐龙辉, 中国科学院西北高原生物研究所周兴民以及四川省林业厅胡铁卿, 四川省成都动物园何光昕、宋云芳、田华剑、王强、李尧述, 陕西省西安动物园高凤岐, 林业部佛坪自然保护区雍严格、赵俊武, 西北大学何承德, 长沙水利电力师范学院葛桃安诸同志的指导及帮助, 在此一并致谢。

历年来本所参加课题研究的有吕宗宝、郑永烈、史东仇、邵孟明、邓凤鸣、马双喜诸同志。原西北农业大学王安英和西安市奶业科学研究所郑安奎为本书最后进行了编绘、清稿。

年龄测定工作承日本北海道大学齿学部大泰司纪之、八谷升先生协助。美国阿拉斯加大学北极生物研究所Dr. Robert White及Ms. Pamela Groves及加拿大国家自然博物馆Dr. David Gray提供了大量的麝牛研究资料。

由于研究这种大型兽类比较困难, 加上水平所限, 研究工作及本书中的内容并不完备, 不足之处及缺点在所难免。为保护这种珍贵动物, 此书的编写目的在于抛砖引玉, 相信在此基础上, 今后的研究将有进一步提高及发展。

吴家炎 1987年12月

## INTRODUCTION

The Takin (*Budorcas taxicolor*) is a typical Asian species. It occurs in China, Burma, India, and Bhutan. There are four subspecies of Takin, namely Mishmi Takin (*B. t. taxicolor*), Bhutan Takin (*B. t. whitei*), Sichuan Takin (*B. t. tibetana*), and Golden Takin (*B. t. bedfordi*). The Sichuan Takin and Golden Takin are endemic subspecies of China.

The body size of Takin is similar to the Gaur (*Bos gaurus*) and the Wild Yak (*Bos grunniens*), but their external characteristics are rather similar to sheep. Takin has a raised nose and lips, a lower buttock, longer beard, and a short tail. These characteristics give us the impression that the Takin is similar to Ox or sheep.

In the great book written by li shih-chen in Ming Dynasty of China, the Takin was called "Zuo Niu", "Zhu Niu", and "Chou Niu", pronounced tnearly similar to "Zhu" which the chinese name of bamboo. At present, the takin lives in bamboo forests and bamboo makes their important food item. The names of Takin given by different nationalities of China are very close to their external characteristics and their habits. For example, in the Qinling Mountain, Takin is called "Golden hair winding horn antelope", "White sheep", "Curved horn sheep"; "Fung niu", "Animal eating salt" in the west areas of Sichuan province; Takin is called "Jie men Ya" by "Zang" (Tibet) people; "Bue Jie" by "Lueba" people; "Le Yi Le" by "Yi" people in the Lion Mountain, Sichuan Province. All these tell us that the Takin is one kind of animal which has a long history and well-known by Chinese people.

In 1850 on Mishmi hills, Assam State in the northern India,

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Hodgson collected specimens of Takin and described as a new genus species. According to specimens collected by David in Moupin County, Sichuan province, Milne-Edwards identified it as Sichuan subspecies in 1874. Lydekker described Takin found in border of Bhutan and Tibet as Bhutan subspecies in 1907. The Bhutan subspecies is smaller than Mishmi one and distributes in higher altitude in Himalayas. Based on the specimens collected in the Taibaishan by Anderson, Thomas name it as Qinling subspecies in 1911. This subspecies only occurs in Qinling, it is called Golden Takin at present.

The important discovery about the Takin's fossil was made during 1936 to 1938. In stratum of Tertiary period of Pliocene at Yueshe, Shanxi province, Teilhard et al. discovered Takin's fossil and named it "*Budorcas teilhardi*". This Takin's fossil also was found in stratum of Pleistocene at Nihewan, Hebei province. Young Chung-chien named the Takin fossil discovered in stratum of Holocene of ruins in the proto-Historic site of Anyang, Henan province as "*Budorcas taxicolor lichü*" in 1948.

Literature on the Takin is given as the following: Cooper (1923), Sowerby (1928, 1936), Lydekker (1913, 1916), Allen (1940), Wang Song (1962), Wang Zong-wi et al. (1962), Hu Jin-shu (1962), and Wu Jia-yan (1966, 1981, 1986). These investigations and research were focused on the distribution, taxonomy system, and ecology of Takin. These are four subspecies of Takin distributed in Provinces of Sichuan, Gansu, Yunnan, Xizang (Tibet), and Shanxi.

Evidently, in systemic zoology the Takin belongs to Bovidae. But people's opinions on the question "which subfamily it is in?" are different. Allen (1940) and Grasse (1955) put it in Rupicaprinae; Simpson (1945) et al. arranged it in Caprinae, Lydekker (1913, 1916) et al. placed it in Antilopinae; Colbert (1955) put both of Takin and Musk Ox (*Ovis moschatus*) in Ovibovinae, which was suggested by Gill in 1872.

Compared the Takin with members of Caprinae, Bovinae, Rupicaprinae, Antilopinae, and Ovibovinae in the size, bone skull, teeth, and chromosomes, the conclusion could be that the takin is an Ox like sheep. The information of fossils and taxonomic

knowledge support that both Takin and Musk Ox compose the Ovibovinae subfamily.

Eighteen living Takin have been examined on their hair colour, nasal bone, and horn curve to compare their external characteristics. The hair colour of Takins captured in their north and south part of distribution range is gradually changed from white to darkbrown; the nasal bone become broader and larger, and the horn curve become flatter with the specimens gotten in low altitude to high altitude. The subspecies distributed in the north is larger in size. These differences are minor, therefore, the four subspecies of Takin must be regarded as one species.

The author compared the external characteristics, skull structure, and chromosome among members of Bovidae, the results are:

1. the Takin has no glandula orbitalis or glandula cruralis, this is similar to the members of Bovinae, but Takin's tail is shorter. The buttocks of Takin are lower and long hairs grow on the jaw; Its horns are narrow and closed in transversal axis or vertical lines, which is similar to Caprinae;

2. in the Takin's skull there is not a large space between the bones of nose and maxilla, and between the Os lacrimale and Os frontale. These characteristics are similar to Bovinae. The space between the bones of nose and maxilla is either narrow or broader in Caprinae and Antilopinae;

3. the incisors and canines of Takin are similar in size and both have a shovel form. These differ from Antilopinae and Bovinae, but resemble certain species of Caprinae;

4. in comparison of the karyotype with certain species of Bovidae, the diploid number (2N) of the Takin (*B. t. taxicolor*) is 52, the fundamental number (NF) is 58, "X" is acrocentric and "Y" is sub-metacentric or metacentric. In a general sense, the Takin's karyotype differs from Bovinae and Antilopinae in Chromosome morphology, but it has certain similarities to Caprinae.

According to the comparisons made by author, the characteristics of body size, skull, skeleton and karyotypes of the Takin with members of subfamilies mentioned above, the Takin is similar to Caprinae in general, but in some aspects it shows a certain similarity with

Bovinae. Therefore, the Takin can be considered as a kind of species Ox which has some similar characteristics with sheep.

Colbert (1955) believed that Bovinae originated in the Mid-Pleistocene, and the branch split up from deer. In the Pliocene and Pleistocene it developed in the direction of greater complication and adaptation. Eurasia is the area of its early development. Chow (1959, 1964) pointed out that the center of Artiodactylia is on the Chinese continent. The present research and karyological analysis fully support his conclusion.

On the basis of geographical knowledge, the only fossil of Takin found in north China was the Teilhard Takin, and it was succeeded by the modern Takin. The earth Takin (Pecora) had split from the bovine stem in the Pliocene. The animal of the pecora branch is considered to be in the position between Ox and sheep, more close to the sheep group. Lichii's Takin discovered in the Holocene stratum differs from the Takin of Anyang. It is thought that this difference is resulted from the subspeciation caused by environmental difference of habitats. These extincted and living Takins have evolved together from the old form of Yushe and Nihewan. In geographic times, the old Takins adapted to hilly and grassy habitats, the north China Plain was their home at that time. After several glaciations in the Quaternary period, they spread south, especially to Qinling Mountain, Min Mt., and the Himalayas. Later, they adapted to the topography and climate of their present high mountainous habitat. The discontinuity of the mountain region split their population into four isolated areas, four living subspecies of Takin were resulted from the isolated regions.

The Bovidae family comprises the majority of living Artiodactyls and has impressive history in the old world. The center of bovid differentiation is located in Asia and Africa, they tend to be confined in southern Asia and Africa since the majority of bovid were adapted to a warm climate. However, northern Asia and Beringia witnessed the emergence of various subarctic bovid group. The American part of Beringia was populated by bovid since Irvingtonian times, and most of these stocks succeeded in colonizing North America (Bjorn Kurten and Elaine Anderson

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1980).

Now, only the Musk Ox in North America is close to the living Takin in the external form. This animal migrated to the American continents from Asia. From the geographic information, we inferred that its home was also in the middle and northern areas of Asia. Because of the land changes in the glacial period and the retreats of the sea, Musk Ox migrated to North America across the Bering land bridge. They became extinct from their original region.

Most taxonomists place the Musk Ox in or near the bovid tribe Bovini (subfamily Bovinae) or subfamily Caprinae. Some authors recognize a separate Musk Ox subfamily, the Ovibovinae. The Takin was considered close to the Musk Ox by most taxonomists (Jerry N. McDonald and Larry Freeman 1984). The particular differences between Takin and Musk Ox are the occipital bone is behind Os Parietal and the horns are nearer the midline, upward the rear in the Takin.

Comparison of the characteristics on the chromosomes of some subfamily of Bovidae: the Bovinae (*Bos* sp.) diploid numbers are 60 in general, the Antilopinae (*Gazella* sp.) are 30–33 in general. The Rupicaprinae (*Rupicapra* sp.) is 58, and the Caprinae (*Naenohedus*, *Capricornis*, *Capra* and *Ovis*) are from 55 to 60. The Musk Ox is 48 and the Takin is 52, but their sex chromosomes have similar form. The “X” is acrocentric and the “Y” is metacentric or submetacentric.

From the fossil records, geographic information, and classification of modern forms, and the chromosome forms, the evolution picture of Takin and Musk Ox are: The Teilhard Takin and Lichii's Takin became into the living Takin, and the Musk Ox came from *Urmiatherium* (Grzimek 1972) which was of *Symbos* in the middle developing stage. Takin and Musk Ox were originated in the same areas and were closely related each other.

This book is divided into 8 parts. 1. Name of Takin and briefly review on research history. 2. Evolution and taxonomic system. 3. Natural landscape and food habit. 4. Characteristics of ecobiology. 5. Anatomy of skeleton and internal organs. 6. Physiology, Biochemistry and Chromosomes. 7. Domestication

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and Breeding. 8. Conservation and management. All results of the research on the takin done by the author from 1964 to 1986 have been included in this book. We sincerely hope that this book could give some helps on research and conservation of the Takin not only in China but also in the world.

Wu Jiayan

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