

**WEED FLORA OF S.R.T. CAMPUS BADSHAHI THAUL TEHRI
GARHWAL (H.N.B. GARHWAL CENTRAL UNIVERSITY,
UTTARAKHAND), INDIA**

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ABSTRACT

Weed inventory was conducted in S.R.T. Campus Badshahi Thaul Tehri Garhwal (H.N.B Garhwal Central University, Uttarakhand), India during 2007 to 2010. Plant specimens were collected, dried, pressed and mounted on herbarium sheet and deposited in the Department of Botany, S.R.T. Campus Badshahi Thaul, Tehri Garhwal. The status of each taxa was determined by taking frequency percentage. During the survey, a total of 72 weed species belonging to 56 genera and 27 families were identified. Asteraceae was found to be the most dominant family in the campus contributed 23.6% followed by Fabaceae and Amaranthaceae (9.7%) each. Most of the species were annual (61.1%), followed by perennial and biennial with 36.1% and 2.7%, respectively. Most abundant species were *Achyranthes aspera* L., *Amaranthus viridis* L., *Bidens pilosa* L., *Chenopodium album* L., *Conyza bonariensis* (L.) Cronquist., *Coronopus didymus* (L.) Smith., *Cynodon dactylon* L., *Gallinsoga parviflora* (Cav.) Icon. Descr., *Eupatorium adenophorum* Spreng., *Parthenium hysterophorus* L. and *Lespedeza gerardiana* Graham ex Maxim.

Key words: Flora, identification, India, investigation, survey, weed.

INTRODUCTION

Weeds differ from other plants in being more adaptive and having peculiar characteristics that make them more competitive (Dangwal *et al.*, 2010a). Weeds have the ability to spread rapidly and reproduce in high numbers which enables them to effectively crowd out native and endemic plant population and establish a plant kingdom of their own within a short period of time. Certain families like Asteraceae, Poaceae, Amaranthaceae and Fabaceae constitute the major weed flora throughout the world (Dangwal *et al.*, 2010b). However, weed flora of a particular region largely depends upon prevailing agro-climatic conditions, altitude, cropping pattern and inputs.

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Crop fields are manmade ecosystem where the desired plants are grown by stakeholders but the weeds do come up and compete with crops mainly for space, sunlight, moisture, nutrients and hence reduce the crops yield (Anderson *et al.*, 1996). Weeds usually absorb mineral nutrients faster and accumulate in their tissues in relatively larger amount as compared to crop plants thus the crops suffers from nutrient starved conditions and some time leads to crop failure. Weeds transpire more water than crop plants thus the weed infested crops exhibit wilting and then reduction in yield. Moreover, the weeds mature ahead of crops so that their seeds get mixed with crop seeds and replace or overlaps the endemic habitats. Weeds reduced the yield of wheat crop by 34.3% in India (Tiwari and Parihar, 1993). Weeds also act as an alternate host for insects, bacteria, viruses and nematodes that attack on the crops and cause diseases to badly affect the crops health (Younkin, 1949). Some other noxious weeds are more harmful and adversely affect the crop productivity, and causes health hazards in human and animals. Weeds have allelopathic effects on crop plants by secreting allelochemicals that inhibits the growth parameters of crop plants (Oudhia and Tripathi, 1998).

The lawns and gardens of the S.R.T. Campus Badshahi Thaul Tehri Garhwal are infested with many weed species and their management needs proper identification which could make management easier and faster. In past no proper attention has been paid to the identification of weeds of parks and botanical gardens and relevant literature is also very scanty. However, there are many studies on the weeds across all over the world (Rabia *et al.*, 2008; Melendo *et al.*, 1999; Isaiarasu and Ganeson, 2005; Sit *et al.*, 2007). However, pertaining to Uttarakhand Himalaya has been workout (Gaur, 1999; Dobhal *et al.*, 2006).

Keeping in view the importance of identification of weed species, the present study was carried out to provide the baseline information about the weeds of the studied area which will serve as a manual for future weed identification and recognizing their diversity at said campus.

MATERIALS AND METHODS

Study area

The study was carried out at S.R.T. Campus at Badshahi Thaul, New Tehri Garhwal Uttarakhand, India. It is situated amidst dense pine and broad leaved forests (85 km from Srinagar and 65 km from Rishikesh on the route to Gangotri shrine). It lies in between the 30°4′-30°52.5′N latitude and 77°50′ -79°3′ longitude and an altitudinal range of 1640 m. Topography of the area is undulating and regulation depends upon precipitation for their survival.

Specimen collection

Plant specimens were collected during 2007 to 2010 of the pre-monsoon, monsoon and post monsoon seasons. The area was surveyed regularly once in a month by walking all sides of the campus. Wide ranges of plant specimens were collected. All specimens were dried, pressed, identified and mounted on herbarium sheets.

Identification and preservation of specimens

All the collected plant specimens have been identified with the help of recent and relevant floras and monographs and confirmed after matching with the authentic specimens housed at Herbaria of Botanical Survey of India, Northern Circle (BSD), Forest Research Institute (DD), Dehradun and Garhwal University Herbarium (GUH), Srinagar Garhwal. All the collected plant specimens have been deposited in the Herbarium of H.N.B Garhwal Central University, SRT Campus, Botany Department, Badshahi Thaul Tehri Garhwal. Standard method of collection, preservation and maintenance of specimens in the herbarium were followed (Jain and Rao, 1997; Singh and Subramanyam, 2008).

Constancy classes of species

Through the use of walk through method, frequency of each weed species was determined. For this purpose, at every 10 step, the species touching the toe was observed and frequency percentage was calculated. Based on frequency classes the status of each species was determined (Fig. 1).

RESULTS AND DISCUSSION

A total of 72 weed species belonging to 56 genera and 27 families were identified from the lawns and garden of S.R.T Campus at Badshahi Thaul (Table-1). Asteraceae was found to be the most dominant family at campus that contributed 23.6% followed by Fabaceae and Amaranthaceae (9.7% each) (Fig. 1). Survey results also revealed that most of the recorded species were annuals (61.1%), followed by perennials and biennials with 36.1% and 2.7%, respectively. There were 13 species which were abundantly found; whereas 38 species were commonly and 20 species were uncommonly found (Table-1). Most abundant species were *Bidens pilosa* L., *Chenopodium album* L., and *Conyza bonariensis* (L.) Cronquist, *Coronopus didymus* (L.) Smith., *Cynodon dactylon* L., *Gallinsoga parviflora* (Cav.) Icon. Descr., *Eupatorium adenophorum* Spreng., *Oxalis latifolia*, *Parthenium hysterophorus* L., *Lespedeza gerardiana* Graham. Weed species were also differentiated into monocotyledonous and dicotyledonous.

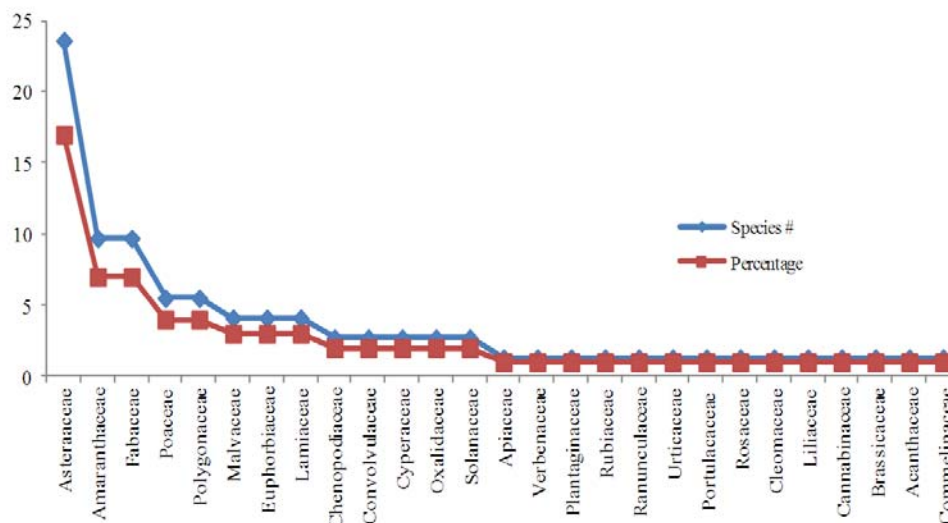


Figure 1. Contribution of families to weeds of S.R.T Campus Badshahi Thaul Tehri Garhwal H.N.B Garhwal Central University.

Almost all the identified and collected species were found with flowering during the survey (Table-1). Most of the weed flora was indigenous except some exotic weed species like *Parthenium hysterophorus*, *Lantana camara* and *Eupatorium adenophorum* which infest the larger area of campus. This is well known weed infesting many countries (Williams and Grovers, 1980). Like other Asteraceous species, it has a minute seeds armed with hairy attachment that facilitate its dispersal by wind. Therefore, it is spreading at an alarming pace in various parts of the country (Shah and Khan, 2006). Grassy weeds were mostly found at campus along with sedge species. Whereas, *Alternanthera pungens*, *Malvestrum coromendelianum* and *Parthenium hysterophorus* were other invasive weeds which also infested a large area. These are problematic weeds, which require continuous hoeing and weeding to reduce the competition amongst the desired species. The weed flora also expresses the ecological significance of each species (Thomas and Abraham, 1996). Annual weed species showed dominance at campus area and were spreading at large scale. The possible reason could be the availability of plentiful moisture, temperature and undisturbance of species. Furthermore, the common species found were more competitive due to rapid growth than rest of species.

Table-1. Botanical names, family, voucher specimen, local names, flowering and fruiting, status, habit and life forms of the Weeds of S.R.T Campus Badshahi Thaul Tehri Garhwal (H.N.B Garhwal Central University) India.

Botanical name (Family)	Voucher specimen	Local name	Flowering & Status fruiting	Habit	Life form
<i>Achyranthes aspera</i> L. (Amaranthaceae)	AS-SRTH-01	Lich-kuri	Aug-Dec. ++	Erect	Biennial
<i>Achyranthes bidentata</i> Blume (Amaranthaceae)	AS-SRTH-04	Chicheree	Aug-Dec +	Erect	Biennial
<i>Aerva sanguinolenta</i> (L.) Blume (Amaranthaceae)	AS-SRTH-08	Safedfulia	Sept-May +	Scandent	Perennial
<i>Ageratum conyzoides</i> L. (Asteraceae)	AS-SRTH-91	Gundrya	Sept-Oct. ++	Erect	Annual
<i>Alternanthera pungens</i> Humb. (Amaranthaceae)	AS-SRTH-94	Gudre-sag	Jul- Nov +	Prostrate	Annual
<i>Artemisia capillaris</i> Thunb. (Asteraceae)	AS-SRTH-96	Marwa	Jul- Nov ++	Erect	Annual
<i>Amaranthus viridis</i> L. (Amaranthaceae)	AS-SRTH- 98	Jungali- Chaulai	Jan-Dec. ++	Erect	Annual
<i>Amaranthus spinosus</i> L. (Amaranthaceae)	AS-SRTH-99	Kanteli chauli	Jul-Dec. ++	Sub-erect	Annual
<i>Amaranthus tricolor</i> L. (Amaranthaceae)	AS-SRTH-102	Lal sag	Aug-Nov. ++	Erect	Annual
<i>Asparagus racemosus</i> Willd. (Liliaceae)	AS-SRTH-104	Satrawar	Apr-Nov +	Climbing shrub	Annual
<i>Avena fatua</i> L. (Poaceae)	AS-SRTH-106	Jawatu	Apr-May +	Erect	Annual
<i>Bidens pilosa</i> L. (Asteraceae)	AS-SRTH-109	Kumur	Mar-Aug +++	Erect	Annual
<i>Cannabis sativa</i> L. (Cannabinaceae)	AS-SRTH-110	Bhang	Jul-Sep +	Erect	Perennial
<i>Centella asiatica</i> (L.) Urban (Apiaceae)	AS-SRTH-111	Brahmi butti	Apr-Nov ++	Herb	Perennial
<i>Chenopodium album</i> L.	AS-SRTH-112	Bathua	Jan-Dec. +++	Erect	Annual

Botanical name (Family)	Voucher specimen	Local name	Flowering & Status fruiting	Habit	Life form	
(Chenopodiaceae) <i>Chenopodium ambrosioides</i> L.	AS-SRTH- 113	Mexican chai	Jan-Dec.	++	Erect	Annual
(Chenopodiaceae) <i>Commelina benghalensis</i> L.	AS-SRTH-114	Kanjula	Jul-Nov	++	Erect	Annual
(Commelinaceae) <i>Coronopus didymus</i> (L.) Smith	AS-SRTH-115	Jungli ajwan	Mar-Oct	+++	Erect	Annual
(Brassicaceae) <i>Convolvulus arvensis</i> L.	AS-SRTH 116	Heyranpatu	Sep.-April	+	Climber	Perennial
(Convolvulaceae) <i>Conyza bonariensis</i> (L.) Cronquist	AS-SRTH -118	Phuri	Feb- Sept.	+++	Erect	Annual
(Asteraceae) <i>Conyza canadensis</i> (L.) Cronquist	AS-SRTH- 117	Safed phuri	Feb- Sept	++	Erect	Annual
(Asteraceae) <i>Cleome viscosa</i> L.	AS-SRTH-107	Jakhya	Jul-Oct	+	Erect	Annual
(Cleomaceae) <i>Cynodon dactylon</i> (L.) Pers.	AS-SRTH-107	Dubla	Apr-Jul	+++	Grass	Perennial
(Poaceae) <i>Cyperus compressus</i> L.	AS-SRTH- 93	Murya	Jul-Nov.	+++	Sedge	Perennial
(Cyperaceae) <i>Cyperus rotundus</i> L.	AS-SRTH- 100	Motha	Jul-Dec.	++	Grass	Perennial
(Cyperaceae) <i>Dicliptera bupleuroides</i> Nees	AS-SRTH- 101	Kutthi	Jan-Dec	+	Semi-erect	Annual
(Acanthaceae) <i>Duchesnea indica</i> (Andrews) Focke	AS-SRTH- 103	Kaphlya	Mar-Sept.	+	Prostrate	Perennial
(Rosaceae) <i>Eclipta prostrata</i> (L.) Mant.	AS-SRTH- 108	Bhangiri		+	Prostrate	Annual
(Asteraceae) <i>Eleusine indica</i> (L.) Gaertn	AS-SRTH- 119	Jharnpriya - Kodu	Jul-Nov	+	Grass	Annual
(Poaceae) <i>Eupatorium adenophorum</i> Sprengel	AS-SRTH- 18	Bakura	Feb-Aug	++	Erect	Perennial
(Asteraceae) <i>Euphorbia heterophylla</i> L.	AS-SRTH- 23	Dudhya	Feb-Aug	++	Erect	Annual
(Euphorbiaceae)						

Botanical name (Family)	Voucher specimen	Local name	Flowering & Status fruiting	Habit	Life form
<i>Euphorbia hirta</i> L. (Euphorbiaceae)	AS-SRTH- 62	Chota- dudya	Sep-Oct. ++	Erect- decumbent	Annual
<i>Euphorbia prostrata</i> Aiton (Euphorbiaceae)	AS-SRTH- 63	Laldani duthi	Jan-Dec ++	Prostrate	Annual
<i>Gallinsoga parviflora</i> Cav. Icon. Descr (Asteraceae)	AS-SRTH- 67	Marchya	Apr-Oct +++	Erect	Annual
<i>Gnaphalium luteo-album</i> L. (Asteraceae)	AS-SRTH- 68	Buglu	Jan-Dec ++	Erect	Annual
<i>Ipomoea nil</i> (L.) Roth (Convolvulaceae)	AS-SRTH- 69	Kaludanu	Mar-Dec ++		Annual
<i>Lantana camera</i> L. (Verbenaceae)	AS-SRTH- 17	Kuri ghas	Jan-Dec +	Erect	Annual
<i>Lespedeza gerardiana</i> Graham (Fabaceae)	AS-SRTH- 5	Khunja	Aug-Oct +++	Prostrate	Perennial
<i>Leucas lanata</i> Benth. (Lamiaceae)	AS-SRTH-06	Bis-kapra	Jan-Dec ++		Perennial
<i>Lolium temulentum</i> L. (Poaceae)	AS-SRTH-07	Mochni	Feb-April +	Erect	Annual
<i>Nepeta ciliaris</i> Benth. (Lamiaceae)	AS-SRTH- 09	Nueet	Jul-Nov ++	Erect	Annual
<i>Malva parviflora</i> L. (Malvaceae)	AS-SRTH- 11	Soncheli	Jan-June ++	Prostrate	Annual
<i>Malvastrum coromandelianum</i> (L.) Garcke (Malvaceae)	AS-SRTH- 25	Suchi	Jan-Dec ++	Erect	Annual
<i>Medicago polymorpha</i> L. (Fabaceae)	AS-SRTH- 19	Ghadu	Aug-Sep +++	Decumben t	Annual
<i>Melilotus alba</i> Medikus (Fabaceae)	AS-SRTH- 21	Safed senji	Aug-Oct ++	Erect	Annual
<i>Melilotus indica</i> (L.) Allioni. (Fabaceae)	AS-SRTH- 16	Ban methi	Aug-Oct ++	Erect	Annual
<i>Oxalis corniculata</i> L. (Oxalidaceae)	AS-SRTH- 33	Bilmori	Feb-Nov +++	Prostrate	Perennial

Botanical name (Family)	Voucher specimen	Local name	Flowering & Status fruiting	Habit	Life form
<i>Oxalis latifolia</i> Humb. (Oxalidaceae)	AS-SRTH- 34	Bilmoria	Jan-Oct +++	Erect	Annual
<i>Parthenium hysterophorus</i> L. (Asteraceae)	AS-SRTH- 35	Jhilmil	Jan-Dec +++	Erect	Annual
<i>Plantago major</i> L. (Plantaginaceae)	AS-SRTH- 36	Luhurya	Apr-Oct +	Erect	Perennial
<i>Polygonum barbatum</i> L. (Polygonaceae)	AS-SRTH- 37	Futa	Jun-Dec +	Erect	Perennial
<i>Polygonum persicaria</i> (L.) Sawak (Polygonaceae)	AS-SRTH- 38	Kaflya	Feb-Nov +	Erect	Annual
<i>Polygonum plebeium</i> R. Br. (Polygonaceae)	AS-SRTH- 39	Dondya	Jan.-Dec +	Prostrate	Perennial
<i>Portulaca oleracea</i> L. (Portulacaceae)	AS-SRTH- 41	Luniya	Apr-May +	Prostrate	Annual
<i>Rubia manjith</i> Roxb. (Rubiaceae)	AS-SRTH-24	Majethi	Jul-Nov. ++	Climber	Perennial
<i>Rumex hastatus</i> D. Don (Polygonaceae)	AS-SRTH- 40	Almoro	Feb- Oct ++	Erect	Perennial
<i>Salvia lanata</i> Roxb. (Lamiaceae)	AS-SRTH- 52	Ghaniya	Mar-Jul ++	Erect	Perennial
<i>Sida acuta</i> Burm. (Malvaceae)	AS-SRTH- 54	Karenti	Sept-Mar. ++	Erect	Annual
<i>Solanum nigrum</i> L. (Solanaceae)	AS-SRTH- 28	Makoi	Aug-Sep ++	Erect	Annual
<i>Solanum surratense</i> Burm. (Solanaceae)	AS-SRTH- 29	Berkateli	Jul-Oct +	Prostrate	Annual
<i>Solidago canadensis</i> L. (Asteraceae)	AS-SRTH- 42	Goldi	Oct-Dec ++	Erect	Perennial
<i>Sonchus asper</i> L. (Asteraceae)	AS-SRTH- 43	Pili Duthi	Mar-Sep ++	Erect	Annual
<i>Sonchus oleraceus</i> L. (Asteraceae)	AS-SRTH- 44	Dudhkani	Mar-Nov ++	Erect	Annual
<i>Sonchus brachyotus</i> DC. (Asteraceae)	AS-SRTH- 45	Karatu	Apr-Oct ++	Erect	Perennial
<i>Taraxacum officinale</i> Weber (Asteraceae)	AS-SRTH- 55	Kanphulia	Feb-Oct +++	Prostrate	Perennial
<i>Thalictrum foliolosum</i> DC. (Ranunculaceae)	AS-SRTH- 53	Mamiri	Jun-Oct ++	Erect	Perennial
<i>Tragopogon gracilis</i> D. Don (Asteraceae)	AS-SRTH- 50	Gualsi	Mar-Sep ++	Erect	Perennial
<i>Tridax procumbens</i> L. (Asteraceae)	AS-SRTH- 47	Kanphuli	Jan-Dec ++	Erect	Perennial
<i>Trifolium prantense</i> L. (Fabaceae)	AS-SRTH- 51	Mithala	Apr-Jul ++	Erect	Perennial
<i>Trifolium repens</i> L. (Fabaceae)	AS-SRTH- 56	Tipatiya	Apr-Jul ++	Decumbent ascending	Perennial
<i>Trigonella corniculata</i> L. (Fabaceae)	AS-SRTH- 57	Ban methi	Apr-Jul +	Erect	Annual
<i>Urtica dioica</i> L. (Urticaceae)	AS-SRTH- 58	Kandali	Nov-Feb ++	Erect	Annual

+++ = Abundant, ++ = Common, + = Uncommon

CONCLUSION

The said study is based on taxonomic approach of weeds of the different seasons, which provides a preliminary data of the campus of S.R.T. Campus Badshahi Thaul Tehri Garhwal (H.N.B Garhwal Central University, Uttarakhand India). It will provide the baseline information about the weeds of the study area. This work will also serve as a manual for weed identification and recognizing their diversity in lawns and gardens of the campus and nearby surrounding areas. It will be helpful to the students, researchers and gardeners for identification of desirable and undesirable plants. Further studies are direly needed to check also their allelopathic effects on agricultural crops and ornamental plants as well.

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