Primates belong to the highest and third most diverse order of class mammalia having 5,488 species (IUCN website). They are believed to have arisen from the ancestors that lived in tropical forests about 63 million years ago in Eocene period of Coenozic era (Moody, 1962).

The non-human primates are represented by 63 genera and about 600 species recorded from 92 countries; Brazil being on the top of this list with 77 non-human primates species (Minhas et al., 2010). As far as non-human primate fauna in Indian subcontinent is concerned, a total of 25 species have so far been reported (Rajpurohit, 2005). Of these, 15 species and 39 subspecies have been reported from India alone (Minhas et al., 2010).

According to classification system given by Nelson and Jurmain (1994), order Primates consists of two major suborders: the Prosimii (prosimians) and the Anthropoidea (anthropoids); the former includes the lorises, lemurs and tarsiers and the latter includes new world monkeys, old world monkeys, apes and humans. Infact, suborder Anthropoidea, comprises two distinct infraorders, namely, Platyrrhini (new world monkeys) and Catarrhini which is further divided in to two families, i.e., Cercopithecidae (old world monkeys) and Hominidae (apes and humans) (Fig. 1.1). The New world monkeys are smaller than the old world monkeys and have relatively flat nose with sideways projecting nostrils separated by a wide septum. In contrast, old world monkeys typically have close set of nostrils that open forward or downward, cheek pouches, narrow internal nasal septum and non-prehensile tail. This group of monkeys lives in Africa and Asia and includes baboons, macaques and langurs. Most of the old world monkeys are arboreal but some of them are semi-terrestrial. The family Cercopithecidae is divided in two subfamilies, i.e., the Cercopithecinae and the Colobinae; the former includes species such as baboons, mangabeys, mandrills, guenons, patas monkeys and macaques while the latter includes colobus monkeys, proboscis monkeys and langurs (Nelson and Jurmain, 1994) (Fig. 1.1).

All of them are herbivores and lack cheek pouches. They have sacculated stomachs with "saccules," or sac-like compartments in which bacteria and unusual combinations of enzymes break down plant cellulose.
Fig. 1.1 Classification system of Primates (Nelson and Jurmain, 1994).
The species belonging to the sub family *Colobinae* have unusually long intestine that increase the absorption of nutrients. These are all adaptations to predominantly low protein, fibrous leaf diet of these species.

Of the 25 non-human primate species found in the Indian subcontinent, the Hanuman langur (*Semnopithecus entellus*) is the most widely distributed Colobine species (Roonwal and Mohnot, 1977; Roberts, 1997; Walker and Molur, 2004; Dar, 2006). It is distributed in most parts of India and parts of Nepal, Bhutan, Pakistan, Bangladesh and Sri Lanka (Wolfhein, 1983; Chhangani, 2002; Karanth *et al*., 2010) (Fig. 1.2). In India, it is found in a wide range of habitats from snow clad peaks of the Himalayas (up to about 4100 m altitude) in the north to Cape Comorin in the south and from the fringe of the great Indian desert in the west to Bengal in the east (Hrdy, 1977; Roonwal and Mohnot, 1977; Bishop, 1978; Mohnot, 2001; Nag *et al*., 2011) (Fig. 1.3). So far, 9 subspecies, of Hanuman langur have been reported from different parts of India (Brandon-Jones, 2004). As far as its distribution in the state of Haryana is concerned, the Hanuman langur is found in forest areas of Kalesar, Pinjore and the Morni range (Fig. 1.4). Some workers have designated Hanuman langur under the genus *Presbytis* (Elerman and Morrison-Scott, 1951; Khajuria, 1954; Napier and Napier, 1967) while others prefer to use *Semnopithecus* (Pocock, 1939; Blanford, 1988; Groves, 2001).

The Hanuman langur is commonly called as ‘Hanuman monkey’ or ‘Common langur’ in India and ‘Gray wanderoo’ (Pocock, 1939); or ‘Gray langur’ (Ripley, 1967); in Sri Lanka.

The classification of Hanuman langur is as follows:

**Kingdom-Animalia**

**Phylum-Chordata**

**Class-Mammalia**

**Order-Primates**

**Family-Cercopithecidae**

**Genus- *Semnopithecus***

**Species-entellus**
Fig. 1.2 Distribution of Hanuman Langurs in Indian Subcontinent (after Karanth et al., 2010).

Fig. 1.3 Distribution of Hanuman langurs in India (after Roonwal, 1981; Wolfheim, 1983 and Napier, 1985).
According to Brandon-jones (2004), Hanuman langur is pale dirty or ashy gray in colour; darker on the shoulder and rumps; grayish brown on the tail; paler on the head and lower parts; hands and feet black.

The color of the fur may be gray or dark brown. Male is large in size (51-78 cm long and around 18 kg in weight) with long tail (about 69-101 cm) (Plate 1.a). The age of maturity for male is 4-5 years. On the other hand, the female is around 40-68 cm long and around 11 kg in weight (Plate 1.b). In adult females, the menstruation lasts about 5-6 days with an average cycle length of 26.8 days (David and Ramaswami, 1969). The langur females come into oestrous in the age of 3-3.5 years (Roberts, 1997). The gestation length in Hanuman langur is 190-200 days and inter birth interval is 16.7 months (Roonwal and Mohnot, 1977). The infants are usually born between January and March until June, with most births around the energetically worst period of the year (Prater, 1965; Roonwal and Mohnot, 1977). Langur normally gives a single birth, but twins and triplets have also been recorded (Mohnot, 1974; Rajpurohit, 1987; Sharma et. al., 2011).

The Hanuman langur is highly adaptive species which prefer to live in dry tropical forests, scrub jungles and arid rocky areas with xerophytic vegetation (Chhangani, 2002). Besides its abundance in forests, it is also found near human habitation and religious places due to the fact that its natural habitat is being eroded at a fast pace (Chhangani, 2000). Hanuman langur is
highly foliovorous species (Roonwal and Mohnot, 1977; Kankane, 1984; Srivastava, 1989; Waterman and Kool, 1994; Roberts, 1997; Kirkpatrick, 1999; Punekar, 2001; Rajpurohit, 2005; Ahsan, 2006; Zhaoyuan and Rogers, 2006; Kumar et al., 2008 and Vandercone et al., 2012). Because of its ruminant-like digestion (Bauchop and Martucci, 1968), the Hanuman langurs may consume various types of food items in different habitats including natural food (leaves, fruits, flowers/inflorescence, seeds, roots of underground plant), cultivated food (potatoes, spinach, cauliflower, cotton, radishes, tomatoes etc.), animal food (insects, eggs, termite mounds, cremated human remains and bones) and provisioned foods given by humans (wheat cakes, millet etc.).

The home range sizes of Hanuman langurs vary greatly in different habitats. In ‘Bisexual’ groups, the home range size is from 7 to 1300 ha while in ‘All Male’, bands it is from 430 to 2200 ha (Rajpurohit and Sommer, 1993; Bennet and Davies, 1994; Chalise, 1995; Schulke, 1998 and Chhangani, 2000).

The Hanuman langurs are social non-human primate species with variable social organization (Newton, 1988; Chhangani, 2000). The two basic types of social groups found in Hanuman langurs are ‘Bisexual’ groups and ‘All Male’ bands (Chhangani, 2000, 2002; Minhas et al., 2010). The number of individuals in a group is, however, variable. ‘Bisexual’ groups consist of adult females, with their infants and either one (‘Uni-male’ group) or more than one (‘Multi-male’ groups) resident males. ‘All Male’ bands comprise of weaned males of different ages. ‘Bisexual’ groups are generally matrilineal groups of adult and sub-adult females, juveniles and infants with an adult male (‘Uni-male Bisexual’ group) or more than one adult male (‘Multi-male Bisexual’ group). The percentage of ‘Uni-male’ versus ‘Multi-male’ groups and the corresponding number of ‘All male’ bands varies from place to place (Newton, 1988). The langurs show great variation in group size (Koenig and Borries, 2001).

The main daily activities of Hanuman langurs include feeding, resting, locomotion, grooming and interaction with the other members of the group and other animals present in their habitats. The social bonding is maintained through grooming between group members. Allogrooming (caring the infants of lactating female by non-lactating females) is prevalent in Hanuman langurs. The resident male controls the movements of the whole group with whoop calls (Trisch, 2001).
Breeding season of Hanuman langurs varies with the locations. These are found to breed round the year (Jay, 1965; Krishnan, 1972) or in some months of the year (Prater, 1965; Sugiyama et al., 1965; Rahman, 1973). The infants are usually born between January and March until June, with most births around the energetically worst period of the year (Prater, 1965; Roonwal and Mohnot, 1977). Infanticide (killing of infants of the previous resident male by new male) has been recorded in Hanuman langurs (Hrdy, 1977; Newton, 1988; Newton and Dunbar, 1994; Borries, 1997).

The Hanuman langurs are considered sacred in India. This animal is provisioned frequently by people due to their religious sentiments particularly on Tuesday near religious places. Food provisioning of Hanuman langurs by humans has created conflicts between man and Hanuman langurs. Crop raiding by Hanuman langurs living near crop fields has also contributed in conflicts between human and primates (Forthman, 1986; Hill, 2000; Siex and Struhsaker, 1999; Chhangani and Mohnot, 2006).

Hanuman langurs are protected by laws in India which forbid their killing and capture, alive or dead (Choudhury, 2001). This species is listed on CITES (Convention on International Trade in Endangered Species) Appendix I, and is also on Schedule II, Part I of Indian Wildlife Protection Act, 1972 amended up to 2002 (Molur et al., 2003).

The Hanuman langurs are given status of ‘Least Concern’ by IUCN (2012), as it is widely distributed with large population. Due to non availability of scientific information about different aspects of ecology and behaviour of Hanuman langurs in Morni range (Haryana), the present study was planned with the following objectives:

1. To identify the flora and fauna of the study area.
2. To estimate the population density of Hanuman langurs.
3. To study their group size and composition.
4. To study their habitat use and diurnal activities schedule (food searching and feeding, drinking, defecation, resting and sleeping activities).
5. To determine their home range.
6. To study their reproductive behavior.
7. Conservational strategies.