

Chapter - I

INTRODUCTION

A member of the family Equidae, the wild ass is placed with other recent equids into the genus *Equus*. In the two million years since their first appearance, members of the genus *Equus* have migrated in many different directions and at different times. *Equus* species survived and diversified in Asia, Europe, and Africa (Waring 1983).

In the late Pleistocene, prior to the beginning of domestication, long-term isolation of equid populations undoubtedly occurred, which led to what are now distinct species. The true (caballine) horses inhabited Eurasian lowlands north of great mountain ranges (Zeuner, 1963).

Today there remain only seven species belonging to the genus *Equus*, three zebras and a wild ass in Africa, and two wild asses in Asia. Przewalski's horses exist in captivity, but are extinct in the wild (IUCN/SSC, Equid specialist group 1992).

The true asses ranged primarily along the northern zone of Africa (Zeuner 1963). While each species continued to evolve characteristics independent of the others, they also differentiated into geographical races or subspecies which are now more or less distinct.

The Asiatic Wild Ass

There are at least eight subspecies, and many more geographically distinct populations of Asiatic asses. The taxonomic classification used by IUCN/SSC Equid Specialist Group (Duncan 1992) has been followed here. There are two subspecies of the Asiatic wild asses, viz. **hemionus** and **kiangs**. Since the hemionus and kiangs are taxonomically and ecologically relatively close, and the data on their numbers and

distribution are sparse, they are generally treated together (Clark and Duncan,1992). There is a broad agreement between the information available on equids' chromosomes, morphology and genetics. A "concensus" classification for Asiatic wild asses is presented

Asiatic Wild Asses

Equus hemionus

<i>E. h. hemionus</i>	North Mongolian Dziggetai
<i>E. h. luteus</i>	Gobi Dziggetai
<i>E. h. khur</i>	Indian Wild Ass
<i>E. h. kulan</i>	Kulan
<i>E. h. onager</i>	Onager
<i>E. h. hemippus</i>	Syrian Wild Ass (Extinct 1927)

Equus kiang

<i>E. k. holdereri</i>	Eastern Kiang
<i>E. k. kiang</i>	Western Kiang
<i>E. k. polyodon</i>	Southern Kiang

There is little variation in the morphometry of the Asiatic wild asses (Groves,1974). The skeletal and colour differences allow the different subspecies to be distinguished easily (Groves,1986).

The Asiatic wild asses occupy quite different environments: the khur in the dry mudflat (Rann) at sea-level; the onager, kulan, and dziggetai in desert areas with hot

summers and relatively cold winters, the precipitation, if any, generally occurs in the form of snow. Contrasting to this, the kiangs occur in the high plateaus of the mountains of Tibet and Ladakh (India) (Figure I.1).

In historical times, the Asiatic Wild asses were distributed throughout the southern half of Asia. They occupied most of the continent's steppe and desert regions; from the Black Sea to the Ural mountains in the north, through Kazakhstan and Siberia, east to the Gobi Desert and almost to the Pacific Ocean. In the south, they occurred in Anatolia (900 B.C.), south to the Negev and through the deserts of Arabia, Persia, Afghanistan and Pakistan to the Rann of Kutch in north-western India.

With the exception of Mongolia, Xinjiang and Tibet, the increasing intensive landuse by man and domestic animals has pushed these animals into protected areas and pockets of little-used land. And today, they survive mostly in small and fragmented populations (Figure I.1)

Among the hemiones, the onager is critically endangered; the kulan and Indian wild ass are considered endangered; and the status of the Gobi dziggetai is insufficiently known. The eastern kiang is abundant, however, the status of the western and southern kiangs is indeterminate.

The Indian Wild Ass: The former distribution of this subspecies (*Equus hemionus khur*) (Plate I.1) was in Baluchistan around Balagajar in the central Makran as well as Sohtagan in the extreme border of Kharan district in Pakistan. In 1880's wild ass were abundant in Baluchistan (Murray 1884). In 1910, 1000 wild ass were estimated in north western Afghanistan but they were believed to be nearing extinction (Simon, IUCN 1966).

A small population of wild ass survived in the Great Rann of Kutch on the border of Chackro and Nagar-Parkar tehsils of Tharparkar district in Sind up to the late 1960's (Roberts 1977).

Spearing and capturing of wild ass were evidently done by relays of horsemen in the Rann. Occasionally wild asses have been captured by running down and noosing from a moving vehicle, for zoos to breed mules for the army. A pair was captured about 60 years ago by the princely family of Dhrangadhra and also of Radhanpur and trained to draw a carriage, and that they worked well (Gee 1963).

The Indian wild ass is concentrated now only in the Little Rann of Kutch in Gujarat (India). The Little Rann of Kutch was declared as a Wild Ass Sanctuary in 1973 mainly to protect the only khur population. This subspecies is included in Schedule I of Indian Wildlife Protection Act, of 1972 and is also listed as endangered in the IUCN's Red Data Book. At present over 2,072 animals (Forest Department of Gujarat, census in 1991) are surviving in Little Rann of Kutch.

The wild ass sanctuary is 18 kms north from the town of Dhrangadhra (Surendranagar District) and is 142 kms from the city of Ahmedabad. The Conservator of Forest (Wildlife Wing) based in Junagadh is responsible for the management of the sanctuary. The Assistant Conservator of Forests (ACF) is the Sanctuary Superintendent based in Dhrangadhra which is the sanctuary office. The sanctuary has been divided into 3 ranges : Dhrangadhra, Bajana and Adesar, each managed by a Range Forest Officer.

The whole sanctuary of 4,953 km² area is managed by a meagre staff of 34 personnel including the Range Forest Officers, Foresters and Guards. The infrastructure provided are two DCM Toyota, one jeep, three motorcycles, 3-4 camels. No wireless sets are provided.

THE STUDY

The present study was initiated by the Wildlife Institute of India, Dehra Dun, in February, 1989. The objective of the study was primarily to generate baseline ecological information on the Indian wild ass and its habitat to develop better management strategies for the subspecies.

The major objectives of the study were:

1. Vegetation Mapping and Classification of the intensive study area and the Bets.
2. Population Structure of wild ass in LRK.
3. Habitat use and Activity patterns of the family band and an all-male herd and a collared mare in the intensive study area.
4. Seasonal variation in ranging patterns of the family band, collared mare, dominant stallion, and ostracized stallion and an all-male herd.
5. Social Organization of the wild ass in LRK.

Study area

The Rann of Kutch: The Little Rann of Kutch (LRK) the present study area, (latitude 23° 10' - 23° 45' north and longitude 70° 45' - 71° 45' east), is located in the state of Gujarat. It is just above the sea level and adjoining the Gulf of Kutch. The 4,953.70 Km² LRK is spread over five administrative districts i.e. Rajkot, Surendranagar, Mehsana, Banaskantha and Kutch of Gujarat.

The 30,000 km² area of the two Ranns, Great and Little is subjected to annual flooding during monsoon by tidal water and seasonal rivers. The surface of the LRK appears, for the most part, to be just above normal high tide level and are thus best considered as forming supratidal areas. The LRK is flooded with sea water, to a depth of 2m, when winds of SW monsoon, blowing from July to September, force the water

from the Arabian Sea up the Gulf of Kutch into a part of the LRK (Glennie and Evans 1976). The rain water also accumulates on the Rann surface (Roy 1973) when the seasonal rivers drain water in the area.

Evolutionary History of the Rann: During the geological past, at least since the Mesozoic, the Great and the Little Ranns were a part of the shallow Arabian sea. The Ranns of Kutch probably occupy the sites of tectonic depression. They were once shallow marine gulfs following the post-glacial rise in the sea level. The Ranns became silted, apparently around 400 B.C. or later. The silts of Little Rann show strong affinity to the materials derived from the local sources of Gujarat, whereas those of the Great Rann are of Indus river deposit (Sieveright 1907; Glennie Evans 1976; Ghosh 1982).

The geological and geomorphic evolution of the Little Rann typically points to a complex interplay of neotectonism and climatic fluctuations during the Quarternary times, although the foundations for formation of Rann were laid down during the Mesozoic times when it was part of the shallow sea (Roy 1973; Merh and Patel 1988).

Parts of Kutch and Saurashtra began to stand out as islands during the early Tertiary and have maintained the situation untill the present, apart from modifications caused by changes in the sea level during the Pleistocene, and the influx of sediment into the area (Roy 1973; Glennie and Evans 1976; Merh and Patel 1988).

In the 4th century, when Alexander visited India, the Ranns were still marine gulfs and had several ports (Krishnan 1952). As a result of sedimentation at the heads of these gulfs, the sites of these ports have since have shifted westwards (Glennie and Evans 1976).

Geography: Rising only a few metres (5-7m) above the Rann (saline mudflat) surface are certain island-like features termed as *Bets* having sparse vegetation and are thus distinguishable from the low-lying barren Rann. The main *Bets* of LRK are Wasraj and its chain islands - Andheri Wen, Khijadiya, Maharajawali, Miyan and Pancham. The other *Bets* are Pung (largest Bet), Dhut, Mardak, Shedwa, Nanda and Jhilandhar (Figure I.2). The Little Rann has three fringes - southern, eastern and northern.

Main Rivers emptying into the Rann during the monsoon are Bhambhan, Kankavati, Godhra and Umai from the southern fringe, Rupen and Saraswati from the eastern fringe and Banas river from the north-eastern fringe empty into the Little Rann.

Climate: The Little Rann has a semi-arid climate which belongs to the 'Steppe-Bush-Type' as per Koppen's classification. The steppe is a transitional belt bordering a real desert and separating it from the humid climate beyond (gulf) (Rao, 1981). The Tropic of Cancer passes through the centre of the LRK and hence, the area records a maximum variation of temperatures typical of an arid climate (Figure I.3). Average maximum temperature in May is around 44° C and sometimes reaches as high as 50° . Minimum temperature in January is 5° C with occasional records of <1° C.

Winter (Nov-Feb), is severe, with temperatures dropping drastically at nights cold waves are not uncommon. Easterly and northerly cold winds blow over the area. Winter depressions from over Afghanistan and Punjab during summer (March-June) initiates strong winds and dust storms are very frequent in afternoons. Winds prevail throughout the day, low morning mist is prevalent and there often is heavy dew during the early morning hours.

Monsoon, sets in by June 15th and continues upto September. An average annual precipitation of 300mm is recorded in the LRK and annual rainfall ranges

between 200mm and 380mm (Pramanik 1952). The annual rainfall was 366.52 mm in 1989, 330.66 mm in 1990, 178.04 mm in 1991 (drought year) and 379.94 mm in 1992. The maximum (>70-90%) precipitation occurred in July and August in all these years.

The Rann experiences relative humidity of 85% during the monsoon, otherwise it is of the order of 25% or less for rest of the year. Because of the high average temperature and low humidity, the potential rate of evaporation is exceedingly high. According to Roy (1973) the area has the highest annual evaporation rate in the country.

Flora and Fauna: The LRK is classified into Rann saline thorn scrub, *Salvadora* scrub and Tropical *Euphorbia* scrub (degradation stage) (Champion and Seth 1968). The dominant shrub in LRK is *Prosopis juliflora* (mesquite) introduced in the area in 1899 (Joshi 1959) (see Chapter II).

The Rann fringes and the *Bets* supports a good diversity of wildlife. Only a few important mammals, birds and reptiles are listed. The LRK, the other animals apart from the wild ass are chinkara (*Gazella bennetti*), nilgai (*Boselaphus tragocamelus*), and black bucks (*Antelope crevicapra*). Amongst the carnivores, the jungle cat (*Felis chaus*), desert cat (*Felis sylvestris ornata*), caracal (*Felis caracal schmitzi*), wolf (*Canis lupus pallipes*), jackal (*Canis aureus*) are found.

Among the birds, the houbara bustard (*Chlamydotis undulata macqueeni*), demoiselle cranes (*Anthropoides virgo*) and common cranes (*Grus grus*) and the lesser flamingo (*Phoeniconaias minor*) flamingo (*Phoenicopterus roseus*).

A good number of hepatofauna diversity was recorded in the LRK: two species of chelonians, 18 species of snakes, 16 species of lizards and five species of amphibians

(Shah *et al.* 1992). The spiny-tailed lizard (*Uromastyx hardwickii*) is a common sight in the LRK.

Human Settlements and its Impact on LRK: In the resource crunch and hostile climatic and geomorphological features in LRK, the human population density according to the 1981 census is around 63.77 individuals/km² (Sinha 1993 *unpubl.*). The economy of the local people of Little Rann is purely dependent on the manufacturing of inland salt from the Rann. A total of 603 villages (eight Talukas) with 41.92 to 84.7 people/km² has been documented in 1981 (Sinha 1993 *unpubl.*) along the fringes of LRK. This density of human population is very high, mainly because the settlements are nearer to the salt manufacturing areas. The population densities in LRK fringes are further inflated, at least temporarily during the monsoon, by the arrival of pastoralists and their livestock.

With increasing urbanization and development associated with its large stretches of southern fringe have been converted into irrigated croplands supported by lift irrigation facilities. A sizeable portion of the Rann has been converted into salt manufacturing area and in the fringes into agricultural croplands due to the increase in human activities in the last two to three decades.

Intensive Study area (ISA): The study was carried out covering the population of wild ass throughout the Wild Ass Sanctuary (4953.7 kms²). Due to time constraints and requirement of intensive multiple data sets, it became imperative to identify an intensive study area (ISA) within the Sanctuary limits. The ISA identified and used during the study is located along the southern fringe of the Little Rann (Figure I.2). The 200 km² ISA around three villages (Nimaknagar, Narali and Jesra) is a typical scrubland.

However, located as it is close to human settlement has croplands interspersed inbetween.

The herds identified for the study were a family band (MH) which ranged between Nimaknagar and Narali forest areas. Dominant stallion KM and an ostracized stallion JJ were identified during the initial phase of the study. An all-male herd (BH) was also identified in Jesra.

STRUCTURE AND ORGANIZATION OF THE THESIS

The thesis is organized into six chapters. Each of the chapters deal with the specific objective stated. Chapter I introduces the animal and the study area. The rest of the chapters all have a method, its results and discussion pertaining to its objective. Finally follows the summary of the whole study and the management recommendations.

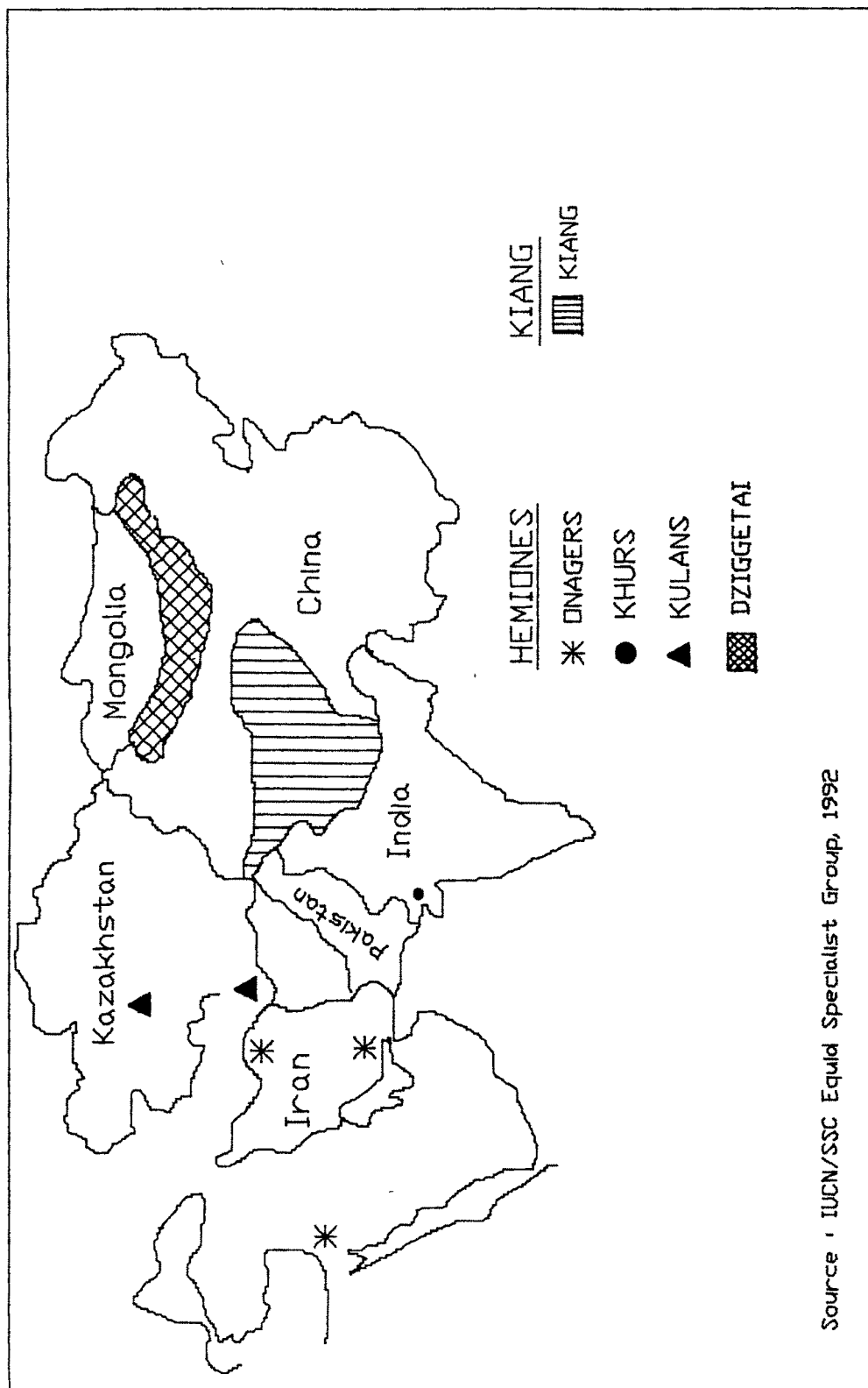


Figure 1.1: Distribution of Asiatic Wild Ass

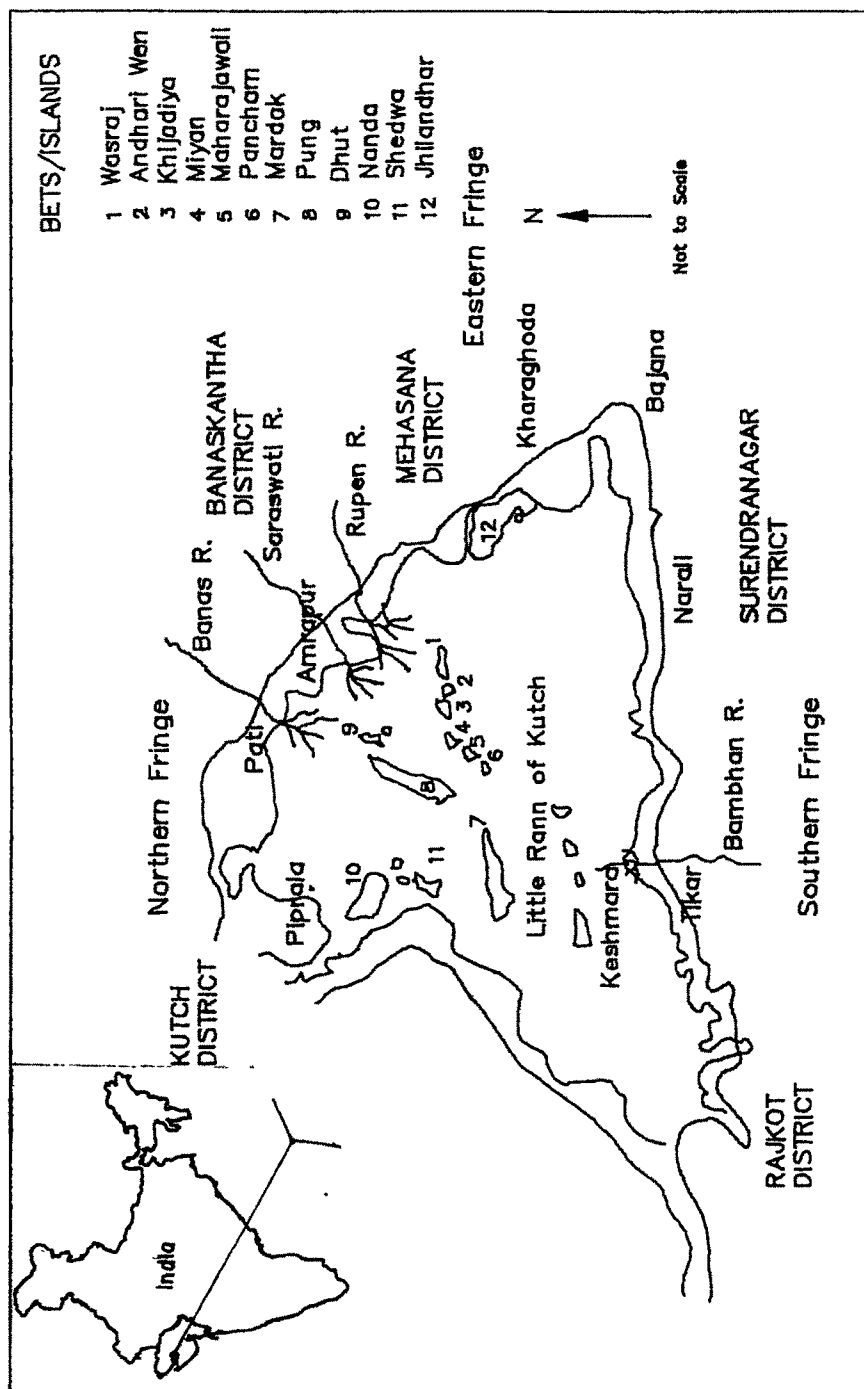


Figure 1.2: Little Rann of Kutch -- Wild Ass Sanctuary

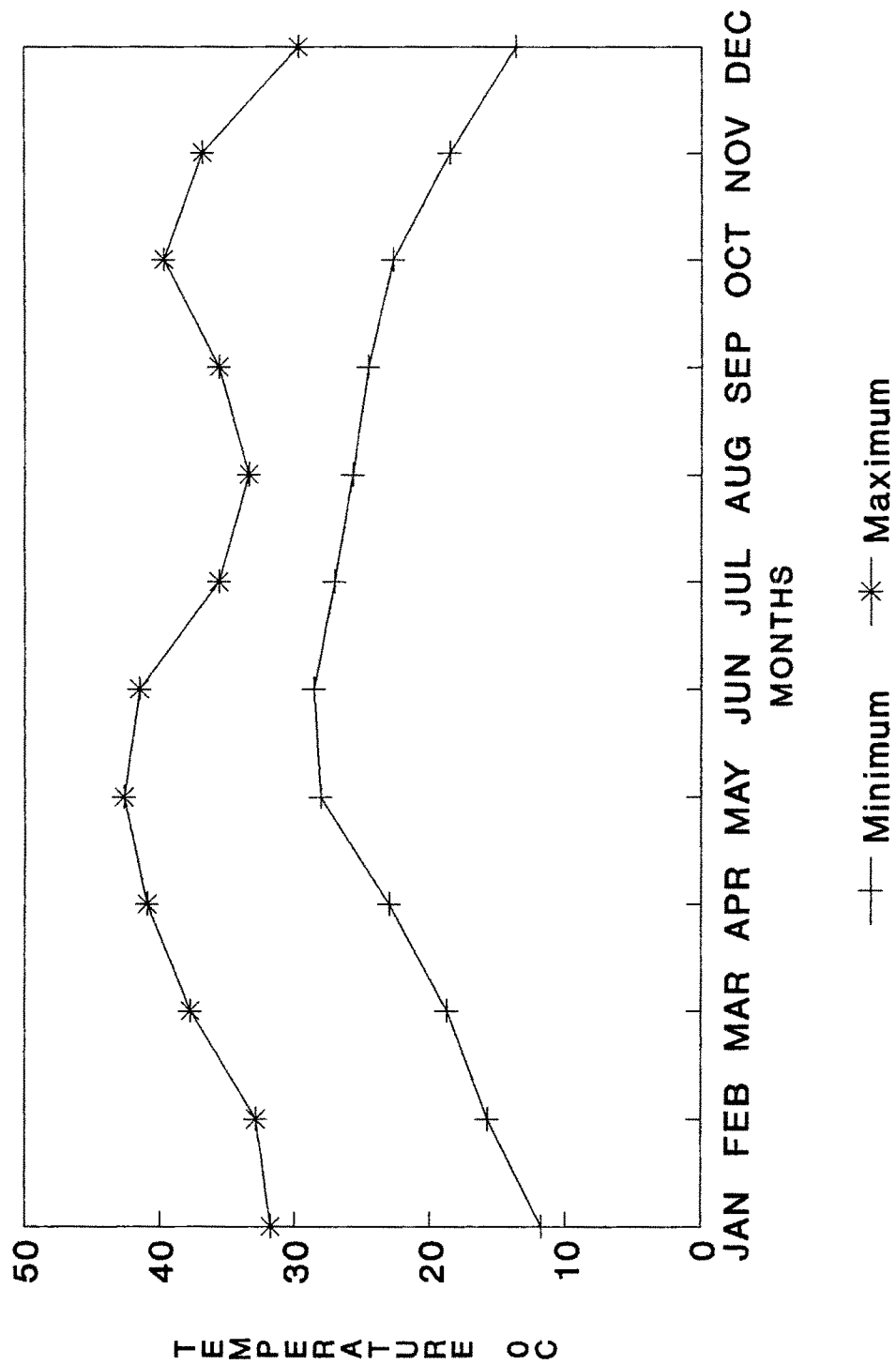


Figure I.3: The temperature recorded in 1990 in study area (Narali).

PLATE I.1 The Indian Wild Ass (Equus hemionus khur).

