
قسم وقاية النبات
كلية الزراعة
جامعة اسيوط

Experience about Organic Beekeeping and Production of Organic Honey

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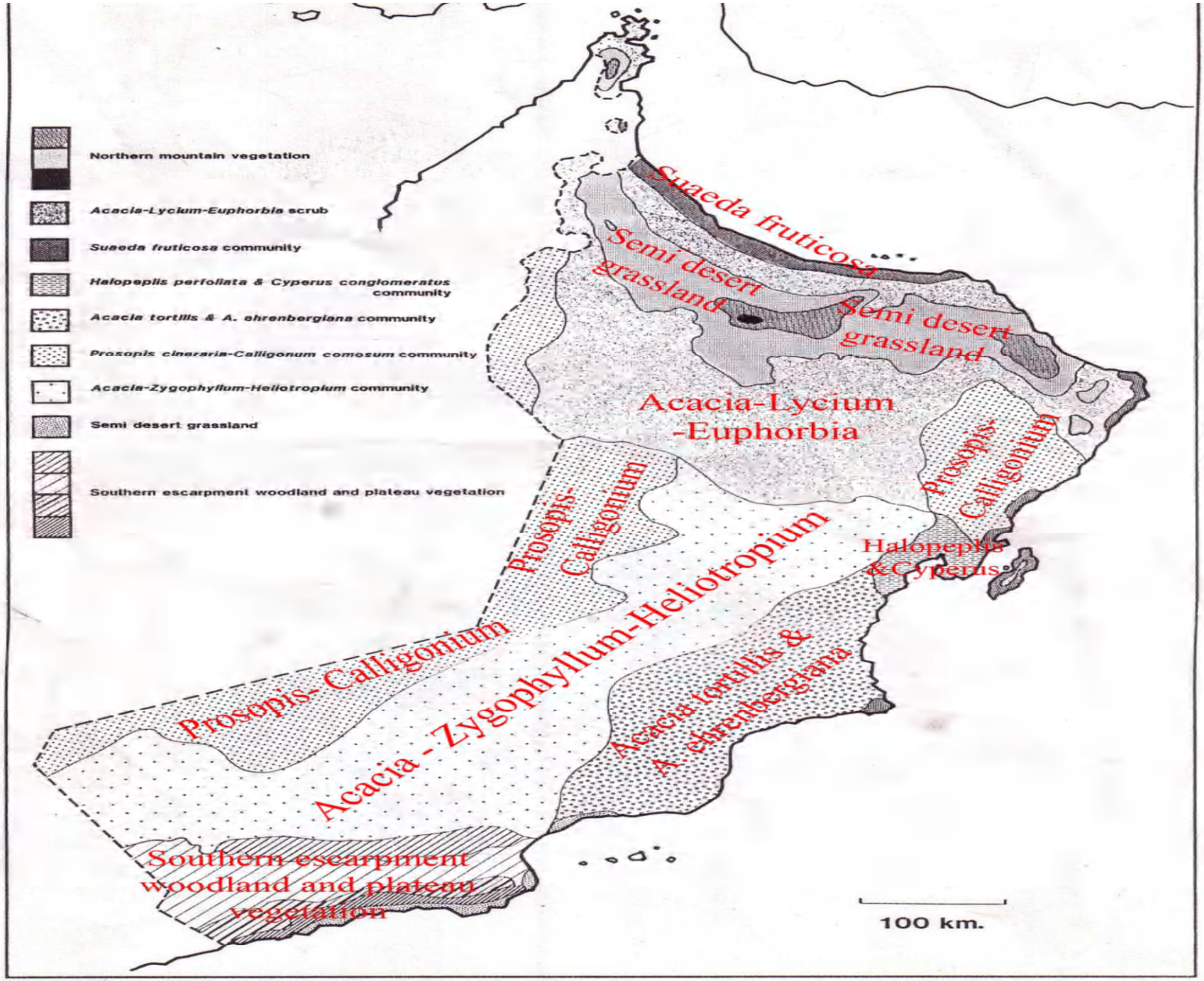
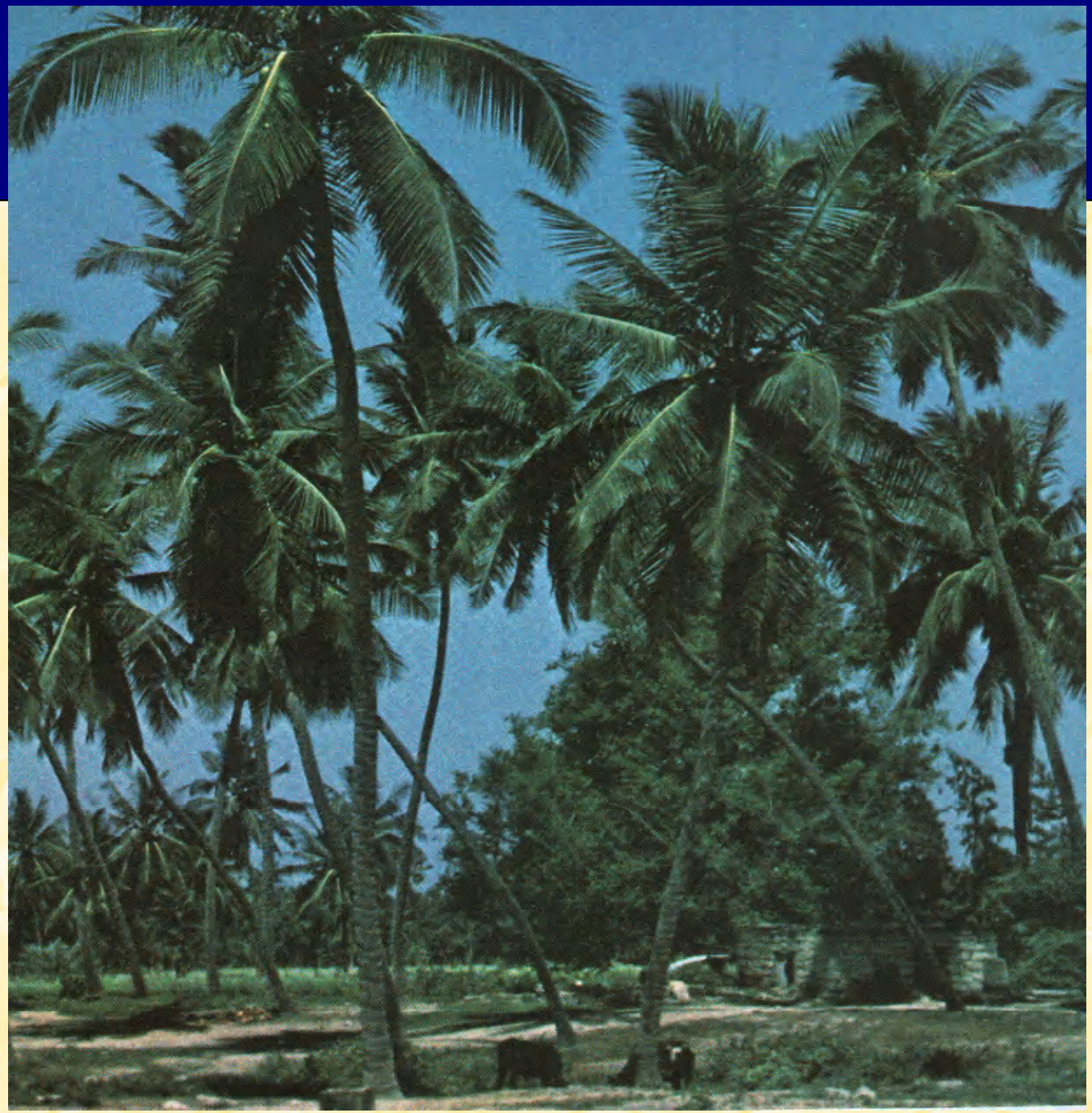
Introduction

Sultanate of Oman, is a country at the eastern extremity of Arabian Peninsula. Oman, a country of some 300,000 km2. The rainfall and underground water enough to support vegetation in plains and mountains of Oman. The two mountain regions in the north and south are separated by about 800 km of desert.



Vegetation map of Oman showing the major vegetation zones. Vegetation boundaries are based on landforms (Clarke 1986).



Introduction

Heavy showers are an important source of rain out of the monsoon period. The ones shown here are occurring over the Samhan escarpment, which is heavily wooded in contrast to surrounding desertic vegetation.

Introduction

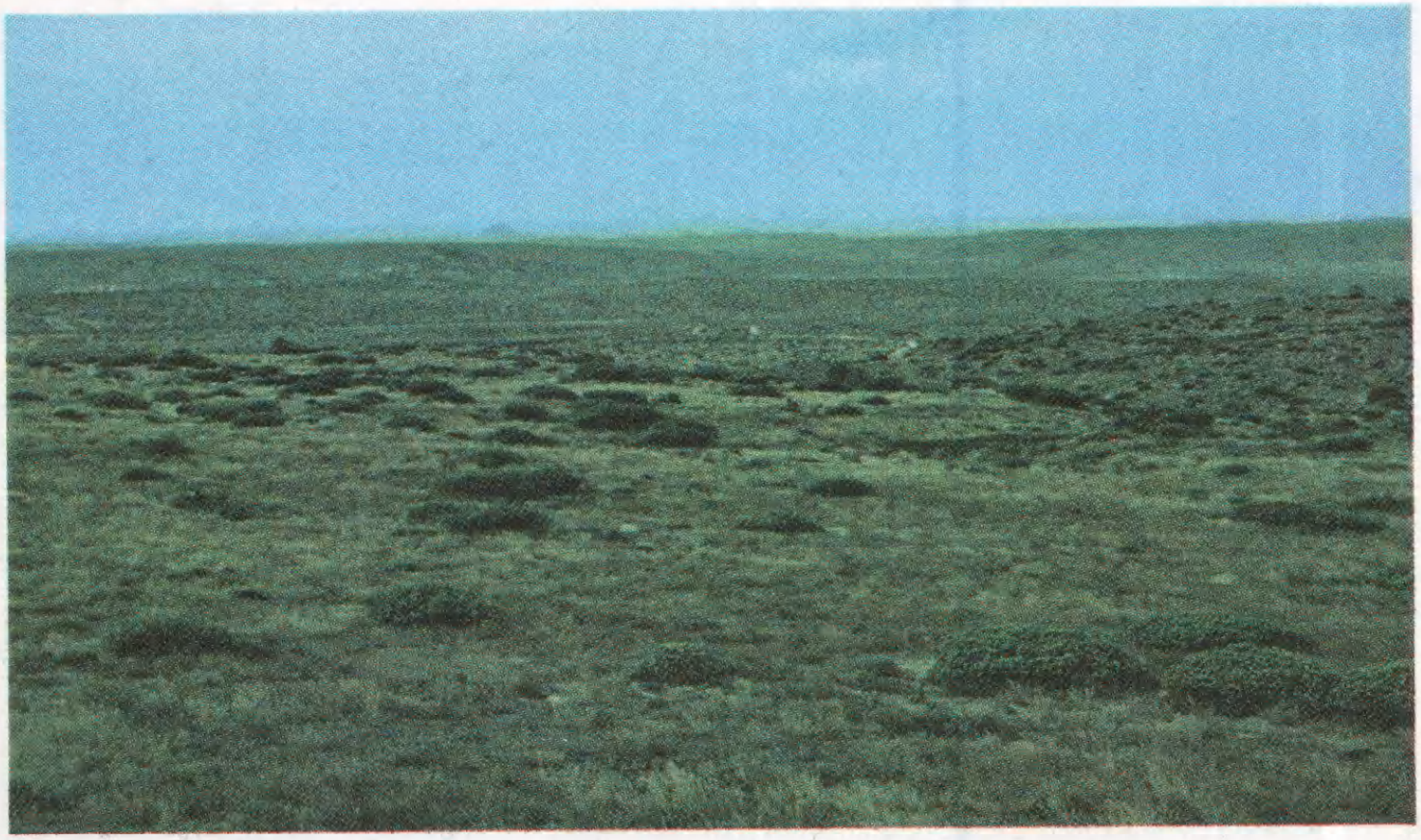
The monsoon mists, shown here over the long grassland of Jabal Qara, play an important part in supplying moisture responsible for the unique greenness of the mountain region of Dhofar.

Introduction

Desert vegetation of the plain and shallow wadi

There is a good variety of species of shrubs, herbs and grasses and an occasional tree such as the Frankincense (*Boswellia sacra*) shown in the foreground.

Introduction



Semi-desert scrub of the type which occurs in a narrow band to the north of the mountain range. It is consists of a variety of herbs and grasses, dominated by the globular form of the shrub *Euphorbia balsamifera* ssp. *adenensis*.

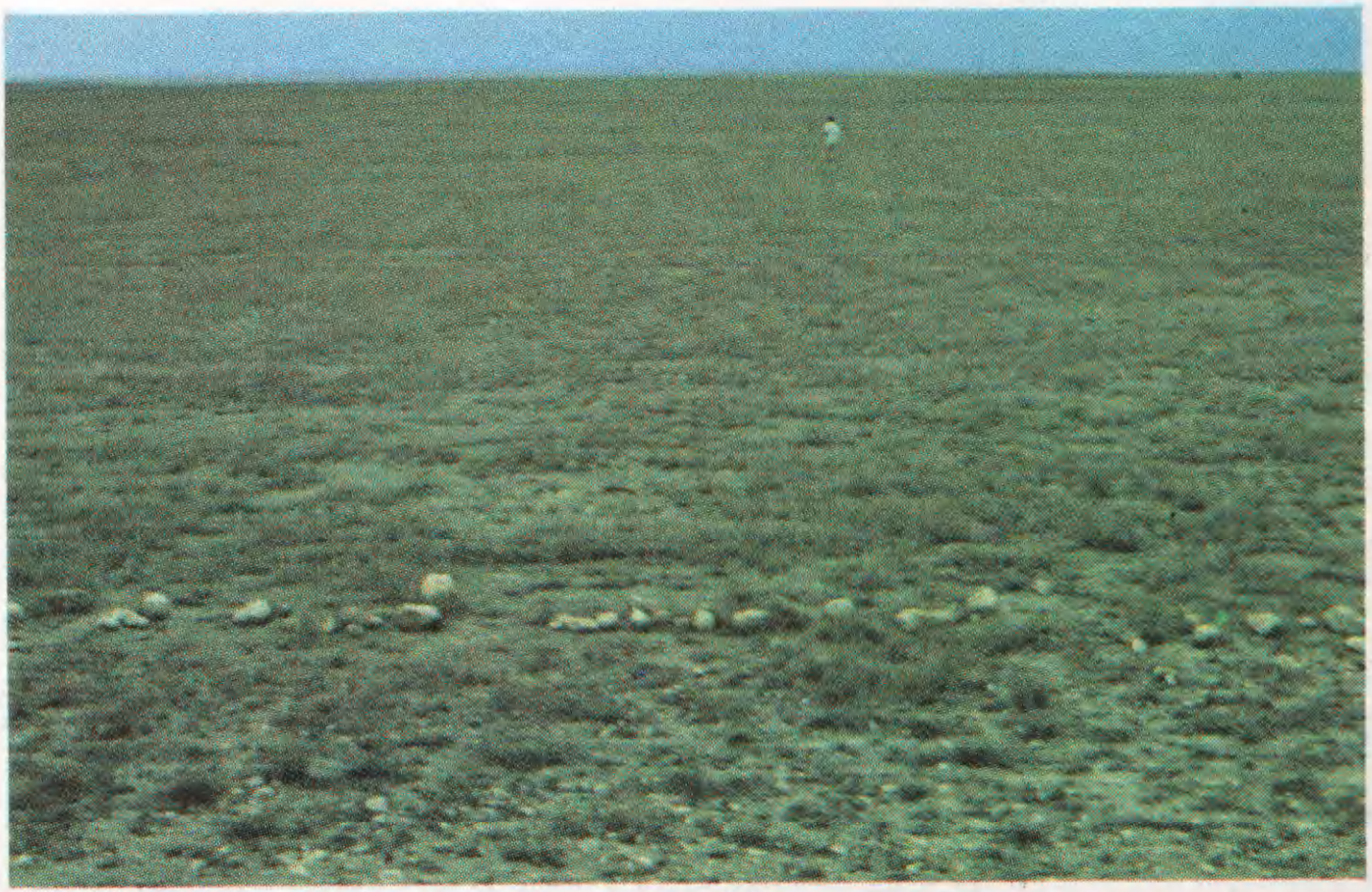
Introduction

Long grasslands of central Jabal Qara at the end of the monsoon in late September, 1977. At this stage of growth the grass is green and contains over 10% crude protein. (Photograph A. Dunsire)

Introduction

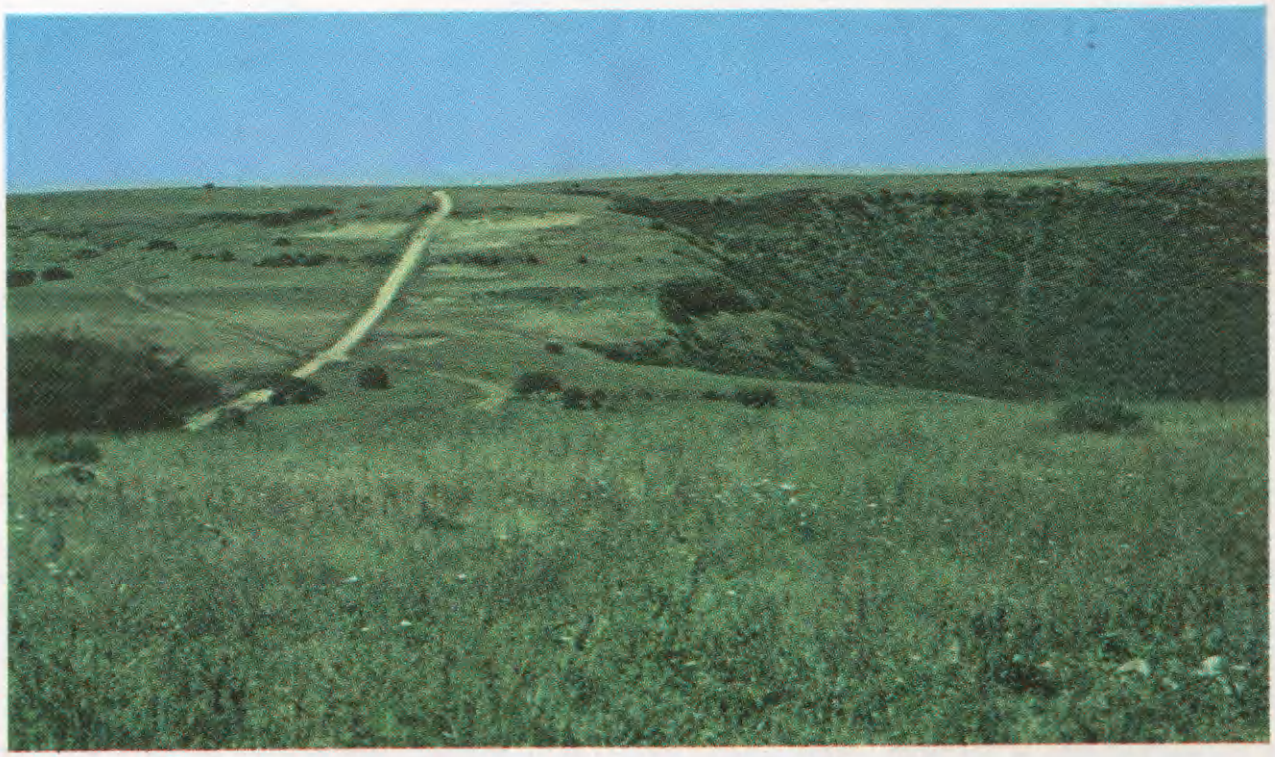
Dense woodland on southern slopes of mountain range.

Introduction



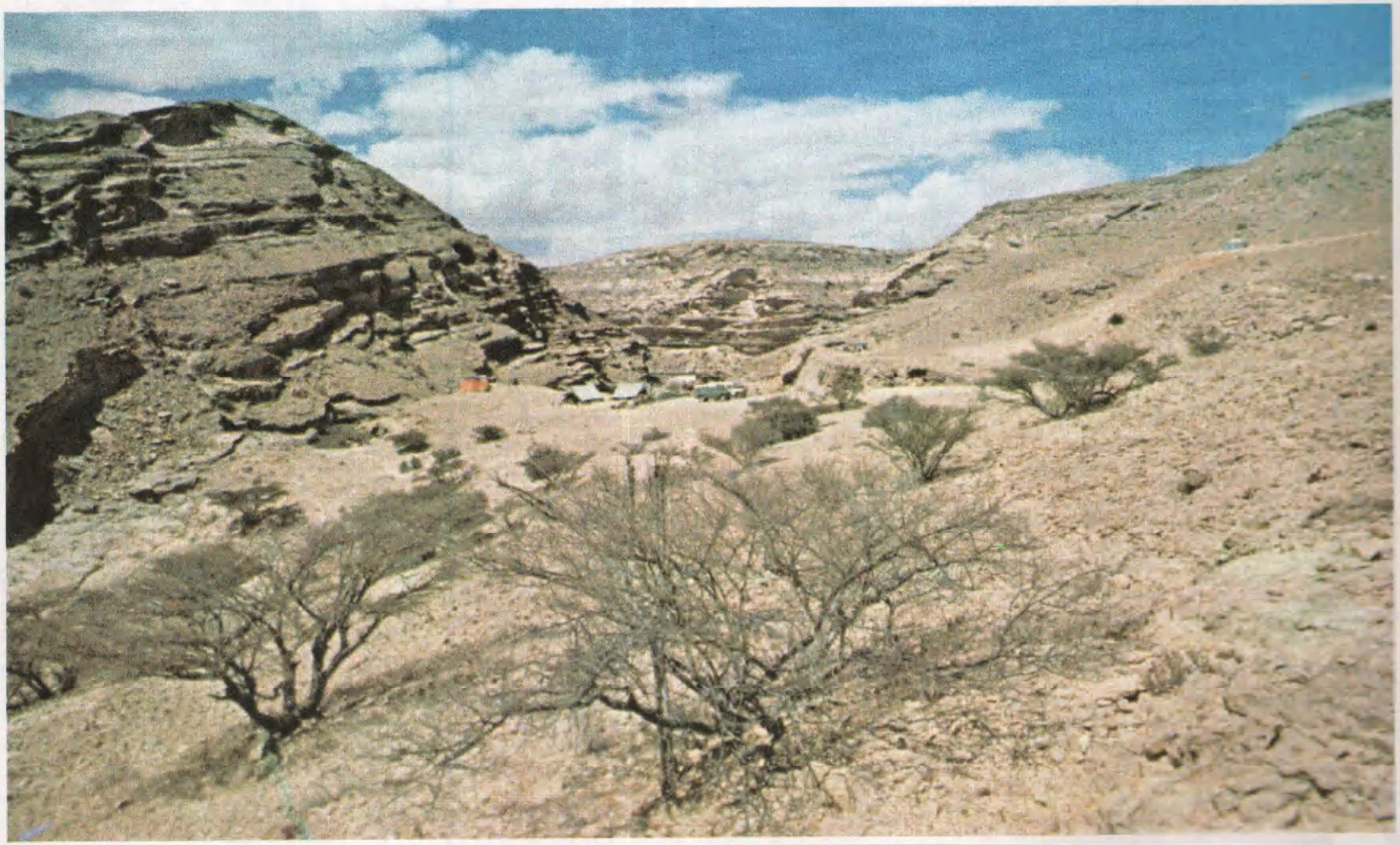
Short grassland vegetation on Salalah plain, shortly after the end of the monsoon. Much bare ground is evident. (Photograph A. Dunsire)

Introduction



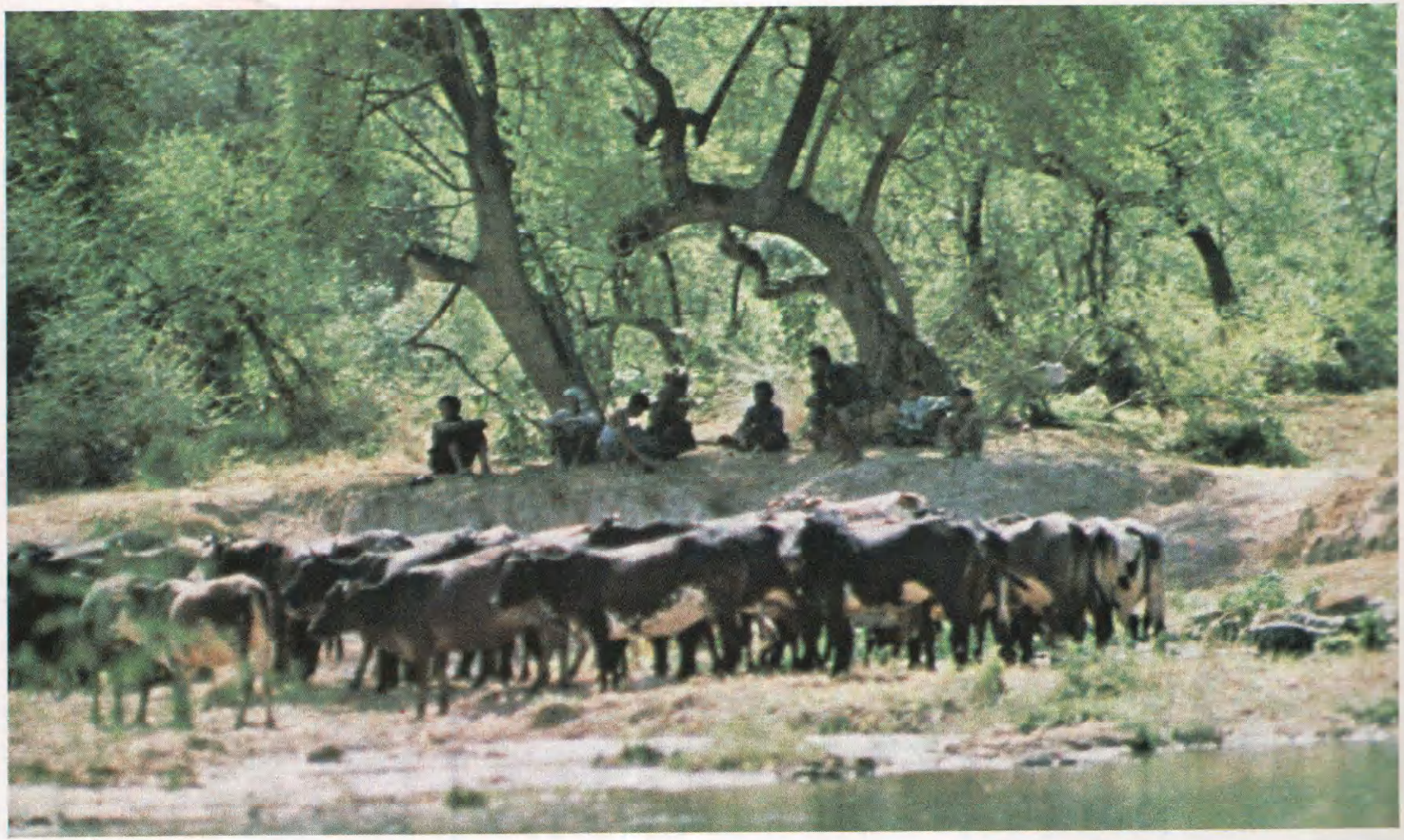
The sharp interface between grassland and woodland suggests the possibility that the natural climax vegetation of the well watered parts of the mountains is woodland and that the long grassland represents a sub-climax artificially maintained by human activities such as cattle grazing and the cutting of timber. Most of the robust woodland occurs on terrain that tends to inhibit these activities, such as steeply sloping ground.

Introduction



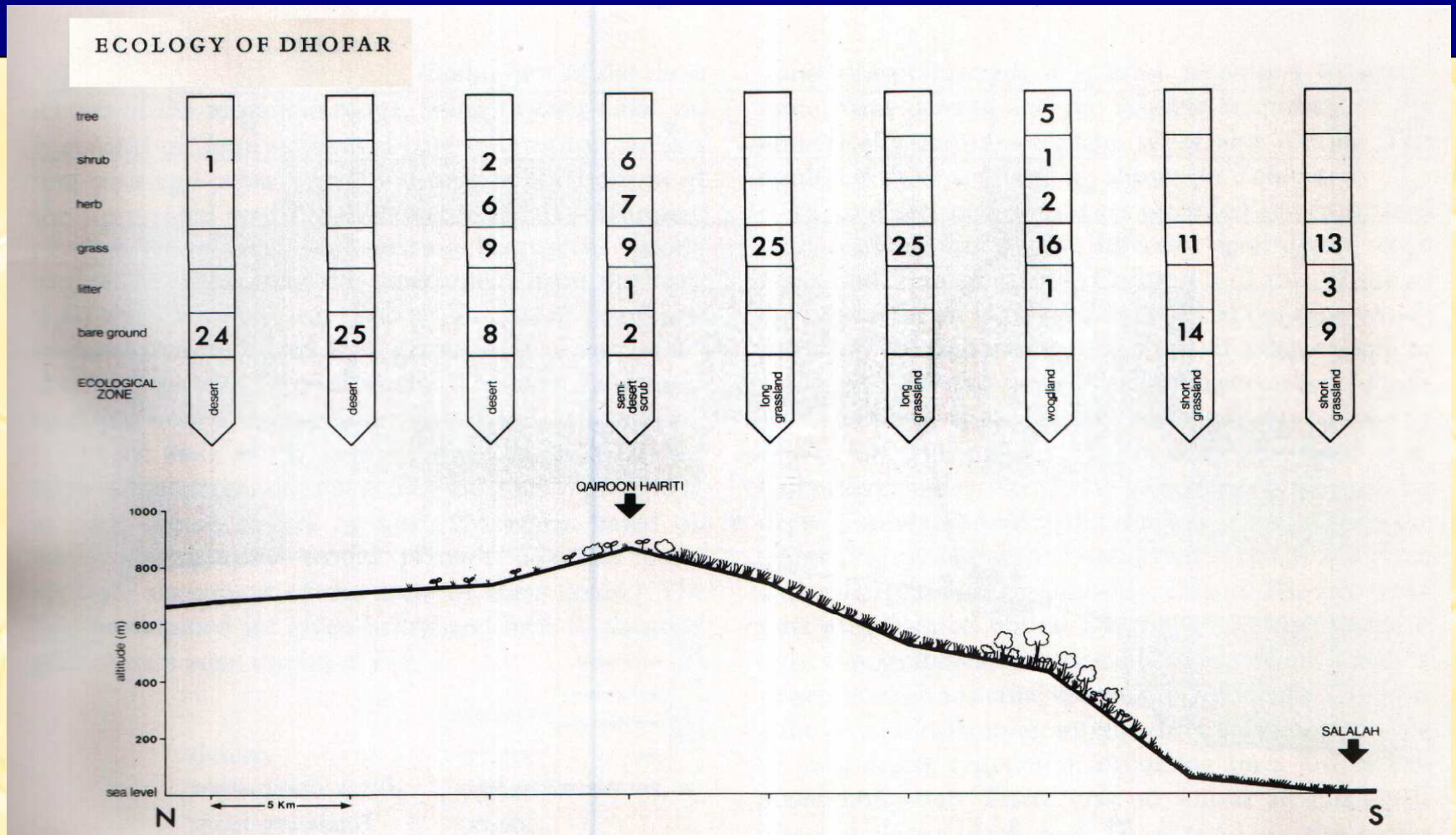
Habitat of *Omania splendens* gen. nov., sp. nov. Oman Flora and Fauna Survey camp above Ayun pools, seen from south. (Photograph A. Dunsire)

Introduction



Tribesmen and their cattle in Wadi Darbat. (Photograph A. Dunsire)

Introduction



North-south profile of Jabal Qara, along Thamarit–Salalah road (see Fig. 2). At 5 km intervals, the altitude and the vegetation type were noted and a step-point transect was carried out, indicating the occurrence of bare ground, litter (dead plant material), grass, herb, shrub or tree at twenty-five points. This information is shown in the vertical columns at the top of the diagram, and gives an indication of the degree and type of vegetation cover at each site.

Introduction

Yemeni or Omani honeybee, *Apis mellifera yemenitica*, is found in northern and southern mountains, where organic beekeeping is practised. This study was conducted in Oman during my work as Apiculture Expert for six years. Observations and data were collected about bee forage plants, honey production and its physico-chemical properties from plains and from mountains, where organic beekeeping is found and organic honey is produced. The large biodiversity of wild and cultivated plants and recent problems of soil and water salinity and different activities of honey bee colonies were investigated.

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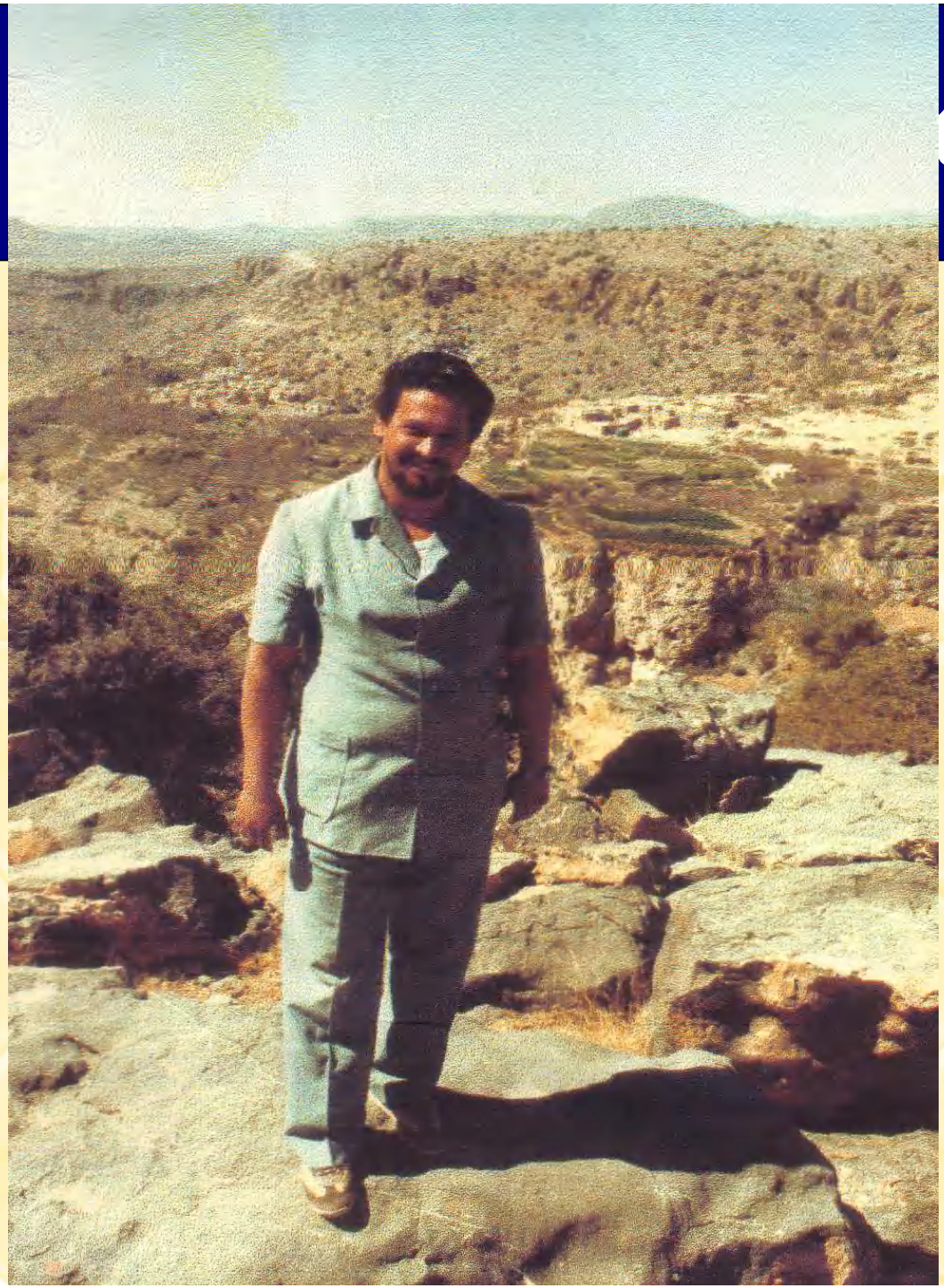

A picture of the author on northern mountains of Oman “ Jabal Akhdar “

roduction

A brood comb containing excellent queen cells of Omani bees in Rostaq, Oman, 1994

Results and Discussion

Bee forage plants in Oman:

Characters of honey depend on the identity of the forage plants used by the honey bee. Manley (1983) reported that, in Oman melliferous plants include alfalfa, mango, but (Reptonia), sunflower, lime and some ornamental plants.

A list of cultivated dicotyledons plants which considered to be forage plants for honey bee colonies including 120 plant species, belonging to 43 plant families, in the plains, was prepared (Hussein, 1997).

Results and Discussion

A list of cultivated monocotyledons plants which considered to be forage plants for colonies including 28 plant species, belonging to 9 plant families, in the plains, was prepared.

A total of 148 cultivated plant species belonging to 52 plant families were included in this survey of bee forage plants in Oman, from which non-organic honeys were obtained.

Survey of wild bee forage plants in Oman was conducted. Fourty six wild bee forage plants in the mountains, from which organic honeys were obtained (Hussein, 1997).

Results and Discussion

Five drought and salt-tolerant flowering trees can be a good source of 'organic honey' in Oman: *Acacia, Prosopis, Ziziphus, Cassia* and *Azadirachta*. Another trees, grasses, legumes, fruits, browse plants, forest trees, ornamental and aromatic drought and salt-tolerant plants were suggested for planting, in order to increase honey production in semi-arid ecosystem.

Results and Discussion

Honey production and physico-chemical characters of 'organic or non-organic honeys' in Oman:

Main honey flow in south of Oman (Dhofar), was in November-December months, from sidr in mountains (organic honey), and secondary honey flow in May-June months in the plain (non-organic honey). Mean production (kg.) of 'organic honey' from mountains was significantly more than this of 'non-organic honey' in the plain, or 14.228 kg./colony and 9.287 kg./colony, respectively, with a general mean honey yield of 8.483 kg./colony (Table 1).

Results and Discussion

Mean honey yield/colony in farms (10.823 kg./colony) was significantly more than this in colonies reared in houses of the plain (7.750 kg,/colony).

In northern Oman, main honey flow 'organic honey' during June, and secondary flow during November.

Significant differences between 'organic' and 'non-organic' honeys were detected with respect to: specific gravity (gm), water content (%), T.S.S. %, pH value and potassium content (p.p.m.).

Results and Discussion

Table 1: Physico-chemical properties of 'organic honeys' from mountains and 'non-organic honeys' from plains of Oman.

Type of honey	Specific gravity (gm)	Water content (%)	T.S.S. (%)	Water content (%)	pH value	Sodium content (p.p.m.)	Potassium content (p.p.m.)	Mean honey/ colony (kg.)
'organic' (n=30)	1.426	17.855	80.825	19.175	6.490	165	705	14.228
'non-organic' (n=123)	1.420	18.862	80.041	19.966	5.167	162	2594	9.287

Results and Discussion

Significant and positive correlation (r= +0.516) was detected between water content (%) in honey, and R.H.%, and between pH values were potassium content, p.p.m. (r= +0.440).

Highly significant differences between sodium or potassium content, p.p.m., from one side, in dark 'non-organic' honeys in the plain and light 'organic honey' from mountains.

Table (1) shows that potassium content, p.p.m., in 'non-organic' honey from the plain, was three times more (2594 p.p.m.), than this of 'organic honey' from mountains (705 p.p.m.).

Results and Discussion

Specific gravity (gm.), T.S.S. % and pH values in 'organic honeys' was more than these of 'non-organic' ones, while the reverse was true with respect to water content %, and potassium content, p.p.m.

During my work, in Oman, the correlating formula between number of extracted combs (X), and honey production, kg (Y), was:

Honey weight (kg.) =1.0645 (number of extracted combs) + 4.236

where: n= 33, r2 = 0.87, r= +0.933.**

Results and Discussion

In Assiut, Egypt, the correlating formula was:
Honey weight (kg.)= 1.41 (number of extracted combs) - 0.92
where: n= 16, r2 = 0.73, r= +0.85. (Hussein, 1983).**
Based on the classification of honeys based on water content % (White, 1979), all 'organic honey' samples from mountains are considered to be top-grade honeys.
Sodium or potassium content in dark honeys, during this work, was significantly more than those in light honeys. These differences may be due to climatic and floral differences and using of chemicals in the plains and mountains (Ibrahim *et al*., 1977; Mulalic and Kajtezovic, 1977; Krupowicz and Kraczowka, 1978; Spettoli *et al*., 1983 and Hussein, 1989, 2001).

Results and Discussion

'Honey hunting, is practised in mountains of Dhofar. This organic honey is popular when harvested without injuring bees.

Underground water with salinity and/or pollution, in the plains, in addition to usage of chemicals leads to production of 'non-organic' honey, while flowering plants in the mountains, away from polluted and/or saline underground water, produce favourable 'organic' honey.

Thanks