

Asteraceae of Solan district of Himachal Pradesh

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Abstract

The study documents the knowledge of the flora belonging to family Asteraceae of Solan district of Himachal Pradesh. In the present investigation, repeated surveys are made to collect the floral information of the region. A number of plants are collected and their identification is done by giving botanical name, habit, habitat and general morphology. Field numbers are allotted and relevant data about the plant are recorded in the field book. Check list about the plants are prepared in an alphabetical order. Hundred one species belonging to fifty nine genera of the family Asteraceae are reported. Out of these, 39 genera are represented by single species and the remaining 20 genera are represented by more than single species. The purpose of this study is to explore and document the members of family Asteraceae. Presently, 38 species belonging to 20 genera are reported for the first time from the study area.

Keywords: flora, asteraceae, occurrence, check list

1. Introduction

Biodiversity form the basis for the healthy environment that helps to sustain health, wealth, food, fuel, and also other services, the human beings depend upon. Further, biological diverse ecosystems perform various vital ecological services, such as decomposition and cycling of nutrients. There are about 1.5 million species of flora and fauna in the world over, out of which about .5 million species represents phytodiversity. Recently, there is great loss of biodiversity due to developmental activities such as industrialization and urbanization. It has been found that loss of biological diversity is the main environmental concern of the time. Species diversity is one of the most important key for determining the sustainability and strength of plant communities which is very essential for the management and conservation of biodiversity (Verma *et al.*, 1999) [7]. Therefore, the knowledge of plant diversity is very important.

The Indian subcontinent due to its rich biodiversity is one of the 12 mega-diversity centres in the world ranking tenth position in the world and fourth in Asia in plant diversity. Each species or sub-species and a variety of plant represent a unique biological germplasm or gene pool with special characteristics and values. The Himalaya comprises one of the Earth's most diverse ecosystems characterized by a comparatively different climate, a fair degree of resource seasonality and a high diversity of plant communities and species. It covers about 18% of the geographical area of India, but accounts for more than 50% of India's forest cover. It supports about 18,440 species of plants, out of which 25.3% are endemic to Himalaya (Singh and Hajra, 1996, Samant *et al.*, 1998) [6, 4].

The Western Himalayas with an altitude ranging between 1,500 - 3,600 m extends along the mountain chain from western Nepal through Uttar Pradesh, Himachal Pradesh,

Jammu and Kashmir in north-west India and northern Pakistan, and then south-west along the mountains in the border region between Pakistan and Afghanistan. The richness of its flora is generally attributed to variation in climate. It harbours 967 endemic angiosperm taxa, out of 3054 species of angiosperm belonging to 872 genera, showing 31.7% endemism (Behra *et al.*, 2002) [1].

Himachal Pradesh, a state of India is situated in the Western Himalayan region between 30°22' to 33°12'N latitude and 75°45' to 79°04'E longitude covering an area of 55,673 square kilometres. Recently, the flora of Himachal Pradesh has been extensively explored by Chowdhery and Wadhwa (1984) [2] and Verma and Kapoor (2010) [8]. The flora of state is under great pressure in terms of expansion of agricultural land, cutting of woody vegetation for timber and fuel, multipurpose plant collection, over grazing, lack of awareness and absence of practical conservation strategies. Solan is one of the twelve districts of Himachal Pradesh in India, blessed with diverse and a rich source of biodiversity. With an altitudinal range of about 760 m to 2200 m, it is located between 30°05' to 31°15' N Latitude and 76°42' - 77°20' E Longitude. The district has humid-subtropical zone (lower elevations) and humid-sub temperate zone (higher elevations) of Himalaya in Himachal Pradesh. The climate of the area is generally sub- temperate, semi- humid characterized by cold winter with mild summer and moderate rainfall.

Asteraceae is the largest family among the flowering plants which includes annuals, biennials, perennials, herbs, shrubs and even trees. Many species show wide adaptations. The members of the family possess simple, rarely compound, alternate or opposite and exstipulate leaves. The family is characterised by its typical inflorescence i.e. Racemose head or Capitulum. It consists of a few or a large number of sessile flower/ floret type i.e. ray and disc florets generally

grouped on flat receptacle which is surrounded by involucre. The capitula are of three types: Discoid type in which all the florets are disc florets and are tubular; ligulate type in which all the florets are ligulate florets and radiate type in which outer fringe of ligulate florets while the central are of disc florets.

Flowers are sessile, complete or incomplete, perfect or imperfect, actinomorphic or zygomorphic, bisexual or unisexual and even neutral, pentamerous and epigynous. The calyx of the florets may be absent, but when present is modified into a pappus or scales. Corolla 5, gamopetalous, tubular or ligulate and superior. Androecium 5, epipetalous, syngenesious and bitheous. Gynoecium is bicarpellary, syncarpous, unilocular, uniovulate, basal placentation, anatropous ovule and inferior. The fruit is cypsela or inferior achene. The seed is exalbuminous. The objective of this study is to find out the present status of the composites occurring in the study area.

2. Material and Methods

To achieve the said objectives, the repeated field surveys are conducted in different selected locations of study area, for the enumeration and documentation of the members of family Asteraceae. The different localities surveyed during the study period include: Nalagarh (400m), Parwanoo (800m), Kunihar (1000m), Arki (1045m), Ramshehar (1100m), Subathu (1265m), Nauni (1275m), Shilli (1290m), Oachghat (1300m), Sanwara (1350m), Waknaghat (1500m), Barog (1600m), Darlaghat (1800m), Kasauli (1927m) and Chail (2200m), the figures within parenthesis are the altitudes of that locality. The specimens collected during field visits are identified and preserved in the form of herbarium after drying in blotting sheets. While collecting the plant specimens, field numbers are allotted and relevant field data about the plant are recorded in the field book. The specimens are carried to the laboratory in the bags, ruck-sacks and in plant presser. The plants collected are pressed in the presser wrapped in blotters. The dried specimens are mounted on the herbarium sheets. Printed labels are pasted and the relevant data is entered. These specimens are identified with the help of taxonomic literature. All the reported plant species are described alphabetically.

3. Results

The present study is conducted to know the floral information of plants belonging to the family Asteraceae from Solan district of Himachal Pradesh. The periodical surveys have been carried out for the collection and different floral information is accumulated. The check list about the plants collected from the study area have been prepared and presented in alphabetical order.

Acanthospermum hispidum DC.

Erect, medium sized annual herb; leaves sessile, elliptic-ovate, opposite; heads discoid, yellow;

Common at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara and Waknaghat; earlier reported as common herb by Sumita (1996) from Nauni area.

Achillea millefolium Linn.

Erect, pubescent, small sized perennial herb; radical leaves

stalked, upper sessile, oblong- lanceolate, alternate; heads radiate, white or pale pink;

Uncommon in grass roadsides at Darlaghat, Kasauli and Chail.

Adenocaulon bicolor Hook. f.

Erect, medium sized perennial herb; lower leaves stalked, upper ones sessile, cordate sinuately, alternate; heads discoid, whitish yellow;

Fairly common along moist places at Darlaghat, Kasauli and Chail.

Adenostemma viseosum Forst.

Erect, pubescent, medium sized annual herb; leaves stalked, lanceolate or ovate, opposite; heads discoid, white;

Common at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Shilli, Oachghat, Sanwara, and Waknaghat.

Ageratum conyzoides Linn.

Erect, medium sized annual herb; leaves stalked, lanceolate or ovate, opposite; heads discoid, pale blue or white;

Common along moist places, orchards and along fields at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Nauni, Shilli, Oachghat, Sanwara and Waknaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

Ainsliaea aptera DC.

Erect, medium sized perennial herb; leaves stalked, broadly triangular, ovate or orbicular, alternate; heads discoid, whitish pink;

Fairly common along Shilli, Waknaghat, Barog, Darlaghat, Kasauli and Chail.

Anaphalis adnata DC.

Erect, medium sized perennial herb; leaves sessile, broadly lanceolate or oblong, alternate; heads discoid, whitish;

Fairly common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Nauni, Shilli, Oachghat, Sanwara and Waknaghat.

A. araneosa DC.

Erect, small sized perennial herb; leaves sessile, lanceolate, alternate; heads discoid, whitish yellow;

Rare along roadsides at Waknaghat, Barog, Darlaghat, Kasauli and Chail.

A. busua DC.

Erect, medium sized perennial herb; leaves sessile, linear-narrow lanceolate, alternate; heads discoid, whitish;

Fairly common along shady areas at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Nauni, Shilli, Oachghat, Sanwara and Waknaghat.

A. cinnamomea C.B. Clarke

Erect, small sized perennial herb; leaves sessile, narrowly lanceolate, alternate; heads discoid, whitish yellow;

Common along roadsides at Waknaghat, Barog, Darlaghat, Kasauli and Chail.

A. contorta Hook. f.

Erect, small sized perennial herb; leaves sessile, linear-

lanceolate, alternate; heads discoid, whitish yellow;
Rare along roadsides at Darlaghat, Kasauli and Chail.

***A. margaritacea* Benth.**

Erect, medium sized perennial herb; leaves sessile, narrowly lanceolate, alternate; heads discoid, whitish yellow;
Fairly common along roadsides at Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***A. royleana* DC.**

Erect, small sized perennial herb; leaves sessile, linear-lanceolate, alternate; heads discoid, whitish;
Fairly common along rock crevices at Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***A. triplinervis* C.B. Clarke**

Erect, small sized perennial herb; leaves sessile, linear-lanceolate, alternate; heads discoid, white or pale yellow;
Uncommon along roadsides at Darlaghat, Kasauli and Chail.

***Arctium lappa* Linn.**

Erect, pubescent, large sized biennial herb; leaves stalked, broadly ovate, alternate; heads discoid, purplish;
Sporadic along roadsides at Darlaghat, Kasauli and Chail.

***Artemisia annua* Linn.**

Erect, pubescent, large sized annual herb; lower leaves stalked, upper sessile, oblong- lanceolate, alternate, heads discoid, green yellowish;
Sporadic along moistorous areas, roadsides at Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***A. parviflora* Roxb.**

Erect, pubescent, medium sized perennial herb; leaves sessile, obovate-oblong, alternate; heads discoid, yellow;
Common along sloppy areas at Kunihar, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996) from Nauni area.

***A. roxburghiana* Wall. Ex. Besser**

Erect, pubescent, large sized perennial herb; lower leaves stalked, upper sessile, oblong- ovate, alternate; heads discoid, purple brown;
Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat and Darlaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***A. scoparia* Waldst.**

Erect, pubescent, medium sized perennial herb; lower leaves stalked, upper sessile, obovate- oblong, alternate; heads discoid, greenish white;
Fairly common at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Wagnaghat and Darlaghat; earlier reported as common herb by Sumita (1996) from Nauni area.

***A. vestita* Wall.**

Erect, pubescent, medium sized perennial herb; lower leaves stalked, upper sessile, narrowly oblong, alternate; heads discoid, greenish yellow;
Rare at Subathu, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***A. vulgaris* Linn.**

Erect, pubescent, large sized perennial herb; leaves sessile, alternate; heads discoid, brown;
Common at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996) from Nauni area.

***Aster asperulus* Nees**

Erect, pubescent, medium sized perennial herb; leaves sessile, ovate, alternate; heads radiate, purple;
Common at Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Meenakshi (2002) from Shilli area.

***A. molliusculus* Wall.**

Erect, pubescent, small sized perennial herb; leaves stalked, narrowly lanceolate, alternate; heads radiate, yellowish;
Common at Shilli, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Meenakshi (2002) from Shilli area.

***A. thomsoni* C.B. Clarke**

Erect, pubescent, medium sized perennial herb; leaves sessile, ovate, alternate; heads radiate, purplish;
Fairly common along roadsides at Kasauli and Chail.

***Bidens pilosa* Linn.**

Erect, pubescent, medium sized perennial herb; leaves stalked, ovate-lanceolate, opposite; heads radiate, yellow;
Very common along roadsides at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat and Kasauli; earlier reported as common herb by Sumita (1996) from Nauni area.

***B. tripartita* Linn.**

Erect, pubescent, medium sized annual herb; leaves stalked, lanceolate, opposite; heads discoid, yellow;
Common along wet areas at Arki, Ramshehar, Oachghat, Sanwara, Subathu, Nauni, Shilli and Wagnaghat, Barog and Darlaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***B. wallichii* DC.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate or triangular, lower leaves opposite, upper alternate; heads radiate, yellowish;
Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Meenakshi (2002) from Shilli area.

***Blainvillea latifolia* DC.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate or triangular, lower leaves opposite, upper alternate; heads radiate, yellowish white;

Common along gardens at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Shilli, Oachghat, Sanwara and Waknaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***Blumea weightiana* DC.**

Erect, small sized perennial herb; lower leaves stalked, upper nearly sessile, lanceolate or linear, alternate; heads discoid, pale yellow;

Common in waste lands at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog and Darlaghat; earlier reported as common herb by Saroj (2000) from Kunihar area.

***Carpesium abrotanoides* Linn.**

Erect, pubescent, small sized perennial herb; leaves sessile, lanceolate, alternate; heads discoid, yellow;

Rare along roadsides at Oachghat, Sanwara, Waknaghat, Barog and Darlaghat.

***C. cernuum* Linn.**

Erect, pubescent, medium sized annual herb; lower leaves stalked, upper sessile, lanceolate, alternate; heads discoid, yellow;

Sporadic along forests at Darlaghat, Kasauli and Chail.

***C. trachelifolium* Less.**

Erect, small sized perennial herb; lower leaves stalked, upper sessile, lanceolate, alternate; heads discoid, yellow;

Restricted along roadsides at Kunihar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog and Darlaghat.

***Centratherum anthelminticum* (Linn.) O. Kuntze**

Erect, pubescent, medium sized annual herb; leaves stalked, elliptic-lanceolate; heads discoid, purplish;

Scattered along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat and Barog.

***Cichorium intybus* Linn.**

Erect, medium sized perennial herb; leaves stalked, oblong-lanceolate, alternate; heads ligulate, bright blue;

Common along open fields, roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat and Kasauli; earlier reported as common herb by Sumita (1996) from Nauni area.

***Cnicus argyracanthus* DC.**

Erect, large sized perennial herb; leaves sessile, irregularly pinnately lobed, alternate; heads discoid, pale yellow or white;

Common along wastelands at Nauni, Shilli, Oachghat, Barog, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***C. arvensis* Hoffm.**

Erect, small sized perennial herb; leaves sessile, oblong, alternate; heads discoid, purple;

Restricted along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara and Waknaghat.

***C. wallichii* DC.**

Erect, large sized perennial herb; leaves sessile, irregularly pinnately lobed, alternate; heads discoid, dull yellow;

Common along wastelands at Kunihar, Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Saroj (2000) from Kunihar area.

***Conyza japonica* Less.**

Erect, pubescent, small sized annual herb; leaves sessile, obovate-spathulate, alternate; heads discoid, pale yellow;

Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***C. stricta* Willd.**

Erect, pubescent, medium sized annual herb; leaves sessile, linear-spathulate to oblanceolate, alternate; heads radiate, pale yellow;

Common along grazing grounds at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Waknaghat, Barog and Darlaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***C. viscidula* Wall.**

Erect, pubescent, medium sized annual herb; leaves sessile, lanceolate, alternate; heads discoid, pale yellow;

Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat and Chail; earlier reported as common herb by Meenakshi (2002) from Shilli area.

***Crepis japonica* Benth.**

Erect, pubescent, small sized annual herb; lower leaves stalked, upper sessile, oblanceolate, alternate; heads ligulate, pale yellow;

Fairly common in waste grounds, roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail.

***Cyathocline lyrata* Cass.**

Erect, pubescent, small sized annual herb; leaves sessile, pinnatisect, alternate; heads discoid, purple;

Uncommon along moist places at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Shilli, Oachghat, Sanwara and Waknaghat.

***Dichrocephala chrysanthemifolia* DC.**

Erect, pubescent, small sized annual herb; leaves sessile, oblong, alternate; heads discoid, white;

Rare along roadsides at Darlaghat, Kasauli and Chail.

***D. latifolia* DC.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate or lanceolate, alternate; heads discoid, yellowish; Rare along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Echinops niveus* Wall.**

Erect, small sized perennial herb; leaves sessile, lanceolate, alternate; heads compound, pale blue or white; Common along grasslands at Kunihar, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Saroj (2000), Meenakshi (2002) from Nauni, Kunihar and Shilli respectively.

***Eclipta alba* Hassk.**

Erect, pubescent, small sized annual herb; leaves sessile, narrowly lanceolate, opposite; heads radiate, white; Common along moist places at Nalagarh, Parwanoo, Kunihar, Arki, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog and Darlaghat; earlier reported as common herb by Sumita (1996) from Nauni area.

***Emilia sonchifolia* DC.**

Erect, small sized annual herb; leaves sessile or stalked, lanceolate-ovate, alternate; heads discoid, purple; Restricted along roadsides at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Sanwara, Wagnaghat, Barog and Darlaghat.

***Erigeron annuus* Pers.**

Erect, pubescent, small sized annual herb; leaves sessile, lanceolate, alternate; heads radiate, yellowish white; Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat and Sanwara; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***E. linifolius* Willd.**

Erect, pubescent, medium sized annual herb; leaves sessile, lanceolate, alternate; heads radiate, pale purple; Common along irrigated lands at Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***E. multicaulis* DC.**

Erect, pubescent, large sized annual herb; leaves stalked, lanceolate, alternate; heads radiate, pale purple; Common along irrigated lands at Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996) from Nauni area.

***Eupatorium cannabinum* Linn.**

Erect, pubescent, small sized perennial shrub; leaves sessile, lanceolate, opposite; heads discoid, white; Fairly common along moist places at Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier

reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***E. reevesii* Wall.**

Erect, pubescent, large sized annual shrub; leaves stalked, lanceolate-ovate, alternate; heads discoid, pale purple; Common along moist places at Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog and Darlaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***Filago germanica* Linn.**

Erect, small sized annual herb; leaves stalked or sessile, obovate-oblong, alternate; heads discoid, pale yellow; Rare along dry rocky ground at Nalagarh and Parwanoo.

***Galinsoga parviflora* Cav.**

Erect, small sized annual herb; leaves stalked, ovate-lanceolate, opposite; heads radiate, yellowish; Common near houses at Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***Gerbera gossypina* (R.) Beaw.**

Erect, small sized perennial herb; leaves stalked, lanceolate; radical; heads radiate, whitish pink; Restricted along forest areas at Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***G. lanuginosa* Benth.**

Erect, small sized perennial herb; leaves stalked, lanceolate, radical; heads radiate, pink; Common on rocks, grassy slopes at Ramshehar, Subathu, Shilli, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Saroj (2002) from Nauni, Kunihar respectively.

***Gnaphalium affine* Linn.**

Erect, pubescent, small sized annual herb; leaves sessile, oblong-spathulate, alternate; heads discoid, bright yellow; Sporadic along roadsides, fields, grasslands at Oachghat, Sanwara, Subathu, Shilli, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***G. hypoleucum* DC.**

Erect, pubescent, small sized annual herb; leaves sessile, linear, alternate; heads discoid, bright yellow; Common along roadsides at Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat and Kasauli; earlier reported as common herb by Sumita (1996) from Nauni area.

***G. luteo-album* Linn.**

Erect, pubescent, small sized annual herb; leaves sessile, spathulate, alternate; heads discoid, bright yellow; Fairly common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Gynura angulosa* DC.**

Erect, large sized perennial herb; leaves sessile, lanceolate or oblong, alternate; heads discoid, orange yellowish; Rare at rocky places at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Inula cappa* DC.**

Erect, large sized perennial shrub; leaves stalked, oblong-lanceolate, alternate; heads ligulate, yellowish; Common along open slopes at Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog and Darlaghat; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***I. cuspidata* C.B. Clarke**

Erect, large sized perennial shrub; leaves stalked, ovate-lanceolate, alternate; heads radiate, yellow; Rare along open slopes at Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat and Kasauli.

***Lactuca dissecta* Don**

Erect, small sized annual herb; leaves sessile, obovate, alternate; heads ligulate, pale blue; Common along fields at Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996) from Nauni area.

***L. hastata* DC.**

Erect, small sized annual herb; leaves stalked, obovate, alternate; heads ligulate, dark blue; Uncommon along fields at Ramshehar, Subathu, Shilli, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***L. longifolia* DC.**

Erect, large sized annual herb; leaves sessile, obovate, alternate; heads ligulate, blue purple; Rare along fields at Subathu, Oachghat, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***L. macrorhiza* Hook.**

Erect, small sized annual herb; leaves sessile, obovate, alternate; heads ligulate, grey blue; Common along roadsides at Subathu, Nauni, Shilli, Oachghat, Wagnaghat, Barog, Kasauli and Chail; earlier reported as common herb by Meenakshi (2002) from Shilli area.

***L. sagittarioides* C.B. Clarke**

Erect, small sized annual herb; leaves stalked, lanceolate, alternate; heads ligulate, yellow; Restricted along roadsides at Wagnaghat, Barog and Darlaghat.

***Lagera alata* Schultz-Bip.**

Erect, pubescent, medium sized annual herb; leaves sessile, oblong, alternate; heads discoid, purple; Uncommon at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara,

Wagnaghat, Barog and Darlaghat.

***Launaea nudicaulis* Less.**

Erect, pubescent, medium sized perennial herb; leaves sessile, oblong, alternate; heads ligulate, white; Fairly common in fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***L. secunda* C.B. Clarke**

Erect, small sized perennial herb; leaves sessile, oblong, alternate; heads ligulate, yellow; Common in fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara and Wagnaghat; earlier reported as a common herb by Sumita (1996) from Nauni area.

***Matricaria chamomilla* Linn.**

Erect, small sized annual herb; leaves sessile or have short petioles, linear-filiform, alternate; heads radiate, yellowish white; Restricted along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Myriactis wallichii* Less.**

Erect, pubescent, medium sized annual herb; leaves stalked, ovate or lanceolate, alternate; heads radiate, yellowish white; Rare along roadsides at Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Parthenium hysterophorus* Linn.**

Erect, small sized annual herb; leaves stalked, pinnatifid, linear or cuneate, alternate; heads radiate, whitish; Very common along waste places at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni and Oachghat, Sanwara, Wagnaghat, Barog and Darlaghat; earlier reported as a common herb by Sumita (1996), Saroj (2000) from Nauni and Kunihar respectively.

***Prenanthes brunoniana* Wall.**

Erect, large sized perennial herb; leaves stalked, lanceolate or triangular, alternate; heads ligulate, purplish white; Uncommon along forests at Darlaghat, Kasauli and Chail.

***Pterotheca falconeri* Hook.**

Erect, pubescent, small sized annual herb; leaves stalked, spatulate or obovate, radical; heads ligulate, yellow; Restricted at Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Rhynchospermum verticillatum* Reinw.**

Erect, pubescent, medium sized perennial herb; leaves shortly stalked, lanceolate, alternate; heads radiate, white or pale yellow; Fairly common at Wagnaghat, Barog and Darlaghat.

***Saussurea candicans* C.B. Clarke**

Erect, medium sized annual herb; leaves sessile, lanceolate, alternate; heads discoid, pinkish white; Common along fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara,

Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as a common herb by Sumita (1996) from Nauni area.

***Scelercarpus africanus* Jacq.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate, lower leaves opposite, upper alternate; heads radiate, yellowish;

Fairly common along fields at Nalagarh, Parwanoo, Kunihar, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara and Waknaghat.

***Senecio chrysanthemoides* DC.**

Erect, pubescent, large sized perennial herb; leaves sessile, ovate, alternate; heads radiate, yellowish;

Common on road sides, grassy slopes at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat and Barog; earlier reported as common herb by Sumita (1996), Saroj (2000) from Nauni and Kunihar respectively.

***S.nudicaulis* Buch.-Ham.**

Erect, pubescent, small sized perennial herb; leaves sessile, obovate-spathulate, alternate; heads radiate, yellow;

Rare along dry slopes at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat and Barog.

***Serratula pallida* DC.**

Erect, medium sized perennial herb; leaves stalked, broadly ovate or oblong, radical; heads discoid, purple;

Uncommon along roadsides at Darlaghat, Kasauli and Chail.

***Siegesbeckia orientalis* Linn.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate or broadly triangular, opposite; heads radiate, yellowish;

Sporadic along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog and Darlaghat.

***Solidago canadensis* Linn.**

Erect, pubescent, small sized perennial herb; leaves stalked, lanceolate, alternate; heads radiate, yellow;

Common along moist areas and roadsides at Shilli, Oachghat, Waknaghat, Barog, Darlaghat, and Kasauli; earlier reported as a common herb by Sumita (1996) from Nauni area.

***S. virga-aurea* Linn.**

Erect, pubescent, small sized perennial herb; leaves stalked, lanceolate, alternate; heads radiate, yellow;

Uncommon along wet areas at Waknaghat, Barog, Darlaghat, Kasauli and Chail.

***Sonchus arvensis* Linn.**

Erect, medium sized perennial herb; leaves stalked, lanceolate, alternate; heads ligulate, yellow;

Common in fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier

reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***S. asper* Vill.**

Erect, medium sized annual herb; leaves stalked, lanceolate, alternate; heads ligulate, yellowish;

Common in fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***S. oleraceus* Linn.**

Erect, medium sized annual herb; leaves stalked, lanceolate, alternate; heads ligulate, yellow;

Common along moist places at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***Sphaeranthus indicus* Linn.**

Erect, small sized annual shrub like herb; leaves sessile, obovate-oblong, alternate; heads compound, pinkish purple;

Sporadic in wet areas at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara and Waknaghat.

***Spilanthes acmella* Linn.**

Erect, pubescent, small sized annual herb; leaves stalked, ovate-lanceolate, opposite; heads discoid, reddish yellow;

Common along gardens at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Waknaghat and Darlaghat; earlier reported as a common herb by Sumita (1996) from Nauni area.

***Synedrella nodiflora* Linn.**

Erect, medium sized annual weed; leaves stalked, elliptic-ovate, opposite; heads radiate, yellow;

Rare along moistorous places, roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli and Oachghat.

***Tagetes erecta* Linn.**

Erect, pubescent, medium sized annual herb; leaves stalked, linear-lanceolate, lower leaves opposite, upper alternate; heads radiate, bright yellowish;

Common along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail.

***T. minuta* Linn.**

Erect, pubescent, medium sized annual herb; leaves stalked, linear-lanceolate, opposite, heads radiate, light yellow;

Common throughout at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Waknaghat, Barog, Darlaghat, Kasauli and Chail.

***T. patula* Linn.**

Erect, pubescent, medium sized annual herb; leaves stalked,

oblong or lanceolate, lower leaves opposite, upper alternate, heads radiate, yellow;

Fairly common at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Taraxacum officinale* Wigg.**

Erect, small sized perennial herb; leaves sessile, narrowly oblong, radical; heads ligulate, yellow;

Common along cultivated fields at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as common herb by Sumita (1996), Meenakshi (2002) from Nauni and Shilli respectively.

***Tragopogon gracile* Don**

Erect, small sized perennial herb; leaves stalked, narrow-lanceolate, alternate; heads ligulate, yellow;

Rare along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Tricholepis elongata* DC.**

Erect, large sized perennial herb; leaves lanceolate or oblong, alternate; heads discoid, pale yellow;

Uncommon at Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail.

***Tridax procumbens* Linn.**

Erect, pubescent, medium sized perennial herb; leaves stalked, ovate or lanceolate, opposite; heads discoid, whitish; Rare along roadsides at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Shilli, Oachghat, Sanwara, Wagnaghat and Barog.

***Vernonia anthelmintica* Willd.**

Erect, pubescent, large sized annual herb; leaves stalked, ovate-lanceolate, alternate; heads discoid, purplish;

Sporadic near villages at Nalagarh, Parwanoo, Kunihar, Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat and Darlaghat.

***V. cinerea* Less.**

Erect, pubescent, small sized annual herb; leaves sessile, lanceolate or ovate, alternate; heads discoid, purple;

Common near waste places and hedges at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Nauni, Oachghat, Sanwara, Wagnaghat, Barog, Darlaghat, Kasauli and Chail; earlier reported as a common herb by Sumita (1996) from Nauni area.

***Vicoa auriculata* Cass.**

Erect, pubescent, medium sized annual herb; leaves stalked, lanceolate, alternate; heads radiate, orange yellow;

Uncommon at Nalagarh, Parwanoo, Arki, Ramshehar, Subathu, Sanwara, Wagnaghat, Barog and Darlaghat.

***Xanthium strumarium* Linn.**

Erect, medium sized annual herb; leaves stalked, broadly triangular-ovate, alternate; heads ligulate, greenish white; Common near wet areas, roadsides at Nalagarh, Parwanoo,

Arki, Ramshehar, Subathu, Nauni, Shilli, Oachghat, Sanwara, Wagnaghat and Darlaghat; earlier reported as a common herb by Sumita (1996) from Nauni area.

4. Discussion

Nature has bestowed us with a very rich botanical wealth and a large number of diverse plants that have played an important role in shaping the life, economy and habitat of the people by performing various ecological, economical and recreational functions. In this study, a survey of diversity of plant belonging to family Asteraceae is conducted from Solan district of Himachal Pradesh. Taxonomic description of the species is enumerated in alphabetical order. Standard methods are followed for the collection of plant materials, drying, mounting, preparation and preservation of plant specimens. The study revealed that 101 plant species belonging to 59 genera occur in the study area. As many as 39 genera namely *Acanthospermum*, *Achillea*, *Adenocaulon*, *Adenostemma*, *Ageratum*, *Ainsliaea*, *Arctium*, *Blainvillea*, *Blumea*, *Centratherum*, *Cichorium*, *Crepis*, *Cyathocline*, *Echinops*, *Eclipta*, *Emilia*, *Filago*, *Galinsoga*, *Gynura*, *Lagdera*, *Matricaria*, *Myriactis*, *Parthenium*, *Prenanthes*, *Pterotheca*, *Rhynchospermum*, *Saussurea*, *Sclerocarpus*, *Serratula*, *Siegesbeckia*, *Sphaeranthus*, *Spilanthes*, *Synedrella*, *Taraxacum*, *Tragopogon*, *Tricholepis*, *Tridax*, *Vicoa* and *Xanthium* are represented by a single species each in the region where as the rest of the genera namely *Anaphalis*, *Artemisia*, *Aster*, *Bidens*, *Carpesium*, *Cnicus*, *Conyza*, *Dichrocephala*, *Erigeron*, *Eupatorium*, *Gerbera*, *Gnaphalium*, *Inula*, *Lactuca*, *Launaea*, *Senecio*, *Solidago*, *Sonchus*, *Tagetes* and *Vernonia* are represented by more than single species.

The analysis of the data indicates that the most dominant genera are *Anaphalis* (8) followed by *Artemisia* (6), *Aster* (3), *Bidens* (3), *Carpesium* (3), *Cnicus* (3), *Conyza* (3), *Dichrocephala* (2), *Erigeron* (3), *Eupatorium*(2), *Gerbera* (2), *Gnaphalium*(3), *Inula* (2), *Lactuca* (5), *Launaea* (2), *Senecio* (2), *Solidago* (2), *Sonchus* (3), *Tagetes* (3), and *Vernonia* (2). The number of species is given within the parenthesis.

Earlier, Sumita (1996)^[5] studied 58 species belonging to 37 genera of family Asteraceae from Nauni area of Solan district of Himachal Pradesh. Saroj (2000)^[9] studied the flora of Kunihar Forest Division, District Solan (HP) and recorded 8 genera of family Asteraceae. Meenakshi (2002)^[3] reported 30 species belonging to 23 genera of family Asteraceae from Shilli wildlife sanctuary situated in Solan district of Himachal Pradesh.

5. Conclusion

This study is carried out to find out the present status of the composites occurring in the study area. The analysis of the plant species in the area give the result that a total of 101 plant species belongs to 59 genera of family Asteraceae. Thirty nine genera are represented by single species whereas twenty genera are represented by more than single species. Of the total genera collected, *Anaphalis* is reported as the most dominant genera with as many as 8 species namely *Anaphalis adnata*, *A.araneosa*, *A.busua*, *A.cinnamomea*, *A.contorta*, *A. margaritacea*, *A.royleana* and *A.triplinervis* occurring therein. Presently, 38 species belonging to 20 genera are reported for the first time from the study area.

The present study revealed that the study area has fairly common number of composites which are either evading or invading in the region.

6. References

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