3. MATERIAL AND METHODS

3.1. GENERAL TOPOGRAPHY, SOIL AND GEOLOGY OF THE AREA

Amritsar is one border districts of north-west frontier of Punjab state. The city lies at 31° 38’ N latitude and 74° 53’ E longitude, with an average elevation of 234 metres. Administratively, District Amritsar is divided into seven tehsils of Amrirsar I, Amritsar II, Ajnala, Baba Bakala, Patti, Tarn Taran, Khadur Sahib and covers an area of 5094 sq. km. The territory of the district is oblong in shape, lying between the rivers Ravi and Beas. Topographically, the state of Punjab is divided into three zones, namely submountain zone, central plains, and south-western zone. The district of Amritsar is located in the central plains. The soil in this district slopes to the south-west from the high right bank of river Beas. Two other major rivers that touch the district are Ravi and Satluj (Jerath 1995). Soil has a great role in the growth and distribution of plants. The soil in this region is composed of deposits known as Indo-Gangetic alluvium, which consists of clay and loam. The presence of calcareous ‘kankar’ in the region imparts natural carbonate alkalinity to the water resources of the region. The presence of clay and loamy soil enables it to hold good amount of moisture and soluble salts or exchangeable sodium. The salinity of subsoil water is negligible and the internal permeability is good. The area is rain-fed and irrigation system to the cultivated fields is provided by channels from the Beas river.

3.2. CLIMATE

Climate is the most far reaching of the natural elements controlling plant life. Amritsar district experiences extremes of climatic conditions. The climate in the area could be divided into four seasons. These are, (i) the rainy season (July to mid September) starting with the break of monsoon which is characterized by hot and humid weather with recurrent rainfall amounting to 65-95 cm and average maximum and minimum temperatures of 35°C and 24°C respectively; (ii) the retreating of monsoon (mid-September to October), during which the north-western winds predominate and rain dwindles away and the temperature also gradually falls; (iii) the cold weather season (November to February) marked by low temperature and sporadic rainfall, January being
the coldest month when the daily temperature may fall to below 0°C and the average maximum and minimum temperatures during the season are 20°C and 6°C respectively; (iv) the hot weather season (March to June) starts with a steep rise in temperature with June being the hottest month with the temperature sometimes rising to 45°C and the average maximum and minimum temperatures during the period are 40°C and 27°C respectively. Dust laden high speed winds are frequent during May and June. An annual rainfall of about 790 mm is recorded in this area.

3.3. METHODOLOGY

The study of medicinal plants of Amritsar district was started in August, 2004 and completed in early 2010. District Amritsar was divided into 7 tehsils (Fig. 1). Randomly 8-10 villages were surveyed from each tehsil (Table 1). The field trips to different villages were undertaken during all the four seasons viz. Summer, Rainy, Autumn and Winter. During survey of the area, photographs of plants were taken to focus on the complete plant, its branches, leaves, flowers, fruits and seeds, especially the part of the plant used in medicines. Locals, herbal doctors and hakims were consulted regarding the use of medicinal plants in the treatment of various ailments. Complete plants in case of small herbs & branches of suitable size in flowering and/or fruiting stage for trees, climbers and shrubs were collected. Each collection was given an author’s collection number on a tag which was fastened to the plant specimens. The specimens were pressed in blotting papers in the fields. Attempts were made to collect the same taxon from different locality/habitat so as to represent the morphological variations present within each species. At least 4-5 specimens were collected for each taxon. Complete field notes were made regarding the habit, habitat, height, flowering and fruiting season and some other special features of all the taxa, besides the date of collection and the locality name. The blotting papers containing specimens were changed after every alternate day for about 7-10 days till the specimens completely dried. The dried plant specimens were poisoned by dipping them in saturated solution of mercuric chloride dissolved in rectified spirit, for the purpose of preservation of collected specimens in the herbarium. All precautions were taken to make the plants presentable and suitable for future studies. The
specimens collected have been assigned author's collection numbers from 5001 onwards starting with the initial letter D (i.e. D 5001 to D 5181).

3.4. IDENTIFICATION

The plant specimens were tentatively identified with the help of keys and descriptions given in various floras and monographs. Confirmation of the identification was done by matching the specimens with the already authentically identified specimens conserved at the Herbaria of Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar; Department of Botany, Panjab University, Chandigarh; Department of Botany, Punjabi University, Patiala; Botanical Survey of India, Dehradun and Forest Research Institute, Dehradun.

All the specimens collected during the course of the study have been deposited in the Herbarium of the Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar.

3.5. PRESENTATION OF DATA

The various species have been presented as per their growth form i.e. (a) Trees; (b) shrubs and woody (shrubby) climbers; and (c) undershrubs, herbs and herbaceous climbers. Under each growth form, the species have been arranged alphabetically. For each species, information has been provided about valid botanical (Latin) names (printed in bold italics and with popular synonyms in few cases), followed by local /vernacular (Panjabi) names, common (English) names, name of the family, distribution in India, brief morphology of the plant, flowering /fruiting season, chemical constituents, medicinal uses, and other ethnobotanical uses (if any), author’s collection number, and locality of collection. The cultivated plants are marked with a single asterisk (*). Photographs of almost all the species have been provided at relevant places.