# Collection of Valuable Indigenous Plant Species of the Arabian Peninsula 1998-2004

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**Citation:** Osman, Ahmed El Tayeb. 2005. Collection of Valuable Indigenous Plant Species of the Arabian Peninsula, 1998–2004. International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria. vi + 130pp.

ISBN: 92-9127-176-5

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# Acknowledgements

This publication documents the joint efforts of ICARDA-APRP and National Agricultural Research System (NARS) in countries of the Arabian Peninsula in collection, classification and storage of indigenous pasture and rangeland species from 1998 to 2004. The contribution of NARS in facilitating the collection missions is highly appreciated.

The valuable financial support of the Arab Fund for Economic and Social Development (AFESD), the International Fund for International Development (IFAD) and the OPEC Fund for International Development (OPEC Fund) is highly appreciated.

Thanks and appreciation to The Ministry of Agriculture and Fisheries of the United Arab Emirates for hosting the ICARDA-APRP office in Dubai.

Special thanks are due to the former and current ICARDA scientists, especially Dr John Peacock, Dr Jan Valkoun, Dr Morag Ferguson, and Mr. Ali Shehadeh, for their contribution to the success of the collection missions.

Thanks to Dr Ahmed Moustafa, APRP Regional Coordinator, for his continuous support, suggestions and encouragement throughout the preparation of this publication.

Thanks are also due to Dr Ali Abd El-Moneim and Dr Surendra Varma for reviewing the text.

Finally, the invaluable technical support by Eng. Arash Nejatian, in the layout of the book is highly appreciated.

Ahmed El Tayeb Osman

# Foreword

The Arabian Peninsula (AP), which comprises seven countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE), and Yemen – is characterized by low and erratic rainfall, high evaporation rates, and high temperatures. Soil and water salinity is also high, and can increase rapidly as a result of irrigation with brackish water. Over the centuries, these extreme conditions have applied rigorous selection pressures on plant species, resulting in a uniquely adapted plant biodiversity. This resource of precious genes can play an important role in agricultural research globally.

However, the native plant biodiversity of the Peninsula is rapidly depleting. A large part of the total land area now suffers from some form of desertification. This is due primarily to overgrazing. Since the late 1960s the region has experienced a sharp increase in animal production as a result of improved veterinary services and subsidies that enable the purchase of processed feed and baled hay. In 1998, an estimated 24 million head of livestock, mainly sheep, goats and camels, were reported in the region.

Overgrazing reduces the productivity of ecosystems and changes the species relative abundance. Herbivores select and graze palatable species, leaving an ecosystem dominated by unpalatable and sometimes poisonous species. This phenomenon is seriously threatening the genetic resources and biodiversity of useful forage species, which were in the past, and could again be, the basis for sustainable animal production in the region.

The main approach used by ICARDA's Arabian Peninsula Regional Program (APRP) to address the problem of degraded rangelands, shortage of feed for livestock, and limited water for irrigated forages, lies in the utilization of adapted indigenous forage species. Collection missions were carried out with the national programs of different countries in the Peninsula. This publication documents the genetic materials collected in the region from 1998 to 2004, and provides passport data for those collections. Some of the species collected have been found to be valuable as forage crops with high water-use efficiency, a feature that is extremely useful in the dry areas.

I hope this publication will be useful for researchers, taxonomists, and range management specialists.

Prof. Dr Adel El-Beltagy
Director General, ICARDA

# Introduction

The Arabian Peninsula (AP), which comprises seven countries – Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (UAE), and Yemen – experiences some of the most extreme climatic conditions, and has in recent years experienced large changes in human activities, which have implications for increased risk of land degradation and loss of plant biodiversity. These, together with a considerable loss of plant biodiversity of the Peninsula, have contributed to desertification in the region. Within these countries, there are diverse ecosystems, which encourage species diversity and are likely to reflect genetic variation within those species found across the ecosystems. In the context of sustainable agricultural production and arresting desertification, the most important on earth.

AP is characterized by low and erratic rainfall, high evaporation rates and extremely high temperatures. Soil and water salinity, are also high which can increase rapidly under irrigation. Over the centuries, these extreme conditions have placed stringent evolutionary selection pressures resulting in a uniquely adapted biodiversity, an expression of genetic variation. With increases in levels of soil and water salinity globally and changes brought about through global warming, adaptation to extreme environmental conditions will become even more critical for agriculture.

The native plant biodiversity of the Arabian Peninsula estimated to be over 3500 species is being rapidly depleted. Large areas of AP now suffer from some form of desertification. The primary cause is overgrazing. Since the late 1960's the region has experienced a sharp increase in animal production, a positive outcome of improved veterinary services and provision of subsidy that enables farmers to purchase processed feed and baled hay. In 1998, it was estimated that there were 24 million heads of livestock, comprised mainly of sheep, goats and camels.

Overgrazing lowers the productivity of these ecosystems and causes reduction in the nutritional value and relative abundance of plant species. Herbivores usually select and graze the palatable species, thus leaving an ecosystem dominated by unpalatable and sometimes poisonous species. This phenomenon is seriously threatening the genetic resources and biodiversity of useful forage species, which were in the past, and could again be, the basis for sustainable animal production in the region.

The main approach adopted by the Arabian Peninsula Regional Program (APRP) to address the problem of degraded rangelands, shortage of feed for livestock and limited water for irrigated forages lies in the utilization of adapted indigenous forage species. Collection missions were carried out in different countries of AP. This publication therefore documents these missions and the genetic materials collected. Special emphasis was given to the passport data, which would guide researchers, taxonomists and range management specialists on where to locate particular species.

The missions started by assessing the situation in the different countries of AP and preparing a questionnaire that was circulated and completed by the AP countries. Based on information from the questionnaire, we agreed that priority should be given to collection missions in the UAE, the Sultanate of Oman and the Republic of Yemen.

A major objective of the first two collection missions in the UAE and the Sultanate of Oman was the training of counterpart scientists from the Ministry of Agriculture and Fisheries, UAE, and the Directorate of Agricultural Research, Oman, in germplasm collection techniques. The training course for 12 scientists was held at the Natural History Museum and Desert Park, Sharjah, UAE, from 28 February to 4 March 1998. Following the training course, separate germplasm collection missions were carried out in the United Arab Emirates, the Sultanate of Oman and the Republic of Yemen for the major indigenous forage grasses, legumes, shrubs and trees of the region, with the ultimate objective of utilizing the most promising germplasm for degraded rangeland rehabilitation and for irrigated fodder production under systems requiring substantially less water than incurrent practice. Similar collection missions took place in Dhofar, Sultanate of Oman (2001), Bahrain (2002), Qatar (1998-2004) and Saudi Arabia (2002-03). The material collected in each mission is reported in the relevant section in the book.

# Collection in the United Arab Emirates 1998