

Rangelands in the Mediterranean zone of Croatia

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Introduction Rangelands dominate the landscape of the Mediterranean part of Croatia along the Adriatic coastline, occupying 83% of the agricultural land (1.7 million ha) and 40% of the entire country. The proportion of rangelands is considerably higher in the Mediterranean littoral than in other ecological regions of Croatia. Sheep and goats are widespread in the region, comprising 76% of total sheep and goat numbers in Croatia. However, in comparison to other regions of Croatia, livestock production in the Mediterranean zone is not well developed. Continuous grazing begun too early in the growing season has caused substantial rangeland degradation and a decline from potential productivity. The improvement strategy is to rely on controlled grazing systems, in which priority is given to restricting grazing pressure in the early spring, improving animal distribution and introducing rotational grazing practices. The more difficult task is to regulate animal numbers. Although the general climate of southern Croatia is Mediterranean, there is a gradient inland from the coast. Dry summer stress, combined with a long history of man's influence on the natural vegetation, has resulted in the formation of several contrasting rangeland types. The main types are pasture vegetation, shrublands (maquis and garrigues) and forested ranges (Horvatic, 1975).

Pasture vegetation All kinds of environments are found on the Croatian littoral from Adriatic islands to the mountain ranges running parallel to the coast. The vegetation is in the form of dry Mediterranean grasslands, which are used for grazing and cutting, and in herbaceous vegetation in the interstices of rocky ground covering extensive areas. The pasture vegetation includes two vegetation classes - *Thero-Brachypodietea* and *Festuco-Brometea*. Mediterranean rocky ground pasture and grasslands represent about 45% of the total rangelands in the region, excluding arable land (Table 1).

Mediterranean shrublands The shrublands of the Croatian littoral are at low elevations. They contribute 31% of the rangelands and include two types of vegetation. The first is Mediterranean evergreen maquis and deciduous thickets, which grow several meters high in dense almost impenetrable stands. The other type is Mediterranean evergreen garrigues (chaparral), which is relatively low vegetation of mostly thinned thickets dominated by dwarf shrubs. Mediterranean forest and woodland ranges occupy about 24% of the total area of rangelands (Table 1).

Range condition and productivity Because of centuries of poor grazing management rangelands have seriously deteriorated in the Mediterranean Croatia (Rogosic, 1995). This degradation has reduced forage production from rangelands and increased the variability from one vegetation type to another and from one environment to the next. On average, the grazing capacity is estimated at about 2 animal unit months (AUM)/ha in the grasslands, 1 AUM/ha in the shrublands, and 0.5 AUM/ha in the forested ranges. (An animal-unit month is the amount of dry forage required by one animal unit (one cow, five sheep or five goats) for one month based on a forage allowance of 11.8 kg/d). The grazing capacity can be increased considerably, especially in grasslands and shrublands, through improvements such as fertilisation, reseeding of improved range species, or conversion of shrublands to grasslands by prescribed burning and seeding.

Priorities in research The political and social climate is ripe for changes in rangelands and livestock management to enhance the productivity of the precious natural resources of Croatia.

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Table 1 Rangelands in Mediterranean Croatia

Class of natural resources	Area (ha)	% of total area
1. Pastures and grasslands	775,000	38.37
2. Maquis and garrigues	534,000	26.44
3. Mediterranean forest	422,000	20.89
4. Arable lands	289,000	14.30
Total	2,020,000	100.00