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Food and Agriculture Organization of the United Nations

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Edited by
Candelario Mondragón-Jacobo
Instituto Nacional de Investigaciones Forestales y Agropecuarias (INIFAP)
Mexico
and
Salvador Pérez-González
Universidad Autónoma de Querétaro
Mexico

Coordinated for FAO by
Enrique Arias
Horticultural Crops Group
Stephen G. Reynolds
Grassland and Pasture Crops Group
FAO Plant Production and Protection Division
and
Manuel D. Sánchez
Feed Resources Group
FAO Animal Production and Health Division

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The designations "developed" and "developing" economies are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country, country territory or area in the development process.

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FOREWORD

The cactus *Opuntia* has been used in Mexico from pre-Hispanic times, and along with maize (*Zea mays*) and agave (*Agave* spp.), played a major role in the agricultural economy of the Aztec civilization.

In recent years there has been increased interest in *Opuntia* species for the important role they play – and are likely to play – in the success of sustainable agricultural systems in marginal areas of arid and semi-arid zones.

Opuntias are well-adapted to arid zones characterized by droughty conditions, erratic rainfall and poor soils subject to erosion, having developed phenological, physiological and structural adaptations to sustain their development in these adverse environments. Notable adaptations are their asynchronous reproduction, and their Crassulacean Acid Metabolism, enabling them to grow with very high efficiency under conditions of limited water.

While opuntias may particularly contribute in times of drought, serving as a life saving crop to both humans and animals, they also regularly provide livestock forage in arid and semi-arid areas. They provide highly digestible energy, water and minerals, and when combined with a source of protein, they constitute a complete feed.

In 1995 FAO published a book on *Agro-ecology, cultivation and uses of cactus pear*, prepared through CACTUSNET, the international cactus network, with only one chapter devoted to the use of opuntia as feed. The present publication, also prepared through CACTUSNET, focuses primarily on the use of opuntia as forage and presents many recent research and development findings.

The preparation of this book was coordinated by Enrique Arias and Stephen Reynolds of the Horticulture and Grassland and the Pasture Crops Groups of the Plant Production and Protection Division, and by Manuel Sanchez of the Feed Resources Group of the Animal Production and Health Division.

E. Kueneman
Chief, Crop and Grassland Service
Plant Production and Protection Division
H. Kudo
Chief, Animal Production Service
Animal production and health division

PREFACE

Towards the end of 1990, encouraged by the Mexican Embassy in Rome, a Mexican delegation consisting of researchers, technicians and officials from the federal agricultural sector, visited the island of Sicily, Italy, with the aim of initiating agreements to exchange information between the two countries concerning the cultivation and utilization of opuntia. When the delegation arrived on the island, the spectacular development of opuntia was noted. It was surprising to realize that formal cultivation of opuntia started only in the 19th century.

One year later, an *International Symposium on Opuntia*, with participants from Chile, Italy, Mexico and USA, was organized in Lagos de Moreno (Jalisco, Mexico), with the purpose of encouraging producers and researchers to increase cooperation among the participating countries and to diffuse information on the importance of opuntia.

As a follow-up to this meeting, it was proposed to create an International Technical Cooperation Network on Cactus Pear (CACTUSNET). The proposal was presented in a special session of the *Second International Congress on Opuntia*, which was held in Santiago, Chile, in 1992. CACTUSNET was established under the auspices of the Food and Agriculture Organization of the United Nations (FAO) in a specific meeting organized by the University of Guadalajara, Mexico, in August 1993, with the participation of ten countries from the Americas, Asia and Europe. Subsequently, several African countries have also joined the Network.

Subsequently, thanks to the voluntary cooperation of CACTUSNET members residing in countries with an arid environment, it was possible to start a database on countries of production, opuntia uses, and cultivated areas. At the end of the 20th century, the area under cultivated opuntia for forage was reported to be 900 000 ha, greatly surpassing the reported area for fruit (100 000 ha). For farmers in arid zones, opuntia planting is one solution to the problem of recurrent droughts. The succulence and nutritive value of opuntia make it a valuable emergency crop, permitting livestock farmers in Brazil, Mexico, South Africa and USA to survive prolonged and severe droughts.

It is worth mentioning that most authors of this book are technicians and scientists with wide experience in their own country of cultivation and use of opuntia as forage. The publication strengthens the written information on opuntia, since most of the existing publications have emphasized its use as a fruit.

Finally, I would like to mention that the diffusion of information on species like opuntia can allow assessment of its value for tackling drought in the short term, while in the medium term opuntia can constitute an important alternative to counteract global climate change and desertification. Other benefits from opuntia are soil and water conservation, and protection of local fauna in arid and semi-arid lands.

The publication of this book is, therefore, opportune, reflecting one of the basic objectives of the CACTUSNET, namely the diffusion of technical and scientific knowledge on opuntia

Dr Eulogio Pimienta

University of Guadalajara, Mexico

First General Coordinator of the CACTUSNET

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