

# 青藏高原草場及其主要植物圖譜

AN ATLAS OF RANGELAND AND ITS  
MAIN PLANT RESOURCES ON THE  
QINGHAI-TIBET PLATEAU



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青 海 卷

Volume Qinghai

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青藏高原草场及草场主要植物图谱

青 海 部 分

蔡照光 黄葆宁 郎百宁 雷更新 编著

\* \* \*

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# 序 言

新第三纪以来的喜马拉雅造山运动，使我国的西南部拔地而起，形成了以世界屋脊著称的青藏高原。这种晚近发生的地质构造运动，较为清晰地展示了地球演变的历史过程，特别是动植物区系的演变和由此而引起的独特而丰富的草原现象。

作为草原资源的一种特殊形态，青藏高原吸引了国内外草业科学工作者的巨大兴趣，也为地学、生物学、农学等多种学科的科学工作者所向往。

作者等有志于修撰“青藏高原草场及其主要植物图谱”，以生动形象提供国内外读者参考，这是广大读者所期望的。

青海是青藏高原主体的一部分，它与四川盆地、河西走廊及新疆东南部相接壤，有重要的农业生态学特征和开发意义。

本书编著者都在青藏高原工作三十年以上，对这一地区有深刻的认识和丰富的体会，近三年来又历尽艰辛，行程两万余公里，广为搜罗，以精湛的摄影艺术和严肃的科学态度，经过反复精选、补充、编排、论证，终于把该图谱的青海部分七十二万平方公里的草原景观和重要植物收藏于四百余幅图片之中编就这份图谱。它是教学和科学研究的珍贵资料，也是描绘祖国河山的壮丽图卷。为了方便，作者还将此图谱全部画面更加精炼，制作了全套幻灯片 402 幅，其精美生动与图谱相比并不逊色。笔者有幸在出版之前对图谱和幻灯片反复观赏，受益很多而爱不释手。

这本图谱在出版过程中，我们高兴地获悉，它已荣获农牧渔业部 1986 年科技进步二等奖。

谨以上面几句话向国内外读者推荐，也向作者祝贺。

任继周

序于新兰车上

1986 年 9 月 12 日

## PREFACE

As the result of the Himalayan mountain-creating movement, which has been continuing since the new Tertiary, the south-western part of China rose abruptly, and formed the Qinghai-Tibet Plateau, "the roof of the World."

The movement of geological structure in the late period clearly revealed the historical process of the globe's development, especially the development of flora and fauna, which brought forth an abundant unique rangeland appearances in the region.

As an uncommon source of rangeland resources, the Qinghai-Tibet Plateau has greatly aroused the interest of the scientists of this field both in China and abroad, an many biologists, agronomists and are interested to survey the area.

To meet the desire of readers, the authors have compiled an "Atlas of the main rangeland types of the Qinghai-Tibet Plateau and their plant resources."

Qinghai is a part of the main body of the Qinghai-Tibet Plateau, which is contiguous to the Sichuan basin, the Hexi corridor and the southern part of Xinjiang. It has a critical agro-ecological importance in the development of pasture-agronomy farming system.

The authors, with more than 30 years working experience on the plateau, and deep understanding of the region, have spent three years and covered the distance of more than 20,000km, collecting, laying out, discussing revising, and compiling the atlas. Over 400 maps are illustrated in the atlas. The atlas is not only valuable material for research and teaching, but also a collection of pictures describing the beauty of our land.

During the publication of the Atlas, we have the pleasure to learn that the atlas is awarded the second science and technology improvement medal.

I sincerely recommend the atlas to readers, and warmly congratulate its authors on their success.

Ren Jizhou

12/9/1986



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# 草 场 生 境

ECOLOGICAL ENVIRON MENT  
OF RANGELAND



青海省是世界屋脊——青藏高原的一部分。介于北纬  $31^{\circ}39'$ — $39^{\circ}11'$ ，东经  $89^{\circ}25'$ — $103^{\circ}04'$  之间。全省面积约 72 万平方公里，平均海拔达 4000m 以上。境内巍峨的祁连山与唐古拉山耸峙南北两侧，昆仑山系的博卡雷克塔格山、布尔汗布达山、可可西里山、巴颜喀拉山、阿尼玛卿山(积石山)等山脉，横贯全境，构成了青海高原的明显骨架，其间分布着谷地、湖盆、高原和山地，组成了祁连山山地、柴达木盆地和青南高原三大地貌，深刻地影响着草场的分布格局。

盘踞于青海北部的祁连山山地，是由一系列北西西—南东东平行山脉与谷地组成的，东西长达 800 余 km，南北宽约 200—300km。山地西段由北向南有走廊南山等 7 条山脉和黑河等 6 条河谷。山地海拔 4000m 以上，雪峰皑皑，气势磅礴，整个山体较完整，相对高差在 500—1000m 之间。高寒草甸草场发育良好。山地东段有冷龙岭、大坂山、拉脊山等三座山脉和大通河、湟水两条河谷及青海湖盆地。随着地势往东南倾斜，大通河、湟水和黄河流域的山地海拔逐渐降低到 3500m 左右，而谷地海拔仅有 1700—2600m，属黄土高原向青藏高原的过度带，山体破碎，山地草原草场发育较差，但气候温暖，河谷地形宽坦，为青海省最主要的种植业区。

青海西北部的柴达木，是一个封闭的完整的盆地。盆地北侧的阿尔金山和祁连山呈弧形弯曲衔接，南部倚东昆仑山脉背靠青藏高原主体，这些山系除西北部的阿尔金山略低于 4000m 外，其余的均超过 5000m，峰颠冰雪终年不化。盆地地势自西北向东南倾斜，西北部海拔高约 3000m，广布第三纪风蚀残丘地貌。东南部堆积第四纪洪积、冲积层。靠近山前的洪积倾斜平原，为砾石和砂石形成的戈壁；其北侧为沙质、沙壤或粘土质的洪积——湖积平原，地形平坦，潜水接近地表或外溢，土壤盐渍化或形成大片盐沼；在洪积平原和冲积—洪积平原上，常分布有风积流动沙丘、沙垄或沙地，稍湿润处，形成草灌丛沙丘。盆地底部多盐湖，湖滨发育着盐生草甸草场。

青南高原是指东昆仑山的博卡雷克塔格山、布尔汗布达山、阿尼玛卿山以南、唐古拉山以北的广阔的高原面。境内的巴颜喀拉山、阿尼玛卿山和唐古拉山



等山脉，山峦起伏，连绵不断，山顶终年为冰雪覆盖，雪线一般在海拔 5000—5300m，整个高原面由西向东倾斜，西部江河源头和中部地势高，平均海拔 4500m 以上，地形开阔坦荡。山体起伏较缓，高原面保留较完整，高寒草原草场和高寒草甸草场发育良好。随着地势向东南倾斜，黄河、长江(通天河)和澜沧江的支流(扎曲、解曲)在青藏高原的东部和东南部开始深切，切割深度达 1000m 米以上，山势陡峻、河谷狭窄，草场类型丰富，垂直分布明显。中部的星宿海、扎陵湖、鄂陵湖和莫云等宽坦的山间盆地或宽谷形成特有的大面积沼泽地，发育着高寒沼泽草甸草场。

青海省深居我国内陆，夏半年的东南暖湿气流对全省影响范围较小，来自印度洋的西南暖湿气流也只能湿润着青南高原东南缘，而绝大部分地区都处于西风环流和“青藏高压”的控制范围内；冬半年则受干冷的西风寒流控制，长达 7—8 个月之久。因而形成了干、湿季和冷、暖季变化分明，雨暖同季、干冷季长，暖湿季短，春秋季节短暂的气候特点。

在干冷西风环流和西南季风、东南季风的控制和影响下，加之空间面积辽阔，地形复杂，各地海拔不同。因此，青海省气候状况又表现了明显的地区分异。省境内东部的湟水、黄河和大通河流域主要属于凉温半干旱和暖温半干旱气候区；东北部的祁连山山地主要属于冷温半湿润气候区；西北部的柴达木盆地主要属凉温干旱、极干旱气候区；南部的青南高原则由东南向西北出现寒温湿润—寒温半湿润—寒温半干旱—寒温干旱有规律的气候分异。

青海的土壤，不仅类型复杂。而且地区分异也较明显。栗钙土和灰钙土主要分布在东部的湟水、黄河流域。棕钙土和灰棕荒漠土主要分布在柴达木盆地。山地灰褐色森林土是森林地区的主要土类。高山灌丛草甸土主要分布在地阴坡。高山草甸土广泛分布于青南高原和祁连山地。高山荒漠土主要分布在高山雪线以下的冰渍物或残积坡积物上。高山草原土主要分布于青南西部和东昆仑山内部山地以及祁连山西段的宽谷。高山漠土主要分布于青南高原的高海拔地区。高山沼泽土呈隐域性土类分布于青南高原的江河源头和祁连山山地的木里等地。

Qinghai province is a part of the Qinghai-Tibet plateau — "The roof of the world". It is situated between latitudes  $N31^{\circ} 39'$  —  $N39^{\circ} 11'$  and longitude of  $E89^{\circ} 25'$  —  $E103^{\circ} 04'$ . The total area of the Province is  $720,000\text{km}^2$  with the elevation of more than 4000m. There are the Qilian and Tanggula mountains and Bokaleiketage, Buerhanbuda, Kekexili, Bayankala, and Animajing mountains of Kunlong mountain range which spreads along the province. Among the mountains, there are valley, basing plateau and sloping land forms, which constitute the Qilian mountain, Chaidamu basin and Qingnan plateau. These various landforms are reflected in the distribution of rangeland species.

Qilian mountains lie in the northern part of the province, it has length of more than 800km from east to west and width of 200–300km from south to north. In the western, from north to south, there are 7 mountain ranges and 6 river valleys. The elevation of the mountainous region is more than 4000m, the relative height is 500–1000m, alpine marsh rangeland is well developed.

In the eastern part, there are Lenlunlin, Daban, Laji mountains, Datong, Huanghui mountains and Qinghai lake basin. Toward the South-east, the elevation decreases to 3500m, and the elevation of the valleys is only 1700–2600m. The valley of the region is very flat and mild climate. It is an important base for crop production in Qinghai province.

This region is a completely sealed basin, which is located in the north-western part of Qinghai. There are the Aerjing mountains in the northern basin and the Kunlong mountains in the south. Except for the Aerjing mountains with elevation of 4000m, other mountains around the basin all other are more than 5000m in elevation, where there is a snow covering throughout the year.

The basin slopes from northwest to southeast, with the Tertiary old denudation topography and the elevation is 3000m in the northwestern part. In the southeastern part, there is fluvial and alluvium topography of the Quarternary Period. At the foot of the mountains there are alluvium plains, gravel and gravel sand dunes. In the north, there is a fluvial and alluvial lake plain with sandy loam and clay warp which is very flat and becoming swamp due to a high water table. The soil is severely salinized and forms a saline swamp. In the alluvium plain, and fluvial alluvial plain there are also some shifting sand dunes and sand dam. Thick grass develops around the dunes if moisture conditions are suitable. At the bottom of the basin, there is often a saltlake formed, and salt-marshed rangeland develops along the bank of basin.

Qingnan Plateau covers Bekaleiketage, Buerhanbuda, Jishi mountains in the eastern Kunlong, and the vast area of the northern Tanggula mountains. It has an elevation of 5000–5300m, and is snow covered year round. The whole plateau slopes from west to east, with an average elevation is more than 4500m, and an undulating topography where alpine pastureland and alpine marsh rangeland develop well.

The geological slope is towards the southeast and the Yellow river, Yangzi river (Tongtian river) and Lancang river cut deeply along the eastern part and south eastern part of the Qinghai-Tibet Plateau to a depth of more than 1000m, creating steep slopes and narrow river valleys.

In the central part, there is the Xingxu sea, Zhaling lake, Eling lake and Moyun mountainous basins where a vast area of swamp is formed.

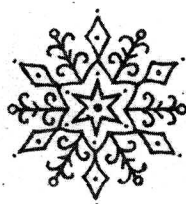
In summer, the climate of Qinghai Province is affected by the south-eastern air current and the westerly warm and wet air current from the Indian ocean wets the south-eastern edge of Qingnan Plateau; the latter dominates the climate of the plateau in summer. In the winter, the climate is dominated by the Qinghai-Xizang high pressure western cold current, and low temperatures usually continue for 7–8 months.

Because of the effects of the circulation of the westerlies and south-westerlies and south-western, south-eastern monsoon, there is a sharp climatic variation in the province. The climate of the Huangshui,



Datong and Yellow river valleys, is mild and semi-arid; in the Qilian mountains of the north-eastern part, climate is mild and semi-humid, and in the Chaidamu basin of the western part, climate is cold and dry. The general pattern of climate from southeast to northwest in the Qingnan Plateau changes from mild, cold humid - mild, cold semi-humid-mild, cold semi-arid -mild, cold arid.

There is various soil types in the province, in general, the main soil types of the Huangshui and Yellow river valleys of the eastern part are Sierozem, and Chestnu soil. In the Chaidamu basin, the main soil types are Brown soils and Brow Desert soil. Brown forest soil is a main soil type in the forest region of the province. In the Qilian mountains and Qingnan Plateau, marsh soil is very common. Desert soil are usually distributed under the snow line of high mountains. The alpine steppe soil mainly distributed in southwest and eastern part of Kunlong mountains and in the valleys of the western area of Qilian mountains Alpine desert soil is mainly found on the Southern Alpine Plateau. The alpine marsh-soil distributed in the river sources is non-zonal.







祁连山地

Qilian Mountainous Region





祁连山冷季放牧场

Cold Season Grazing Rangeland of the Qilian Mountains





祁连山高山植被

Alpine Vegetation of the Qilian Mountains



祁连山东段大通河谷  
Datong Valley of the East of the  
Qilian Mountains



祁连山东段黄土高原谷地  
Valley of the Loess Plateau of the Eastern  
Qilian Mountains