STUDIES ON THE WEED FLORA OF AGASTYAMUNI BLOCK, RUDRAPRAYAG DISTRICT, UTTARAKHAND

Kamlapati Chamoli*

Department of Botany, Govt. P. G. College Agastyamuni (Rudraprayag) Uttarakhand-246421

*Corresponding Author Email id: kpcmchamoli5@gmail.com

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Abstract: Weed commonly called ‘khar- kabad’ in Uttarakhand or ‘kharpatvar’ in India, and is one of the major biological constraints that limits crop productivity. The present communication pertains to survey and inventory of weed flora in Agastyamuni block of district Rudraprayag, Uttarakhand. The study was based on extensive and intensive field survey made during July 2018 to October 2019. During the study period the authors have reported a total 312 species belonging to 188 genera and 54 families from dicots, monocots and pteridophyta. Asteraceae was found to be the most dominant family followed by Poaceae, Lamiaceae and Fabaceae respectively. Survey results also revealed that most of the recorded species were annuals followed by perennials and biennials. Most abundant species were Bidense pilosa, Chenopodium album, Erigeron canadensis, Cynodon dactylon, Gallinsogo parviflora, Eupatorium adenophorum, Oxalis corniculata, Parthenium hysterophorus, Lantana camara, Sonchus arvensis, Ageratum conozoides, Plantago major, Ganaphallium lutealbum, Siegesbeckia orientalis, Youngia japonica, Amaranthus viridis, Stellaria media and Phalaris minor. Many weeds are ethnobotanically important and utilized by the local community.

Key words: Weed Flora, Rabi and Kharif Crops, Diversity, Agastyamuni, Uttarakhand

Introduction

Vegetation is the most precious gift, nature has provide us for all kind of essential requirements in the form of food, fodder, fuel, medicine, timber, oil etc (Gaur,1999). The knowledge of the floristic composition of a plant community is the prerequisite to understand the overall structure and function of an ecosystem. The present study reveals the common weed of Rudraprayag District in Uttarakhand State.

Baker (1965) has defined that “a plant is a weed if any specified geographical area, its populations grow entirely or predominantly in situations markedly disturbed by man (without, of course being deliberately cultivated plants)”. Jethro Tull (1731) was the first person to use the term “weed” in literatures in his famous writing on ‘Horse hoeing husbandry’. Weed is generally considered to be noxious if it is exotic (non-native), spread, easily, difficult to control, have negative impact on agriculture, navigation and is injurious to human health, livestock, wildlife, lake and other property (Larry et al. 1996). It decreases the yield of crops by competing for water, common nutrients, space, carbon dioxide and sunlight, act as alternate host for pathogens and other organisms (Peters, 1955). Moreover, the weeds mature ahead of crops so that their seeds get mixed with crop seed and replace or overlaps the endemic habitats weeds reduced the yield of wheat crop by 34.4% in India (Tiwari and Parihar 1993). Weeds differ from other plants in being more adaptive and having peculiar characteristic...
that make them more competitive (Dangwal et al. 2010).

In view of importance of the problem, the present study was conducted to find out the Rabi and Kharif crops season weeds flora, which will further help in future in formulating a good weed control program.

Material and Methods

Study Area: Uttarakhand is well known for its biodiversity richness and diverse cultural mosaic. The state comprises of 13 districts and lies between 28°43’-31°8’ N and 77°35’-81°2’ E. The study was carried out in Agastyamuni Block of Rudraprayag district which occupies an area of 2439 km². The district is located at 30.28°N, 78.98°E. It has an average elevation of 895 msl (2,936 feet).

Methodology

Survey and Collection: Extensive field surveys were undertaken in almost all parts of the Rudraprayag district from July 2018 to October 2019. The first step was the study of basic information about weed plants and involving question related the weed with local inhabitants. Field notes on some of the important characters like habit, habitat, shape and size, floral, fruit characters, season, ecological features and phytosociological association were instantaly recorded. The kharif cropping season starts with the onset of monsoon, i.e., from mid June to October and mostly grows the paddy (Oryza sativa), maize (Zea mays), jhangora (Echinochloa frumentacea), finger millet (Eleusine coracana), soyabean and pulses. Rabi crops are known winter crops, grown in October - November and harvest in spring and summer, i.e., wheat (Triticum aestivum) barley (Hordeum vulgare), mustard and pulses.

Identification: Each species was identified with the help of existing flora (Naithani, 1984-1985, Gaur, 1999). The specimens information of plants was collected, processed, documented and finally deposited in the herbarium of the department of Botany Govt. P.G. college Agastyamuni as reference material.

Results and Discussion

A total 312 species belonging to 188 genera and 54 families were identified from the Rudraprayag District. During the field study, the weed species sampled were belonging to dicot, monocot and pteriodophyta. Asteraceae was found to be most dominant family followed by Poaceae, Lamiaceae and Fabaceae respectively. Survey results also revealed that most of the recorded species were annuals followed by perennials and biennials. There were 31 species which were abundantly found, whereas 50 species were commonly and 30 species were rare. Most abundant species were Bidense pilosa, Chenopodium album, Erigeron canadensis, Cynodon dactylon, Gallinsogo parviflora, Eupatorium adenophorum, Oxalis corniculata, Parthenium hysterophorus, Lantanacamara, Sonchus arvensis, Ageratum conozoides, Plantago major, Ganaphallium lutealbum, Siegesbeckia orientalis, Youngia japonica, Amaranthus viridis, Stellaria media, Commelina benghalensis, Euphorbia heterophylla, Colebrookia oppositifolia, Rumex hastatus, Xanthium strumarium, Dactyloctenium aegyptium, Diggitaria abyssinica, Setaria viridis, Phalaris minor, Polygogon monspeliensis, Cyperus rotundus, Euphorbia heterophylla, Eleusine indica and Anagallis arvensis.
### Table 1: Botanical names, family, life form and voucher specimen of the weeds of Rudraprayag district, Uttarakhand

| SN | Botanical Name       | Family       | Life form | Voucher No. of Specimen |
|----|----------------------|--------------|-----------|-------------------------|
| 1  | Ageratum conyzoides  | Asteraceae   | Annual    | 1                       |
| 2  | Ageratum houstonianum| Asteraceae   | Annual    | 2                       |
| 3  | Anaphalis margaritaceae| Asteraceae | Annual    | 3                       |
| 4  | Anaphalis sp.        | Asteraceae   | Annual    | 4                       |
| 5  | Artemisia ludoviciana| Asteraceae   | Annual    | 5                       |
| 6  | Artemisia vulgaris    | Asteraceae   | Annual    | 6                       |
| 7  | Arctium tementosus    | Asteraceae   | Annual    | 7                       |
| 8  | Blumea lacera        | Asteraceae   | Annual    | 8                       |
| 9  | Bidens pilosa        | Asteraceae   | Annual    | 9                       |
| 10 | Bidens bipinnata     | Asteraceae   | Annual    | 10                      |
| 11 | Bidens biternata     | Asteraceae   | Annual    | 11                      |
| 12 | Bellis perennis      | Asteraceae   | Annual    | 12                      |
| 13 | Bellis sp.           | Asteraceae   | Annual    | 13                      |
| 14 | Conyza japonica      | Asteraceae   | Annual    | 14                      |
| 15 | Conyza aegyptiaca    | Asteraceae   | Annual    | 15                      |
| 16 | Cirsium arvense      | Asteraceae   | Perennial | 16                      |
| 17 | Cirsium palchichii   | Asteraceae   | Perennial | 17                      |
| 18 | Cotula sp.           | Asteraceae   | Annual    | 18                      |
| 19 | Crepis foetida       | Asteraceae   | Annual    | 19                      |
| 20 | Carthamus oxycantha  | Asteraceae   | Perennial | 20                      |
| 21 | Dichrocephala integrifolia | Asteraceae | Annual | 21                      |
| 22 | Emilia sonchifolia   | Asteraceae   | Annual    | 22                      |
| 23 | Erigeron Canadensis  | Asteraceae   | Annual    | 23                      |
| 24 | Erigeron bonariensis | Asteraceae   | Annual    | 24                      |
| 25 | Erigeron sp.         | Asteraceae   | Annual    | 25                      |
| 26 | Erigeron sp.         | Asteraceae   | Annual    | 26                      |
| 27 | Eupatorium adenophorum| Asteraceae | Annual    | 27                      |
| 28 | Eupatorium luteolium  | Asteraceae   | Annual    | 28                      |
| 29 | Galinsoga parviflora | Asteraceae   | Annual    | 29                      |
| 30 | Galinsoga quadraradiata | Asteraceae | Annual | 30                      |
| 31 | Galinsoga sp.        | Asteraceae   | Annual    | 31                      |
| 32 | Hypochaeris maculate  | Asteraceae   | Annual    | 32                      |
| 33 | Parthenium hysterophorus | Asteraceae | Annual | 33                      |
| 34 | Sonchus asper        | Asteraceae   | Annual    | 34                      |
| 35 | Sonchus arvensis     | Asteraceae   | Annual    | 35                      |
| 36 | Sonchus oleraceus    | Asteraceae   | Annual    | 36                      |
| 37 | Siegesbeckia orientalis | Asteraceae | Annual | 37                      |
| 38 | Sphaeranthus indicus  | Asteraceae   | Annual    | 38                      |
| 39 | Sadilego sp.         | Asteraceae   | Annual    | 39                      |
| 40 | Senecio vulgaris     | Asteraceae   | Annual    | 40                      |
| 41 | Saussurea sp.        | Asteraceae   | Annual    | 41                      |
| 42 | Saussurea sp.        | Asteraceae   | Annual    | 42                      |
| 43 | Sclerocarpus africanus | Asteraceae | Annual | 43                      |
| 44 | Synoitis sp.         | Asteraceae   | Annual    | 44                      |
|   | Species                          | Family          | Life Form |   |
|---|----------------------------------|-----------------|-----------|---|
|45 | *Tridex procumbens*              | Asteraceae      | Annual    | 45|
|46 | *Taraxacum officinale*           | Asteraceae      | Annual    | 46|
|47 | *Tagetes minuta*                 | Asteraceae      | Annual    | 47|
|48 | *Tagetes erecta*                 | Asteraceae      | Annual    | 48|
|49 | *Varnonia sp.*                   | Asteraceae      | Annual    | 50|
|50 | *Xanthium strumarium*            | Asteraceae      | Annual    | 51|
|51 | *Vicia indica*                   | Asteraceae      | Annual    | 52|
|52 | *Youngia japonica*               | Asteraceae      | Annual    | 53|
| 1 | *Alternanthera sessilis*          | Amaranthaceae   | Annual    | 54|
| 2 | *Amaranthus viridis*             | Amaranthaceae   | Annual    | 55|
| 3 | *Amaranthus gracilis*            | Amaranthaceae   | Annual    | 56|
| 4 | *Amaranthus spinosus*            | Amaranthaceae   | Annual    | 57|
| 5 | *Amaranthus sp.*                 | Amaranthaceae   | Annual    | 58|
| 6 | *Achyranthes aspera*             | Amaranthaceae   | Annual    | 59|
| 7 | *Achyranthus sp.*                | Amaranthaceae   | Annual    | 60|
| 8 | *Cythula cylindrica*             | Amaranthaceae   | Annual    | 61|
| 9 | *Cythula achyranthoides*         | Amaranthaceae   | Annual    | 62|
|10 | *Cythula prostrate*              | Amaranthaceae   | Annual    | 63|
|11 | *Chenopodium album*              | Amaranthaceae   | Annual    | 64|
|12 | *Dysphania ambrosiodes*          | Amaranthaceae   | Annual    | 65|
|13 | *Digera muricata*                | Amaranthaceae   | Annual    | 66|
|14 | *Gomphrena serrata*              | Amaranthaceae   | Annual    | 67|
|15 | *Gomphrena celosioides*          | Amaranthaceae   | Annual    | 68|
| 1 | *Barleria cristata*              | Acanthaceae     | Annual    | 69|
| 2 | *Barleria prionitis*             | Acanthaceae     | Annual    | 70|
| 3 | *Barleria sp.*                   | Acanthaceae     | Annual    | 71|
| 4 | *Blepharis sp.*                  | Acanthaceae     | Annual    | 72|
| 5 | *Dicliptera bupleuroides*        | Acanthaceae     | Annual    | 73|
| 6 | *Peristrophe paniculata*         | Acanthaceae     | Annual    | 74|
| 7 | *Strobilanthes wallichii*        | Acanthaceae     | Annual    | 75|
| 1 | *Agave sp.*                      | Asparagaceae    | Perennial | 76|
| 2 | *Asperagus racemosus*            | Asparagaceae    | Perennial | 77|
| 1 | *Asplenium adiantum-nigrum*      | Aspleniaceae    | Annual    | 78|
| 2 | *Asplenium ceterach*             | Aspleniaceae    | Annual    | 79|
| 3 | *Asplenium trichomanes*          | Aspleniaceae    | Annual    | 80|
| 1 | *Cyclospermum leptophyllum*      | Apiaceae        | Annual    | 81|
| 2 | *Centella asiatica*              | Apiaceae        | Annual    | 82|
| 3 | *Lamium amplexicala*             | Apiaceae        | Annual    | 83|
| 4 | *Lamium sp.*                     | Apiaceae        | Annual    | 84|
| 5 | *Senicula europaea*              | Apiaceae        | Annual    | 85|
| 1 | *Colocasia esculenta*            | Aracaceae       | Perennial | 86|
| 2 | *Phoenix dactylifera*            | Aracaceae       | Perennial | 87|
| 1 | *Hedera helix*                   | Araliaceae      | Annual    | 88|
| 2 | *Hedera nepalensis*              | Araliaceae      | Annual    | 89|
| 3 | *Hedera sp.*                     | Araliaceae      | Annual    | 90|
| 1 | *Trianthema portulaestrum*       | Aizoaceae       | Annual    | 91|
|   | Species                          | Family            | Life Form | Notes   |
|---|---------------------------------|-------------------|-----------|---------|
| 1 | Capsella bursa-pastoris         | Brassicaceae      | Annual    | 92      |
| 2 | Coronopus didymus               | Brassicaceae      | Annual    | 93      |
| 3 | Nasturtium officinale           | Brassicaceae      | Annual    | 94      |
| 4 | Sinapis arvensis                | Brassicaceae      | Annual    | 95      |
| 1 | Cynoglossum zeylanicum          | Boraginaceae      | Annual    | 96      |
| 1 | Arenaria serpyllifolia          | Caryophyllaceae   | Annual    | 100     |
| 2 | Drymaria cordata                | Caryophyllaceae   | Annual    | 101     |
| 3 | Drymaria sp.                    | Caryophyllaceae   | Annual    | 102     |
| 4 | Stellaria neglecta              | Caryophyllaceae   | Annual    | 103     |
| 5 | Stellaria media                 | Caryophyllaceae   | Annual    | 104     |
| 6 | Spergula arvensis               | Caryophyllaceae   | Annual    | 105     |
| 1 | Cyperus difformis               | Cyperaceae        | Annual    | 106     |
| 2 | Cyperus esculenthus             | Cyperaceae        | Annual    | 107     |
| 3 | Cyperus iria                    | Cyperaceae        | Annual    | 108     |
| 4 | Cyperus tenuispica              | Cyperaceae        | Annual    | 109     |
| 5 | Cyperus rotundus                | Cyperaceae        | Annual    | 110     |
| 6 | Cyperus kyllingia               | Cyperaceae        | Annual    | 111     |
| 7 | Fimbristylis dichotoma          | Cyperaceae        | Annual    | 112     |
| 8 | Juncus effuses                  | Cyperaceae        | Annual    | 113     |
| 1 | Cannabis sativa                 | Cannabaceae       | Annual    | 114     |
| 1 | Commelina benghalensis          | Commelinaceae     | Annual    | 115     |
| 2 | Commelina communis              | Commelinaceae     | Annual    | 116     |
| 3 | Commelina erecta                | Commelinaceae     | Annual    | 117     |
| 4 | Commelina diffusa               | Commelinaceae     | Annual    | 118     |
| 5 | Cynitis cristata                | Commelinaceae     | Annual    | 119     |
| 1 | Cystopteris sp.                 | Cystopteridaceae  | Annual    | 120     |
| 1 | Convolvulus arvensus            | Convolvulaceae    | Annual    | 121     |
| 2 | Pharbitis purpurea              | Convolvulaceae    | Annual    | 122     |
| 1 | Coriaria nepalensis             | Coriariaceae      | Annual    | 123     |
| 2 | Coriaria sp.                    | Coriariaceae      | Annual    | 124     |
| 1 | Companula sp.                   | Companulaceae     | Annual    | 125     |
| 1 | Cleome viscosa                  | Cleomaceae        | Annual    | 126     |
| 1 | Pteridium aquilinum             | Dennstaedtiaceae  | Annual    | 127     |
| 2 | Pteridium caudatum              | Dennstaedtiaceae  | Annual    | 128     |
| 1 | Euphorbia sp.                   | Euphorbiaceae     | Annual    | 129     |
| 2 | Euphorbia hirta                 | Euphorbiaceae     | Annual    | 130     |
| 3 | Euphorbia heterophylla          | Euphorbiaceae     | Annual    | 131     |
| 4 | Euphorbia prostrate             | Euphorbiaceae     | Annual    | 132     |
| 5 | Ricinus communis                | Euphorbiaceae     | Perennial | 133     |
| 1 | Elaeagnus parvifolia            | Elaeagnaceae      | Annual    | 134     |
| 1 | Equisetum sp.                   | Equisetaceae      | Annual    | 135     |
| 1 | Crotalaria juncea               | Fabaceae          | Annual    | 136     |
| 2 | Desmodium elegans               | Fabaceae          | Annual    | 137     |
| 3 | Desmodium intortum              | Fabaceae          | Annual    | 138     |
| 4 | Desmodium triflorum             | Fabaceae          | Annual    | 139     |
| 5 | Desmodium incanum               | Fabaceae          | Annual    | 140     |
| 6 | Desmodium sp.                   | Fabaceae          | Annual    | 141     |
| 7 | Desmodium grahamii              | Fabaceae          | Annual    | 142     |

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| No. | Scientific Name                  | Family          | Life Form | Page |
|-----|---------------------------------|-----------------|-----------|------|
| 8   | Desmodium gangeticum            | Fabaceae        | Annual    | 143  |
| 9   | Flemingia prostrata             | Fabaceae        | Annual    | 144  |
| 10  | Indigofera grandiflora          | Fabaceae        | Annual    | 145  |
| 11  | Indigofera cossoides            | Fabaceae        | Annual    | 146  |
| 12  | Indigofera sp.                  | Fabaceae        | Annual    | 147  |
| 13  | Indigofera sp.                  | Fabaceae        | Annual    | 148  |
| 14  | Lathyrus aphaca                 | Fabaceae        | Annual    | 149  |
| 16  | Lathyrus sativus                | Fabaceae        | Annual    | 150  |
| 17  | Medicago disciformis            | Fabaceae        | Annual    | 151  |
| 18  | Medicago polymorpha             | Fabaceae        | Annual    | 152  |
| 19  | Melilotus indica                | Fabaceae        | Annual    | 153  |
| 20  | Medicago denticulate            | Fabaceae        | Annual    | 154  |
| 21  | Senna tora                      | Fabaceae        | Perennial | 155  |
| 22  | Trifolium repens                | Fabaceae        | Annual    | 156  |
| 23  | Trifolium pratense              | Fabaceae        | Annual    | 157  |
| 24  | Trigonella corniculata          | Fabaceae        | Annual    | 158  |
| 25  | Vicia sativa                    | Fabaceae        | Annual    | 159  |
| 26  | Vicia hirsute                   | Fabaceae        | Annual    | 160  |
| 27  | Vicia sp.                       | Fabaceae        | Annual    | 161  |
| 1   | Geranium ocellatum              | Geraniaceae     | Annual    | 162  |
| 1   | Gentiana acaulis                | Gentianaceae    | Annual    | 163  |
| 1   | Deutzia staminea                | Hydrangeaceae   | Annual    | 164  |
| 1   | Reinwardtia indica              | Linaceae        | Perennial | 165  |
| 1   | Ajuga bracteosa                 | Lamiaceae       | Annual    | 166  |
| 2   | Anisomeles india                | Lamiaceae       | Annual    | 167  |
| 3   | Anisochilus cornosus            | Lamiaceae       | Annual    | 168  |
| 4   | Colebrookea oppositifolia       | Lamiaceae       | Annual    | 169  |
| 5   | Callicarpa macrophylla          | Lamiaceae       | Annual    | 170  |
| 6   | Hiptis suaveolens               | Lamiaceae       | Perennial | 171  |
| 7   | Isodon coetsa                   | Lamiaceae       | Annual    | 172  |
| 8   | Leucas hyssopifolia             | Lamiaceae       | Annual    | 173  |
| 9   | Leucas aspera                   | Lamiaceae       | Annual    | 174  |
| 10  | Leucas lanata                   | Lamiaceae       | Annual    | 175  |
| 11  | Leucas sp.                      | Lamiaceae       | Annual    | 176  |
| 12  | Lindera sp.                     | Lamiaceae       | Annual    | 177  |
| 13  | Mentha longifolia               | Lamiaceae       | Annual    | 178  |
| 14  | Micromeria biflora              | Lamiaceae       | Annual    | 179  |
| 15  | Nepeta leucophylla              | Lamiaceae       | Annual    | 180  |
| 16  | Nepeta sp.                      | Lamiaceae       | Annual    | 181  |
| 17  | Nepeta sp.                      | Lamiaceae       | Annual    | 182  |
| 18  | Nepeta cilaris                  | Lamiaceae       | Annual    | 183  |
| 19  | Ocimum tenuiflorum              | Lamiaceae       | Annual    | 184  |
| 20  | Pogostemon plectranthus         | Lamiaceae       | Perennial | 185  |
| 21  | Pogostemon benghalensis         | Lamiaceae       | Perennial | 186  |
| 22  | Pogostemon sp.                  | Lamiaceae       | Perennial | 187  |
| 23  | Salvia plebeian                 | Lamiaceae       | Annual    | 188  |
| 24  | Scutellaria lateriflora         | Lamiaceae       | Annual    | 189  |
| 25  | Scutellaria altissima           | Lamiaceae       | Annual    | 190  |
| No. | Species Name                  | Family              | Life Form | Page |
|-----|------------------------------|---------------------|-----------|------|
| 26  | Scutellaria baicalensis      | Lamiaceae           | Annual    | 191  |
| 27  | Scutellaria galericulata     | Lamiaceae           | Annual    | 192  |
| 28  | Strobilanthes wallachi      | Lamiaceae           | Annual    | 193  |
| 1   | Malvastrum coromandelianum  | Malvaceae           | Annual    | 194  |
| 2   | Malva parviflora             | Malvaceae           | Annual    | 195  |
| 3   | Sida cordifolia              | Malvaceae           | Annual    | 196  |
| 4   | Sida rhombifolia             | Malvaceae           | Annual    | 197  |
| 5   | Urena lobata                 | Malvaceae           | Annual    | 198  |
| 1   | Boerhavia diffusa            | Nyctaginaceae       | Annual    | 199  |
| 2   | Boerhavia erecta             | Nyctaginaceae       | Annual    | 200  |
| 1   | Oxalis corniculata           | Oxalidaceae         | Annual    | 201  |
| 2   | Oxalis corymbosa             | Oxalidaceae         | Annual    | 202  |
| 3   | Oxalis martiana              | Oxalidaceae         | Annual    | 203  |
| 4   | Oxalis latifolia             | Oxalidaceae         | Annual    | 204  |
| 5   | Oxalis debilis               | Oxalidaceae         | Annual    | 205  |
| 1   | Avena fatua                  | Poaceae             | Annual    | 206  |
| 2   | Arundo donax                 | Poaceae             | Annual    | 207  |
| 3   | Cynodon dactylon             | Poaceae             | Annual    | 208  |
| 4   | Chloris barbata              | Poaceae             | Annual    | 209  |
| 5   | Dactyloctenium aegyptium     | Poaceae             | Annual    | 210  |
| 6   | Chrysopogon festucoides      | Poaceae             | Annual    | 211  |
| 7   | Crispyogon Sp.               | Poaceae             | Annual    | 212  |
| 8   | Digitaria abyssinica         | Poaceae             | Annual    | 213  |
| 9   | Digitaria sanguinalis        | Poaceae             | Annual    | 214  |
| 10  | Digitaria ciliaris           | Poaceae             | Annual    | 215  |
| 11  | Digitaria sanguinalis        | Poaceae             | Annual    | 216  |
| 12  | Digitaria sp.                | Poaceae             | Annual    | 217  |
| 13  | Eleusine indica              | Poaceae             | Annual    | 218  |
| 14  | Echinochloa colona           | Poaceae             | Annual    | 219  |
| 15  | Eragrostis atrovirens        | Poaceae             | Annual    | 220  |
| 16  | Eragrostis tenella           | Poaceae             | Annual    | 221  |
| 17  | Imperata cylindrical         | Poaceae             | Annual    | 222  |
| 18  | Oplismenius compositus       | Poaceae             | Annual    | 223  |
| 19  | Oplismenius burmannii        | Poaceae             | Annual    | 224  |
| 20  | Polypogon monspeliensis      | Poaceae             | Annual    | 225  |
| 21  | Poa annua                    | Poaceae             | Annual    | 226  |
| 22  | Phalaris minor               | Poaceae             | Annual    | 227  |
| 23  | Panicum repens               | Poaceae             | Annual    | 228  |
| 24  | Pennisetum purpureum         | Poaceae             | Annual    | 229  |
| 25  | Setaria pumila               | Poaceae             | Annual    | 230  |
| 26  | Setaria palmifolia           | Poaceae             | Annual    | 231  |
| 27  | Sateria glauca               | Poaceae             | Annual    | 232  |
| 28  | Sorghum halepense            | Poaceae             | Annual    | 233  |
| 29  | Setaria sp.                  | Poaceae             | Annual    | 234  |
| 30  | Setaria verticillata         | Poaceae             | Annual    | 235  |
| 31  | Saccharum spontaneum         | Poaceae             | Annual    | 236  |
| 32  | Saccharum sp.                | Poaceae             | Annual    | 237  |
|   | Species Name                  | Family            | Life Form | Page |
|---|-------------------------------|-------------------|-----------|------|
| 1 | Adiantum capillus             | Pteridaceae       | Annual    | 240  |
| 2 | Notholaena californica        | Pteridaceae       | Annual    | 241  |
| 3 | Pteris vittata                | Pteridaceae       | Annual    | 242  |
| 4 | Pteris muricata               | Pteridaceae       | Annual    | 243  |
| 5 | Pteris wallichiana            | Pteridaceae       | Annual    | 244  |
| 6 | Pteris cretica                | Pteridaceae       | Annual    | 245  |
| 1 | Plantago major                | Plantaginaceae    | Annual    | 246  |
| 2 | Scoparia dulcis               | Plantaginaceae    | Annual    | 247  |
| 3 | Veronica hederifolia          | Plantaginaceae    | Annual    | 248  |
| 1 | Fumaria pariviflora           | Papavraceae       | Annual    | 249  |
| 1 | Portulaca sp.                 | Portulaceae       | Annual    | 250  |
| 2 | Portulaca oleracea            | Portulaceae       | Annual    | 251  |
| 1 | Fagopyrum esculentum          | Polygonaceae      | Annual    | 252  |
| 2 | Rumex hastatus                | Polygonaceae      | Annual    | 253  |
| 3 | Rumex dentatus                | Polygonaceae      | Annual    | 254  |
| 4 | Rumex nepalensis              | Polygonaceae      | Annual    | 255  |
| 5 | Polygonum hirsutum            | Polygonaceae      | Annual    | 256  |
| 6 | Polygonum sp.                 | Polygonaceae      | Annual    | 257  |
| 6 | Polygonum nepalensis          | Polygonaceae      | Annual    | 258  |
| 7 | Polygonum capitatum           | Polygonaceae      | Annual    | 259  |
| 8 | Polygonum avicularare         | Polygonaceae      | Annual    | 260  |
| 9 | Polygonum plebeium            | Polygonaceae      | Annual    | 261  |
| 10 | Polygonum barbatum            | Polygonaceae      | Annual    | 262  |
| 1 | Anagallis arvensis            | Primulaceae       | Annual    | 263  |
| 1 | Duchesnea indica              | Rosaceae          | Annual    | 264  |
| 2 | Potentilla reptans            | Rosaceae          | Annual    | 265  |
| 3 | Rosabrunonii                  | Rosaceae          | Perennial | 266  |
| 4 | Pyracantha crenulata          | Rosaceae          | Perennial | 267  |
| 5 | Prinsepia utilis              | Rosaceae          | Perennial | 268  |
| 6 | Potentilla sp.                | Rosaceae          | Annual    | 269  |
| 7 | Potentilla canadensis         | Rosaceae          | Annual    | 270  |
| 8 | Potentilla sp.                | Rosaceae          | Annual    | 271  |
| 9 | Rubus occidentalis            | Rosaceae          | Perennial | 372  |
| 10 | Rubus ellipticus              | Rosaceae          | Perennial | 273  |
| 11 | Rosa multiflora               | Rosaceae          | Perennial | 274  |
| 1 | Ziziphus nummularia           | Rhamnaceae        | Perennial | 275  |
| 1 | Ranunculus arvensis           | Ranunculaceae     | Annual    | 276  |
| 2 | Ranunculus sceleratus         | Ranunculaceae     | Annual    | 277  |
| 3 | Ranunculus repens             | Ranunculaceae     | Annual    | 278  |
| 4 | Ranunculus sp.                | Ranunculaceae     | Annual    | 279  |
| 5 | Thalictrum foliolosum         | Ranunculaceae     | Annual    | 280  |
| 6 | Thalictrum sp.                | Ranunculaceae     | Annual    | 281  |
| 1 | Leptodermis lanceolata        | Rubiaceae         | Binnial   | 282  |
| 2 | Gallium aparine               | Rubiaceae         | Annual    | 283  |
| 3 | Gallium sp.                   | Rubiaceae         | Annual    | 284  |
| 4 | Rubia cordifolia              | Rubiaceae         | Perennial | 285  |
| 1 | Lycopersicon sp.              | Solanaceae        | Annual    | 286  |
| 2 | Solanum nigrum                | Solanaceae        | Annual    | 287  |
Almost all the identified and collected species were found in flowering stage during the survey. Most flora was indigenous accepts some exotic (Parthenium hysterophores, Lantana camara and Eupotorium adenophorum), which infest the larger area of district Rudraprayag. 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 in Rudraprayag district along with sedges species. Whereas, Lantana camara, Malvestrum coromendelianum and Parthenium hysterophorus were other invasive weeds which also infested a large area. These problematic weeds require continuous hoeing and weeding to reduce the competition amongst the desired species. The study also revealed that the ecological weed species showed dominancy in Rudraprayag district and were spreading at large scale. The possible reason could be the availability of plentiful moisture, temperatures and undisturbance of species. Furthermore, the common species were found more competitive due to rapid growth. Dangwal et al, (2010) also opined that weeds grow in association with agricultural crops and bring about significance decline due to their competition with crop plants for sunlight, space and nutrients etc. According to Rao and Nagamini (2010), weeds compete with crops for natural and applied resources besides being responsible for reducing quality of agricultural productivity. Shailey and Gaur (1993) and Tiwari et al. (2016) studied the phytosociological association of crops and weeds of Pauri district of Uttarakhand and recorded 180 weed species to belonging to 50 Angiosperm families. The dominant dicot families were Amaranthaceae, Apiaceae and Brassicaceae in their

|   | Scientific Name                | Family           | Life Form | Code |
|---|-------------------------------|------------------|-----------|------|
| 1 | Solanum americanum             | Solanaceae       | Annual    | 288  |
| 2 | Solanum viarum                | Solanaceae       | Annual    | 289  |
| 1 | Smilax aspera                  | Smilacaceae      | Perennial | 290  |
| 2 | Smilax sp.                     | Smilacaceae      | Perennial | 291  |
| 1 | Buddleja asiatica             | Scrophulariaceae | Perennial | 292  |
| 2 | Buddleja sp.                   | Scrophulariaceae | Perennial | 293  |
| 3 | Verbascum Thapsus              | Scrophulariaceae | Annual    | 294  |
| 4 | Mimulus sp.                    | Scrophulariaceae | Perennial | 295  |
| 5 | Mazus pumilus                  | Scrophulariaceae | Annual    | 296  |
| 6 | Lindernia ciliata              | Scrophulariaceae | Annual    | 297  |
| 7 | Lindernia parviflora           | Scrophulariaceae | Annual    | 298  |
| 8 | Scrophularia Chinese           | Scrophulariaceae | Annual    | 299  |
| 1 | Salix sp.                      | Saliaceae        | Perennial | 300  |
| 1 | Elatostema monandrum           | Urticaceae       | Annual    | 301  |
| 2 | Girardinia diversifolia       | Urticaceae       | Perennial | 302  |
| 3 | Bohemaria platyphylla          | Urticaceae       | Perennial | 303  |
| 4 | Bohemaria rugulosa             | Urticaceae       | Perennial | 304  |
| 5 | Elatostema reticulatum         | Urticaceae       | Perennial | 305  |
| 6 | Pilea scripta                  | Urticaceae       | Perennial | 306  |
| 7 | Pauzolzia hirta                | Urticaceae       | Annual    | 307  |
| 8 | Uritica dioica                 | Urticaceae       | Perennial | 308  |
| 1 | Barberis vulgaris              | Verbenaceae      | Perennial | 309  |
| 2 | Lantana camara                 | Verbenaceae      | Perennial | 310  |
| 3 | Lantana indica                 | Verbenaceae      | Perennial | 311  |
| 1 | Viola sp.                      | Violaceae        | Annual    | 312  |
studies. Gupta et al, (2008) studied the dynamics of cereal crop weeds of Doon Valley with special reference to rice, maize and wheat fields. They reported 151 Weed species belonging to 118 and 31 families, 57 weeds were reported from rice, 77 from maize and 71 from wheat field. Kaul (1986) studied the weed flora of Kashmir Valley and reported 401 weed species belonging to 251 genera and 56 angiosperm families.

Conclusion

Weed species are major part of any area/ region of plant diversity. This study may be useful for agriculturists as well as taxonomists who are involved in the management of weeds and conservation of biodiversity in different parts of uttarakhand. All the species are not harmful to human being, animal and agriculture crops besides they may be useful for biological tools, medicine and as a good indicator of ecological adaptaitons, food and fodder etc. This work will also serve as manual for weed identification and recognizing their diversity in Agastyamuni valley of Rudraprayag district of Uttarakhand. Further study and exploration of weeds are directly needed to check diversity of weeds in the said region.

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