INTRODUCTION

The plants are an integral component of life on this planet earth. Angiosperms are the most dominating among various plant groups. They are diverse in various quantitative and qualitative characters and widely distributed throughout the world in different geographical regions Funk (2006). According to Jachak and Saklani (2007) there are around 2,50,000 flowering plants occurring all over the world and approximately half of them are present in tropical forests. There are around 400 families of the flowering plants out of which nearly 315 are present in India (Sharma, 2003). They are contributing in different capacities towards human being for sustainable growth and development. Plants are known to provide food, fodder, fibre, fuel, oil, gum, timber, wood, shelter, shade, rubber, flowers, spices, perfumes, dyes, beverages, resin etc. Besides this they are known to be used in various traditional medicines since time immemorial.

Most of the developing countries have adopted traditional medicines derived from plants, whether in a simple form of raw material or in a refined form. Chinese have been known to be the first user of their natural flora for medicines. According to World Health organization, 80% population in the developing countries depends on traditional medicines for their primary health care needs (Shankar and Majumdar, 1998). This is because of their easy availability, cost effectiveness and none or least side effects.

The plant based indigenous knowledge from all over the world has significantly contributed to the development of different traditional systems of medicine. Even today, large numbers of plants are being used as herbal remedies in the rural areas. During the last decades, there has been an increasing trend in the use of plants as traditional medicines in different parts of the world including India. The knowledge related to traditional medicinal plants is passed on orally from one generation to the next. Therefore, it is important to document and preserve this valuable knowledge for the generations to come. Traditional medicines are providing ideas for the synthesis of new and alternative drugs. The richest plant diversity of India is a reservoir for medicinal plants. Its diversified land forms and environmental conditions sustain different plant species. Indian people have sound knowledge of utilizing medicinal
plants for wide range of diseases based on their, instinct, observation, necessities, long experience, and trial and error with these plants. The knowledge concerning the use of plants for various purposes depends upon the availability of plants in a particular area. According to one estimate over 6000 plants are being used in traditional medicines in India which meets the 75% medicinal requirement of the third world countries (Rajshekharan, 2002).

Many medicinal plants have not yet been explored because of the availability of other medicines. However, during recent years, people have again started with the herbal medicines (Dwarakan and Alagesaboopathi, 1999). Pei (2001) reported that traditional healer uses 2500 plant species for various diseases and 100 species of plants serve as a regular source of medicines in India. A large number of plants have been identified, introduced and utilized by modern drug industries. Even today, many plant species have been identified for their commercial utilization in the preparations of medicines to treat different human ailments. Various plant parts used in the preparation of different drugs include roots, stems, leaves, bark, pods, flowers, seeds, rhizomes, bulbs and sometimes even the whole plant.

Researchers have developed a relationship between morphological traits of plant species with geographical distribution. Various morphological characters like plant habit, flower color, stems type, leaves shape, presence or absence of hairs etc. are helpful in the correct identification of species. The morphological descriptions are important for plant taxonomists. This aspect is of utmost importance in case of medicinal plants because same species may have number of morphotypes depending on different climatic conditions containing some new or modified chemical compounds. According to Zanne et al. (2014) any change in growth habit can occur due to changes at chromosomal level. These shifts in growth habit were related to shifts in climate change which alter the expression of only a few genes.

Sharma and Sharma (1966, 1967 and 1968) studied the flora of Chandigarh and its nearby areas. They have not studied the cytomorphological variations in the reported species. They have documented about 860 angiosperms representing 526 genera and 116 families. About 80 percent of the species were dicotyledons. The members of Poaceae, Fabaceae, Asteraceae, Cyperaceae and Euphorbiaceae have constituted the
major flora. Later on, Sharma and Khosla (1989) described the grasses of Punjab and Chandigarh for their taxonomic considerations.

Sharma and Sharda (1997) studied 24 species of sweet scented flowering trees of Chandigarh. Various parameters such as plant height, botanical name, synonyms, family, popular names, flower color, flowering season, uses and locations of the trees were also recorded. Sixty-three families of dicotyledons and seventeen families of monocotyledons were described on the basis of their vegetative characters such as root, stem, leaf and floral characters like inflorescence, type of flower, calyx, corolla, gynoecium and androecium (Chopra, 1998). Therefore, it is essential to study the morphological features in plant species (Rieseberg, 1992; Singh and Dey, 2005). Dogra et al. (2011) studied the 425 species of weeds and medicinal plants from Chandigarh. These species were of different growth habits like herbs, shrub trees etc. Approximately 50% species were designated as weeds. Now days, the present study area is densely populated. The adjoining areas have also been developed at a very fast rate. The land use for construction or widening of roads and urbanization has further affected the floristic diversity. Various human activities had affected biodiversity directly or indirectly which leads to extinction of some unique species. Hence their documentation is highly required. As the morphological traits are influenced by the environmental conditions, sometimes it becomes difficult to characterize the species. At this point, chromosomal study may be helpful.

Chromosome study is a classical tool in plant systematic and evolution. The chromosome number, forms and meiotic configurations can differentiate the genera and species. The chromosomal studies also tell about the structural and numerical changes occurred in chromosomes during the course of evolution. Chromosomal study can also throw light on the evolutionary behavior of polyploids. The basic chromosome number (x) has its own significance in the biosystematics of Angiosperms (Sharma and Sharma, 2014).

Meiotic study is highly important as chromosomal rearrangements occur during this process which leads to evolution and diversification of species. The behavior of chromosomes also needs critical evaluation as it reflects the fate of species. The
chromosome number and ploidy level authenticate the identity of plant species which is really important in case of medicinal plants. The appearance of univalents, trivalents, tetravalents, laggards and unequally distribution of chromosome at anaphase indicate the meiotic irregularities which may subsequently change the morphological feature or chemical composition of plant species. It may also results into the formation of new species. Therefore, meiotic analysis has been carried out in some medicinal plants to confirm their identity. The chromosome number, structure and pairing behavior may also reveal the genetic potential of the species. Previously, meiotic studies have been carried out in medicinal plants in various parts of the world to establish their identity (Raghavan, 1957, Sobti and Singh, 1961; Gajapathy, 1962). Subsequent work done by some other researcher had not completely elaborated the cytomorphological details of the medicinal angiosperms of Chandigarh. Therefore, keeping this in view, the present study has been planned with the following objectives:

OBJECTIVES:

To prepare a list of various medicinal plants of Chandigarh and to record their medicinal importance.

To collect, identify and preserve the plants/plant parts.

To study various morphological features of the species under investigation.

To study chromosome number and configuration to understand the ploidy level and their correlation with geographical distribution.

To take field photographs and to study the cytomorphological diversity of these plants.

To maintain and deposit plant specimens in the Herbarium of the Panjab University, Botany Department, Chandigarh.