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Multi-functionality of Mediterranean herbaceous rangelands in Israel : a comprehensive pastoral/ grazing system approach

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Introduction Domestic livestock have grazed Mediterranean ecosystems, and particularly those of the Middle East, for at least 10,000 years. In the past, herd size and animal production were considered the principal factors in the evaluation of these grazing systems. During the last several decades, a comprehensive, multi-functional grazing system approach has been developed, which, in addition to economic aspects, also considers ecological, social, cultural, recreational and political aspects. The impact of grazing on ecosystem functioning is a key issue for modern range management as well as for recreation potential and nature conservation. Herbaceous Mediterranean rangelands are distinguished by strong seasonality in resource availability, considerable variability in inter-annual rainfall and a long history of grazing (and fires), including periods of heavy and even very heavy grazing. The aim of this paper is to present the current management of the rangelands of Israel via a multi-functional approach.

Materials and methods At present, the herbaceous rangelands in the northern part of Israel are utilized by beef cattle for meat production. However, at the same time these herds also serve as a tool for preventing wildfires and to maintain species richness. Such a pastoral system is being studied experimentally at the Karei Deshe experimental farm located in the eastern Galilee in the north-east of Israel. The study treatments included two stocking rates and three grazing management systems: continuous vs. rotational, either seasonal early or seasonal late.

Results The total primary production was highest under heavy stocking rates and rotational management. Consumption of supplementary feed during the dry season was almost double at the heavy stocking rate compared to the moderate one and was lower under a rotational system than under continuous management. The lowest species richness was detected in areas subjected to late rotational grazing or under no grazing. By the increased diversity, the value of cattle-grazing for recreation was found to be high. A decrease in fire hazard was also found. Addition of water troughs and feed supplementation stations affected cattle distribution in relation to pollution of streams and springs. Under early grazing and/or a heavy stocking rate, the cover of short annual grasses increased, whereas under moderate stocking and/or late grazing there was higher cover of tall annual and perennial grasses. Pasture quality was very high at the beginning of the green season and decreased sharply towards the summer. Protein content and digestibility were higher under heavy and early grazing. Stocking rates and timing of grazing influenced forage availability and quality, forcing cattle to modify their diet and habitat selection.

Conclusion The results presented in this study help to define appropriate management practices for this system according to the main goals of beef cattle production, recreation and nature conservation (Figure 1).

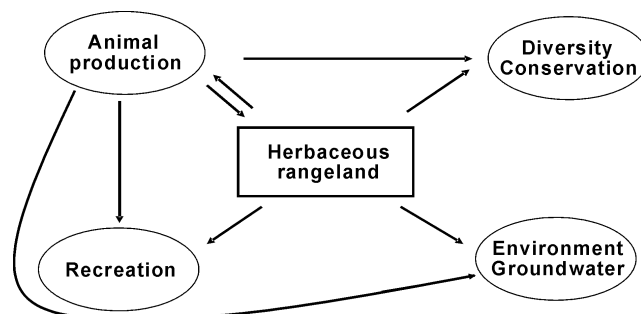


Figure 1 Multi-functional goals of Mediterranean herbaceous rangelands in Israel.