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IRRIGATED FORAGE PRODUCTION. DEVELOPMENTS IN CROP SCIENCE, VOL. 24

Irrigated Foragae Production. Developments in Crop Science, Vol. 24. A. Dorvat with contributions from Y. Cohen and A. Goldman. Elsevier Science Publishers B.V., P.O. Box 211, 1000 AE Amsterdam, The Netherlands and P.O. Box 945, Madison Square Station, New York, NY 1010-0757, USA, 1993, 288 pp., price Dfl. 295.00. ISBN 0-444-88300-2.

This monograph presents a summary of the agronomic aspects of irrigated forage production for livestock in areas with limited resources for irrigation. Forages are plants or plant parts eaten by animals or harvested and then fed to animals. Various harvesting, preservation, feeding, and management methods may be used in forage production systems. This book describes the physical and biological factors that control the production of forage crops. It builds upon previous works on crop physiology, crop-water relations, irrigation, agronomic aspects of crop production, and digestibility and feed conversion of forages.

The book is organized into two parts with part one focussing on principles of yield formulation and biomass development, water relations and irrigation, and forage quality and part two addressing the production principles for alfalfa, pasture grasses, forage corn, Berseem clover, annual ryegrass, and fodder beet forages. The last chapter discusses economic aspects of forage production systems.

Chapter 1 describes the physiological processes of biomass accumulation as influenced by radiation interception and the effects of canopy architecture and mineral nutrition. Absent from this chapter are discussions of root development and rooting characteristics of forage crops and the fertilizer contributions from animal manures. The rooting characteristics for the individual forage crops are discussed later in part two. Chapter 2 was written by Y. Cohen on water relations and irrigation and builds on the concepts of the association between crop dry matter (DM) production and transpiration (T) traced to DeWit, Arkley, Hanks, Tanner and Sinclair and many others. The chapter discusses the extension of the DM-T and DM-evapotranspiration relationships to the DM-irrigation relationship, irrigation scheduling, salinity effects on crop production, and irrigation methods. Although advanced irrigation methods like surge-flow for graded furrows and drip irrigation are described, a discussion of dead-level basin irrigation, which can achieve excellent uniformity with laser leveling technology and can be highly efficient, as used in the Western U.S. for alfalfa is not described. Chapter 4 on forage quality concludes the first section. The quality of forages

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is discussed in relation to feeding value mainly for ruminants by its digestible energy and protein content.

Chapter 5 discusses the production of alfalfa and is a complete discussion of DM-evapotranpsiration relations, nutrient requirements, harvesting, and forage quality. The chapter contains good discussions of alfalfa rooting characteristics influenced by water. The chapter includes a discussion of alfalfa seed production which seems somewhat unrelated to forage production although seed production fields are sometimes grazed during the winter. Irrigated pastures are discussed in Chapter 6, and it describes grazing by beef, dairy cattle and sheep with complete discussions of pasture management systems. Chapter 7 is devoted to forage corn that could be used for livestock feed as silage or stover and is a complete description of corn production and its forage quality. Berseem clover mainly grown during winter-spring periods in Mediterranean climates is described in Chapter 8. Annual ryegrass production is summarized in Chapter 9, and fodder beet production is discussed in Chapter 10. Chapter 11 is contributed by A. Goldman and discusses economic evaluation of forage production systems. This topic is difficult to adequately summarize since so many alternatives must be analyzed. A useful listing of common and scientific names of forage crops is provided at the end of the book, but the crops are not classified by photosynthesis pathway (C_3 or C_4), and a subject index is provided.

Irrigated forage production is often overlooked in discussing crop irrigation. Irrigation of forage crops is often criticized as a wasteful use of limited water resources because of the low water use efficiency and the low irrigation efficiency normally associated with forage irrigation. This monograph summarizes the importance of management to achieve high levels of DM production, and then this production can be efficiently harvested or grazed to produce meat or dairy products from animals. This is an important topic as world water resources are being stretched, and food needs for our world population require efficient uses of our animal, crop, land, water, capital, and labor resources. Limited mention is made of forage irrigation with treated sewage effluent, but this topic should be of increasing importance world-wide. Also, the book does not discuss the production of small grains for pastures.

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