

Identification of Weed Flora in Apple Orchards of Himachal Pradesh

Ajai Bhandari *,**

Department of Bio-Sciences, Himachal Pradesh University, Shimla-171 005, Himachal Pradesh, India

ABSTRACT

The nature has endowed Himachal Pradesh with a wide range of agro-climatic conditions due to which almost all kind of fruits grown in the country can be produced in the state. At present about 34 types of fruit species are grown in Himachal Pradesh on a bigger or smaller scale, but Apple has dominated the fruit industry of the State during the last five decades. Area under apple crop constitutes about 46.5% of the total area under horticultural crops; and its production has increased manifolds since 1950-1951. Himachal Pradesh is thus rightly earned the name "Apple State of India". However, one of the major problems faced in apple orchards is the presence of weeds (unwanted plants other than apple). Weed infestation in nurseries is a very serious problem, causing slow growth and development of young seedlings. Up to 90% of the tree roots are in the top 60 cm (2 ft.) of the soil and weeds growing in the root areas of the trees are in direct competition with the tree for water and nutrients. They also harbour insects, diseases and rodents. They may lower both the quality and the quantity of apples and may increase the cost of production by causing difficulties during harvest. Since apple trees are poor competitors their control becomes necessary. Apple crops are fertilized heavily. The weeds rob up the fertilizers at a faster rate than the apple plants resulting in lower yields. It is very essential that before evaluating the damage and control measures that are to be undertaken to eradicate them, the weeds growing in any one particular region must properly be identified. Moreover, the weeds which actually occur within the apple orchards have not been identified till date. It is with this last objective the present study was undertaken.

*Present Address: Secretary (GAD, SAD, Parliamentary Affairs, Sainik Welfare), Ellerslie Building, Himachal Pradesh Government Secretariat, Shimla -171002, Himachal Pradesh, INDIA

** Supervised by: Prof. M.K. Seth

Large numbers of weed collections were made from different apple orchards of Himachal Pradesh from 2002 to 2007. The characteristic features of the weeds were noted and their coloured photographs were taken in the field. Five Herbarium mounts of these plants were also prepared for record and identification. Standard procedures were adopted for collecting, preserving and identifying the plants. For each plant common and vernacular names, etymology, citations, morphological details, flowering and fruiting periods, places of collection, habitat, distribution, economic and ethnobotanical uses, coloured photographs and notes (if any) are presented. In all 367 weeds belonging to 252 genera and 92 families have been collected, identified, described and photographed. 36 species belonging to 19 genera and 14 families are pteridophytes and only a single species *Ephedra gerardiana* belonging to family Ephedraceae is a gymnosperm. 331 species belonging to 233 genera and 78 families are angiosperms. Out of these 310 species belonging to 212 genera and 63 families are dicots and 20 species belonging to 20 genera and 14 families are monocots. The top 10 families of weed flora of Himachal Pradesh (with number of species in brackets) are Asteraceae (57 Species), Rosaceae (19 Species), Lamiaceae (18 Species), Papilionaceae (13 Species), Polygonaceae (12 Species), Ranunculaceae (12 Species), Scrophulariaceae (10 Species), Solanaceae (10 Species), Boraginaceae (8 Species) and Urticaceae (8 Species). Four genera namely *Anaphalis*, *Geranium*, *Ipomoea* and *Rubus* have 5 species each. Five genera namely *Adiantum*, *Berberis*, *Chenopodium*, *Malva* and *Solanum* have 4 species each. 18 genera namely *Androsace*, *Asplenium*, *Aster*, *Clematis*, *Dryopteris*, *Epilobium*, *Euphorbia*, *Galium*, *Gentiana*, *Hypericum*, *Jasminum*, *Plantago*, *Polystichum*, *Potentilla*, *Pteris*, *Rumex*, *Sonchus* and *Viola* have 3 species each. The rest of the genera have either two species or are represented by a single species each.

Out of 367 weeds, 279 are herbs and 55 are shrubs. The rest of the weeds are either herbs-undershrubs/shrubs (18) or undershrubs/shrubs-trees (15). The number of annual, biennial and perennial weeds is 87, 11 and 234 respectively. 35 weeds are annual to perennial. Three parasitic weeds have also been found. These are *Cuscuta reflexa*, *Orobanche alba* and *Orobanche cernua*. Weeds can be beneficial too. 236 species of weeds are reported to be medicinal; 89 weeds have edible value; 50 weeds can be utilized as fodder; 38 species are aromatic and have essential oils; 29 species have ornamental value; 26 weeds can be used as fuel; 25 species are good soil binders; 22 are dye yielding plants; 21 species have sacred value; 13 species yield wood; 12 are fibrous plants; 11 can yield fatty oils; 10 species are poisonous and have narcotic value; 8 are tannin yielding; and 7 can be utilized as insecticides.

13 species, namely *Astragalus oplites*, *Calendula officinalis*, *Cosmos bipinnatus*, *Dahlia rosea*, *Delphinium denudatum*, *Dichrocephala chrysanthemifolia*, *Digitalis purpurea*, *Eupatorium adenophorum*, *Galinsoga quadriradiata*, *Ipomoea quamoclit*, *Jasminum mesnyi*, *Nepeta podostachys* and *Orobanche cernua*, not enumerated earlier, have been reported for the first time from Himachal Pradesh. Three fern

allies (pteridophytes other than ferns), namely *Equisetum diffusum*, *Equisetum ramosissimum* and *Selaginella adunca* have also been reported from Himachal Pradesh.

It is hoped that the results of the present study can be utilized for further research and incorporation in studies like weed identification, weed control, orchard soil management, plant biodiversity and utilization of plant resources.