

Rangelands of Bulgaria

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Rangeland is an important natural resource in Bulgaria, a country of more than 9 million inhabitants. Bordered by Romania on the north, Yugoslavia on the west, and Greece on the south, the country occupies 42,800 square miles. Bulgaria has almost 5 million acres of grasslands, with the rest of the country covered by deciduous and evergreen forests or cultivated. Sheep, cattle, goats, and water buffalo are the major species of livestock on the grasslands.



Fig. 1. Location of Bulgaria.

I visited the Institute for Mountain Agriculture at Trojan, Bulgaria, while on a scientist exchange program sponsored by the Office of International Cooperation and Development in the U.S. Department of Agriculture. The Institute is the center for grazing and grassland improvement research in Bulgaria. Formal education in range science is not available in Bulgaria, but much of the research conducted at the Institute is similar to range research in the United States.

Most of Bulgaria's grazing lands are in the mountains, which occupy about half the nation's land surface. The Balkan mountains are the major range and bisect the country from east to west. The Rhodope mountains are a prominent range in the southern part of the country.

Bulgaria has a variable climate. Northern Bulgaria is

characterized by hot summers, cold winters, and fairly uniform seasonal distribution of precipitation (Keefe 1974). Annual rainfall in the grazing areas of the mountains ranges from 27 inches at elevations of 1,300 to 1,400 feet to 47 inches at 5,000 feet. A few sheltered areas in the mountains remain covered with snow all year, while lower elevations are covered with snow 25–35 days a year. A Mediterranean climate with mild, damp winters and hot, dry summers prevails most of the time in southern Bulgaria.

Grassland Communities

Four major natural grassland communities occur in Bulgaria, according to scientists at the Institute for Mountain Agriculture. A community dominated by French whisk (*Chrysopogon gryllus*) occurs from sea level to 2,300 feet. In the mountains this grassland occupies south-facing slopes. The grasses in the French whisk community are low in protein, and annual forage production ranges from 890 to 1,800 pounds/acre. Research at the Institute indicates that forage production in this grassland is doubled by fertilization with nitrogen.

A second grassland community is dominated by common bent (*Agrostis capillaris*). Scientists at the Institute consider this community to be the best for grazing. Common bent is higher in protein than the grasses that dominate the other communities and is more palatable. Livestock grazing common bent tend to produce more milk. The grassland is found at elevations of 2,300 to 3,300 feet and it produces about 1,800 pounds/acre of forage annually. A community second only to common bent grassland in its value for grazing is dominated by fescue (*Festuca fallax*). The fescue community occurs at elevations of 3,300 to 4,900 feet and is bordered by forest on its upper end.

The highest elevation grassland occurs at 3,300 to 7,900 feet and is dominated by mat grass (*Nardus stricta*). This grassland commonly occurs above the upper limit for tree growth. Mat grass is low in palatability and produces only 450 to 890 pounds/acre of forage annually. The growing season in this high grassland lasts only 3 months and it is grazed from June through August.

About 500,000 acres of the grazing lands in Bulgaria are improved pastures planted with grass-legume mixtures. Major grasses used in these mixtures are orchardgrass, tall fescue, meadow fescue, red fescue, timothy, and Italian ryegrass. Bird's-foot trefoil, red clover, and white clover are the major legumes. Seeded pastures are about 5 times more productive than natural pastures and have higher nutritional quality. These pastures are grazed from the beginning of April to the end of October. After about 6 years, productivity declines and the pastures are replanted.

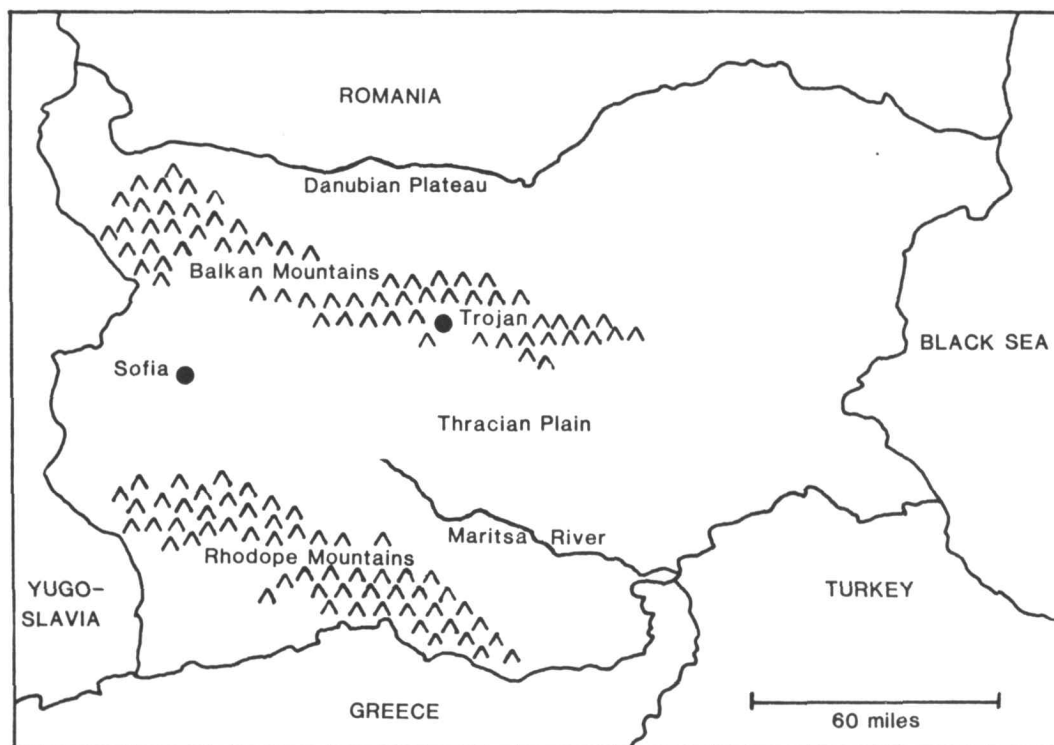


Fig. 2. Topography of Bulgaria.

Cultivated fields that have become low in fertility are often planted with grass-legume mixtures. In the mountains, potatoes are grown in rotation with pasture. Generally, the fields are in pasture for 6 years followed by 2 years of potatoes and then they are planted back to a grass-legume mixture.

Livestock

Sheep are the predominant livestock in Bulgaria and number about 10 million animals. They are raised for wool, meat, and milk. Cigay, from the USSR, and Cakel are the primary breeds grazed in the mountains. Breeds used in the lowlands include Merino, Corriedale, and Lin-



Fig. 3. Sheep in Bulgaria.

coln. Many of the milk breeds originated in Greece and Israel.

Eighty percent of the sheep in Bulgaria graze in the mountains under the control of a herder and his dogs. Each shepherd has a flock of 500 to 750 sheep. Collies from Australia are the most popular dog breed used. Natural features in the mountains are used as borders within which each shepherd keeps his flock. Stocking rates in the higher mountains range from 1.2 to 1.7 acres/sheep.

Grazing begins in May in the higher mountains and the flocks are moved to higher elevations as the summer progresses. By August, the flocks have reached the highest elevations and begin grazing down. The flocks reach the valley floors by the first of November. This form of grazing management is referred to as the 'Alpine Way'.

Flocks in lower areas are smaller than those in the higher mountains. Pastures at lower elevations are cut for hay before they are grazed. These areas are grazed from April through November.

About 20% of the sheep are in 'grazing complexes'. These complexes are in the lower areas on planted pastures. Each grazing complex contains 5 to 6 fenced pastures, ranges from 490 to 1,240 acres in size, and is grazed by 2,000 to 5,000 sheep. The sheep are rotated among pastures with each pasture grazed about 6 days and ungrazed 20 to 30 days. The exact number of days grazed depends on productivity of the pasture. If forage production of a pasture falls below 4,500 pounds/acre, the pasture will not be grazed. A pasture may be fertilized or irrigated during the time it is not grazed. About 500 complexes are in Bulgaria; some are grazed by sheep and some by cattle.



Fig. 4. Hay from pastures at lower elevations.

There are about 2 million cattle in Bulgaria. Cattle primarily graze the lowlands and are used for meat and milk production. Dairy cattle include Holsteins imported from the mid-western United States. Scientists at the Institute for Mountain Agriculture are working with Herefords and Angus to improve meat production.



Fig. 5. Wooden implements used for raking hay.

Goats and water buffalo are also raised in Bulgaria. Goats number about 50,000 and are used primarily for meat and milk. The Bulgarian white goat was developed at the Institute for Mountain Agriculture for milk production with stock from Czechoslovakia and Germany. Buffalo were numerous in Bulgaria before World War II, but there were only a few remaining at present. They are raised primarily for their milk, which the Bulgarians consider tastier than cow's milk. The Moora buffalo, a breed from India, was introduced into Bulgaria to improve milk production of the Bulgarian buffalo. Buffalo are also used for meat and leather. They graze the tougher, more unpalatable grasses that cattle will not eat. They also tend to be more difficult to handle than cattle.

Range Research

The Institute for Mountain Agriculture was established in 1910 and is staffed by 1 chief, 3 directors, and 200 scientists. Of the 200 scientists, 55 are working on grassland research. The Institute has 7,400 acres of land, 12,000 sheep, 250 goats, and 500 polled Herefords. Major topics of range and range-related research at the Institute include fertilizing grassland to increase production and forage quality, interseeding improved grasses and legumes into native pasture, developing more productive grass-legume mixtures, and developing machines to harvest hay on steep slopes. Additional research interests include finding new ways to control weeds and developing new technologies for preserving grass after cutting.

Weed control research at the Institute has centered around methods of controlling ferns, which invade grassland and are poisonous to livestock. Mowing is ineffective in killing the plants and stimulates resprouting. Bulgarian researchers compared the effects of 2 American herbicides—Velpar and Roundup—and Ausolux, from England. Ausolux at 1.3 gallons active ingredient/acre was the most effective in killing ferns.

Future plans of researchers at the Institute include experimenting with some American grazing systems. They are also working with Australian researchers on grazing management.

Scientists in Bulgaria and in the U.S. have much in common. We have similar objectives, such as learning how to more effectively manage rangelands for man's benefit and increasing understanding of rangeland ecosystems. These goals will be achieved more easily by crossing political barriers and sharing information and expertise. Hopefully, exchanges between American and Bulgarian scientists will one day facilitate establishment of range science as a discipline in Bulgaria.

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