Icelandic horse has been reported to be alive and well at 53 years. Both mares and stallions remain reproductively fit until approximately 25 years.

Conclusions

Gunnar Bjarnason, Iceland's expert on horses, has said, "There are many incredible things about our unique horse which are difficult to understand and accept in the beginning" (pers. comm.). Perhaps the most surprising characteristics of this horse are its ability to utilize tundra vegetation as its principal source of food year-round and to remain fit in the arctic environment with minimal energy and protein supplementation. It is a willing servant in terrain and conditions where most other breeds are reluctant to go or unable to perform. These characteristics, alone, command the attention of individuals considering the acquisition of horses for use in tundra regions. Add to the above that the Icelandic horse can provide far more years of service than other breeds, and it becomes apparent that their purchase may be economically justified for many purposes.

In the long history of the breed, the Icelandic horse has unquestionably demonstrated its usefulness as a riding, herding, pack and draft animal. In the past two years, it has demonstrated its value in Alaska's reindeer industry. We can think of many other potential uses for this horse. It would appear to have prospects as a pack animal in sport hunting and fishing, and it is conceivable that sports like trekking or dude riding could become significant attractions to recreationists and tourists in some of our communities. We cannot imagine a more enjoyable way for one to get out and experience the beautiful lands of the north.

(NOTE: This article is based on one published by the Agricultural Experiment Station of the University of Alaska, Fairbanks; Agroborealis 16:27-32.)

The Range Manager's Contribution to Small, Mixed-farming Systems: Portugal as a Case Study

Linda Howell Hardesty and Thadis W. Box

Editor's Note: A proof that good range management can occur anywhere in the world on any sizes of unit.

Portugal does not have what is generally considered rangeland, but livestock are produced there under conditions that challenge our profession to new perspectives on range management. Portugal's ancient landscape has been intensively cultivated and grazed for centuries. While the country has grown into a busy, modern nation, its livestock production systems share aspects common to many lesser developed regions. Agricultural production has a restricted land base which must meet dozens of conflicting, interchangeable demands. This precludes the extensive livestock production systems to which most range managers are accustomed and requires that we adapt our understanding of rangelands to small, intensive, mixed-production systems, where grazing animals may be a luxury. Livestock must coexist within the framework of a closely integrated and flexible agricultural production system.

Portugal has a Mediterranean climate. Rainfall occurs primarily in winter and ranges from 2,800 mm (112 inches) in the northeast to 400 mm (16 inches) in the south. Temperatures are mild (average annual temperature 15 degrees C.), rarely below freezing except at high elevations. The growing season is balanced between the rainy but too cool winter and the warm but too dry summer.

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Topography varies from flat, shifting lowlands bordering the Atlantic coast to steep, boulder-strewn mountains in the Northeast. The Tagus River bisects the country north-south and roughly defines the undulating plains of the Alentejo in the South.

Livestock production systems follow these topographic divisions.

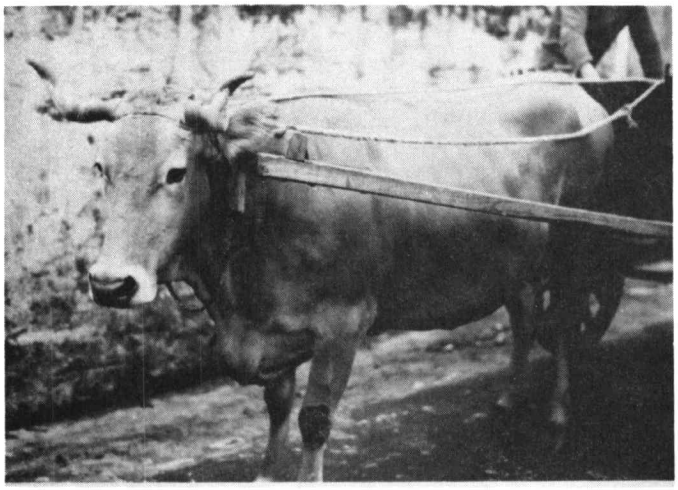
The Littoral

The coastal areas north and south of Lisbon are densely populated but still support extensive pine and eucalyptus plantings, descendants of the pine forests planted by Dom Dinis in the 13th century to stabilize sandy soils and protect inland areas from the sea. This is also Portugal's most industrialized region, and many farm families are partially supported by the men's factory jobs. Land holdings average less than 2 ha (5 acres) and are often composed of up to twenty far-flung parcels, as land is divided at death and reshuffled by marriages. Many of these parcels are too small to farm with machinery, though tractors have replaced draft animals whenever possible.

The cattle in this region are mostly Friesians and they produce over half the nation's milk supply. Most villages have cooperative milking parlors, and evening driving presents a frightening obstacle course of women leading their cows to milk as the men return home on bicycles or motorcycles.

The average farm has only one or two cows. Cows are kept adjacent to the home and fed green chop, silage, hay, and by-products like turnip tops. Grain feeding is mostly limited

to dairy cows but the cost can be prohibitive. Reproduction is depressed by brucellosis and probable mineral deficiencies. This is not considered a problem, however, as calves are a by-product of the dairy system. At weaning, calves are either slaughtered or sold for fattening, depending on the market.



Livestock holdings of one to five cattle are common in many areas of the world. Like this cow in northern Portugal, they are often used for work, milk and meat.

Competition for land for industrial expansion and suburban housing will be a continuing problem here. If the dairy system is to survive in its present form, it will require excellent management of the remaining land base, and growing dependence on feed grains.

The Mountains

In the mountainous northeast, industrial encroachment is less obvious. The traditional agricultural system remains intact, though the men often travel to the coast or neighboring European countries to work. Small scattered plots are the rule here, too, defined by ancient stone walls and terraces. The lower slopes are a tortuous maze of vineyards and olive orchards, often intermixed. Corn, kale, turnips, beans, and small grains are raised for home use and cash sales.

The average producer has three head of cattle, three or four sheep and goats, and two hogs. Animals are stabled below the family's living quarters, providing heat, milk, meat, traction, and manure. Here, too, reproductive rates of the native breeds are unnecessarily low, but unlamented as long as enough cows are fresh.

The native Mirandesa and Barrosa cattle are sturdy, compact animals, well adapted to the climate and the work they perform—pulling plows, wagons, and carts. Sheep are of Merino and Spanish stock, valued perhaps more for their milk than wool. Goats are less common, and less preferred due to brucellosis, parasites, and other health problems. Cattle graze the roadways, the orchards, and the less fragile fallow fields. When grazing is not available, they are fed natural meadow hay, corn stover, and similar feeds. Some landowners and villages maintain natural meadows rich in clover, medics, annual grasses, and forbs. These are carefully managed to prevent overuse; some are even hand weeded, manured, and channeled to enhance drainage. Sheep use is restricted on these meadows.

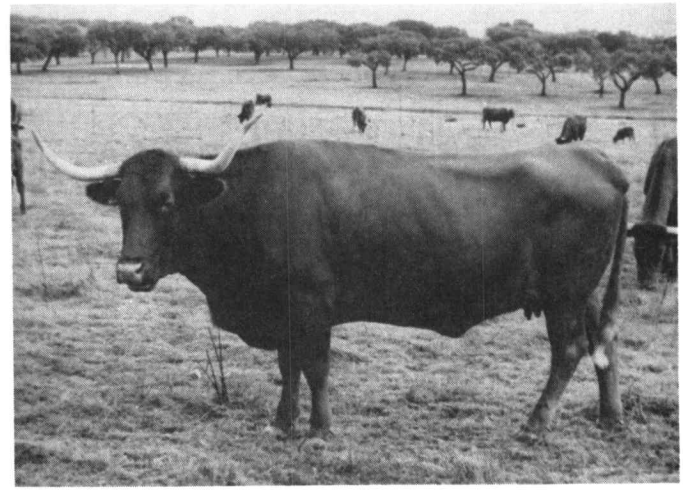
Above the villages the soil is too thin and rocky to scrape into terraces. The goats and sheep are herded here on scrubby heathers, low brush, and scattered annual grasses and forbs. This land, along with aftermath on unwalled fields, is used in common. Though few complain about abuses of this system, there are signs of degradation.

Government attempts to "reforest" these areas are being resisted. For whatever reason, when pressures on these areas increase, this tradition of common use could make range improvement difficult in spite of any biological potential.

This system is an old, conservative, and successful approach to living in a hard environment. A farm of a few hectares (less than 20 acres) produces dozens of products, some especially suited to whatever conditions the year will bring. The inherently poor soil is cherished: terraced, manured, and drained, so that it continues to produce after centuries of use. Kept in reasonable numbers, livestock contribute to the versatility and thrift of these farms, right down to the rabbits raised in the stables on bits of feed that escape the larger animals.

The Alentejo

Cattle were once important draft animals on the deeper-soiled, rolling lands south of the Tagus River. Land holdings



Annual ranges under an open oak savannah support small herds of Alentjeno cattle in southern Portugal. The Alentjeno cattle of southern Portugal are probably ancestors of many of the longhorn cattle introduced into America.

were often thousands of hectares. Land reform programs in the past decade have limited most farms to 300 ha (751 acres) or less. Most of these operations now use tractors, and cattle are raised for meat.

This region produces most of Portugal's domestic cereal grains, along with cork, olives, and grapes. Cork grows in open savannas, olives are planted in orchards, and the land beneath both is plowed and planted with grain. Sheep and cattle graze the winter grain fields in areas where spring rains are reliable enough to insure regrowth. After the harvest, stubble, straw, and fallow fields provide forage. Poorly drained lowlands and rocky waste areas provide natural or sown annual pasture. Subterranean clover with vetch and oats is a common seed mixture. In a good year these pastures can be grazed early, then rested and cut for hay or

silage late in the season. Legumes and annual grasses such as fescues, vulpias, and rye grasses are spontaneous, but pasture grasses are not usually seeded.

Grain price supports have led to cultivation of steep or unstable marginal areas. The availability of tractors has encouraged unnecessarily frequent and deep plowing. These abuses are causing serious soil erosion. Reclamation and conversion to productive pasture is possible, but ultimately depends on the comparative prices of grain and meat.

Herd size is larger in the Alentejo, averaging 50 head of cattle and 300-500 sheep. Goats, when found, tend to replace sheep rather than be mixed with them. Clearly this region has greater meat production potential than any other in the country.

The native Alentejana and Mertolenga cattle are probably predecessors of the Texas longhorn. They resemble the other rugged Iberian strains. Crossed with Charolais, they produce a sturdy, fast-growing calf which is either fattened on the ranch or sent to a feed yard at weaning.

This part of Portugal and neighboring Spain is the home of fine horses, fighting bulls, and the ranching traditions which gave birth to our own American ranching heritage. Even now there are lingering traces of the grandeur and romance of the old cattle companies.

Conclusions

There are three different livestock production systems in Portugal, but they have some common and, to us, unusual characteristics. Land is the single most limiting factor. Livestock is not the only product of the land, as is often thought to be the case on rangelands. Almost all Portuguese range and pasture lands can be used for other crops. Livestock can be replaced as a source of protein, traction, and income and this will happen when alternate products are more economically attractive.

In systems like these, where the goal is to reduce risk by maintaining diversity and flexibility, long-range investments in herd improvement or range development are unacceptable to many producers.

If the goal is to increase meat production within the existing systems, solutions lie in improving animal management, cultivating sufficient forage to balance year round forage supply, and creating incentives for the conversion of marginal and degrading croplands to permanent pastures. Accomplishing these goals depends on educating producers, for example, to cut hay at earlier, more nutritious stages; on providing favorable financing for small investments in mineral supplements and vaccines; and on insuring the marketing stability that will create a base for longer-range planning.

It may be argued that such improvements in these systems could be better managed by agronomists, economists, or sociologists, but we believe that the range manager has a contribution to offer. Trained to work within entire systems, and with an ecological background, range managers can see system-wide problems and solutions. We can effectively evaluate ideas in terms of their biological implications and their impact on the natural resources base that supports the entire system. Technological and structural changes or improvements are also important, but are limited by these basic ecological realities.

These small, mixed-farming systems exist, with local cultural modifications, throughout Latin America, the savannah and Sahel of Africa, and our own southwestern United States.

Learning to shift our thinking from extensive livestock production systems to small, mixed production systems will enable range professionals to help maintain or improve production in these common, though often overlooked, mixed production systems. If we do not, we hand over, by default to agronomists and animal scientists, a large portion of the world that can best be managed on an ecological basis. •

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