

## **WEED FLORA OF MULBERRY GARDENS IN JAMMU & KASHMIR, INDIA**

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### **ABSTRACT**

*Weed flora of the mulberry gardens in Jammu and Kashmir comprised of 123 species in 103 genera and 35 families. Among these, 100 species (81.30%) were dicot and the rest were monocots. Asteraceae (29 species) was the largest family. The studied species included annuals (55.28%), biennials (6.50%) and perennials (38.21 %). Most of the species were therophytes, 85% species were herbaceous, the rest were grasses and one each sedge and parasitic. The flowering and fruiting period ranged mostly from three to five months.*

**Keywords:** Weeds, mulberry garden, growth form, life-span, flowering, identification.

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### **INTRODUCTION**

Mulberry cultivation is the basic step in the sericulture industry leading to silk production and is directly related to quality and quantity of mulberry leaf. The mulberry leaf contributes 38.2% for the success of the silkworm rearing (Yokoyama, 1962). Weeds in general are highly selective in their choice of growing conditions; the weeds observed here must be characteristic to mulberry plantation and many factors contribute to the occurrence of an association of crops with certain weeds (Crafts *et al.*, 1962; Tanaka, 1964).

Weeds in mulberry garden pose a serious problem for mulberry plantation in the production and quality of leaf. Weeds impact the growth of plants by competing for the soil nutrients, which reduce the yield and quality of mulberry leaf (Muniyappa *et al.*, 2000). Sikdar *et al.* (1981); Srinivasan *et al.* (1987) have reported that weeds growing in mulberry plantation are responsible for reducing the mulberry leaf yield significantly and Isaiarasu *et al.* (2005); Setua *et*

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*a/.* (2008) are of the opinion that the reduction in mulberry leaf yield in turn affects the production of cocoon and silk.

Weeds may act as host and vectors for plant pathogens besides of nuisance value in the management of mulberry garden. From sericulture point of view, these plants are to be controlled, whereby their effect can be minimized in mulberry garden. For management of weed, the prerequisite is to identify the weed and observe their appearance in the field. In this back ground, the present study was undertaken to enlist weed flora of mulberry gardens in Jammu and Kashmir so as to create a base line data for framing management strategies.

## **MATERIALS AND METHODS**

During survey of the mulberry gardens, sampling sites were distributed to a large area across Jammu & Kashmir State. The field studies and sampling was made across the state from time to time spread over several years. During each visit plant specimens were collected along with extensive field notes for identification purpose. All the collected plants were properly pressed, dried and mounted on standard herbarium sheets and specimens identified. Observations were recorded about occurrence, growth form, life span, flowering and fruiting periods of each species.

## **RESULTS AND DISCUSSION**

The observations (Table-1) give an overall picture of the weeds associated with the mulberry plantation, their growth form, life-span spectrum, flowering and fruiting periods. Total weed flora of the mulberry gardens studied comprised of 123 species related to 103 genera and belonging to 35 families.

The floristic composition of recorded weed species of the mulberry gardens were grouped into Monocotyledons and Dicotyledons. The number of monocot families recorded was 4 (11.42%), while the number of dicots was 31 (88.57%). The number of monocot species recorded in the study was 23 (18.69%) related to 20 genera (19.41%), while the number of dicot species was 100 (81.30%) related to 83 genera (80.58%). *Ranunculus*, *Artemisia*, *Polygonum* and *Veronica* are the larger genera with 4, 3, 3 and 3 species respectively. Family *Asteraceae* comprises 29 species i.e. about 23.57% of the total recorded species, followed by *Poaceae* which includes 18 species (14.63%), *Fabaceae* 09 species (7.31%), *Boraginaceae*, *Brassicaceae*, and *Lamiaceae* was represented by 06 species each (4.87%), *Rununculaceae* and *Scrophulariaceae* were represented by 05 species each (4.06%). *Polygonaceae* was represented by 04 species (3.25%) while *Liliaceae* and *Apiaceae* by 03

species each (2.43%). The other remaining 24 families were either represented by 2 or one species. Out of these families, Asteraceae, Poaceae and Fabaceae were the dominant families contributing collectively 45.52% of the total recorded species (Fig. 1). This indicates that these three families were the common taxa which constitute the main bulk of the weed flora in the mulberry gardens. This is in conformity with the results of earlier studies by Sridhara *et al.* (1995) and Azad *et al.* (2005). Dangwal *et al.* (2010b) also reported that the families, Asteraceae, Poaceae, Amaranthaceae and Fabaceae constitute the major weed flora throughout the world.

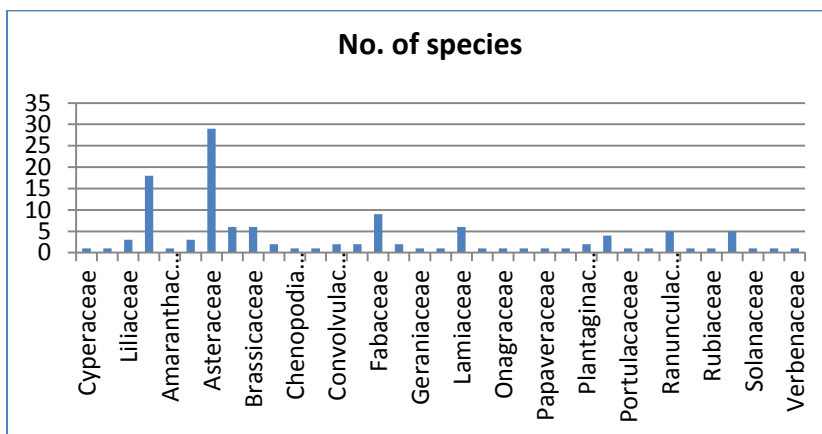
The present study revealed that the weed flora showed four types of growth forms and 91% families are comprised of herbs only, totaling about 86% species, a few species are grasses and one each is sedge and parasitic in habit (Fig. 2).

The weed plant species life-span spectrum usually varies from family to family or even within the same family. The recorded species were categorized into three main groups: annual, biennial and perennial. The recorded species include 68 annuals (55.28%), 08 biennials (6.50%) and 47 perennials (38.21%) (Fig. 3). Family Asteraceae comprised of 15 annuals, 10 perennials and 4 biennials, followed by family Poaceae which includes 9 annuals and 9 perennials (Table 1). According to the plant life-form classification by Raunkiaer (1934), the recorded species are mainly therophytes. This agrees with the findings of earlier studies by Azad *et al.* (2005).

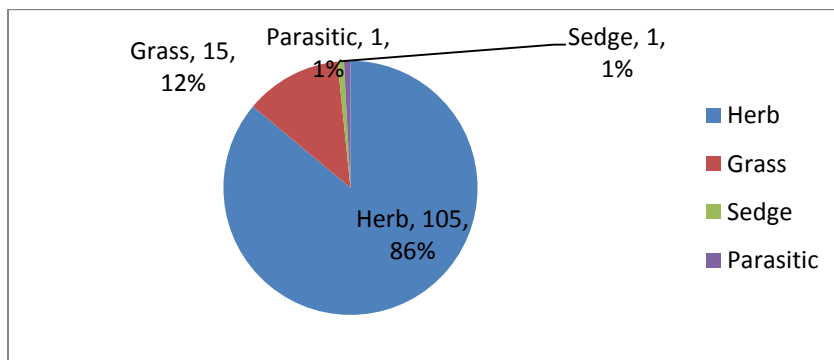
The weed flora differed in flowering and fruiting behaviour as well. It was observed that a few species showed flowering in the month of March, followed by fruiting and it continued in other species up to November and in few species up to December. Majority of the species showed complete flowering and fruiting by August. Flowering and fruiting period ranged from three to five months (Table-1).

## CONCLUSION

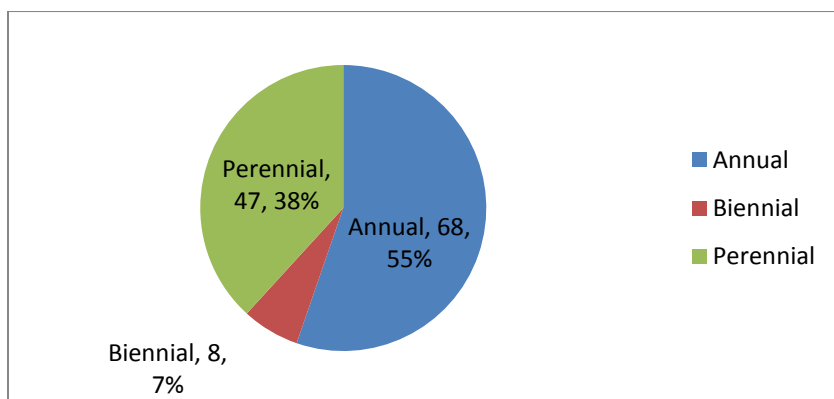
The present studies corroborate with the observations made by different workers and leads to the conclusion that weeds associated with mulberry plantation must be controlled in order to prevent deterioration of mulberry leaf quality as well as retardation of mulberry leaf yield as the silkworm derives 25 of silk protein from mulberry leaf on which it feeds. Concerted efforts are required to evolve a good insight into the problem and for that these findings can be taken as a base data to generate new hopes among the local farmers for easy and fruitful mulberry culture for a sustainable sericulture in Jammu & Kashmir.



**Figure 1.** Distribution of species in each family



**Figure 2.** Species categorized on the basis of growth form



**Figure 3.** Species categorized on the basis of lifespan

**Table-1.** Floristic composition of the weed flora

Family	Plant species	Growth	Life span	Flowering/ fruiting
MONOCOT				
Cyperaceae	<i>Cyperus rotundus</i> L.	S	P	July-Nov.
Iridaceae	<i>Iris ensata</i> Thunb.	H	P	April-June
Liliaceae	<i>Allium sativum</i> L.	H	P	--
	<i>Gagea elegans</i> Wallichex Royle.	H	P	Mar.-May
	<i>Tulip astellata</i> Hook.	H	P	April-May
Poaceae	<i>Agrostis tenuis</i> Sibth	G	P	June-Sept.
	<i>Avena fatua</i> L.	G	A	Apr.-May
	<i>Bromus mollis</i> L.	H	A	April-July
	<i>Cynodon dactylon</i> (L.) Pers.	G	P	July-Oct.
	<i>Digitaria cruciata</i> (Nees. ex. Steud)	G	A	--
	<i>Echinochloa crusgalli</i> (L.)P.Beauv.	G	A	July-Oct.
	<i>Echinochloa colona</i> (L.) Link.	H	A	--
	<i>Hordeum murinum</i> L.	G	A	May-July
	<i>Imperata cylindrica</i> (L.) P. Beaur.	H	P	May-July
	<i>Lolium perenne</i>	G	P	May-July
	<i>Lolium temulentum</i> L.	G	P	May-July
	<i>Pennisetum glaucum</i> (L.) R.Br.	G	A	--
	<i>Phleumhima laicum</i> Mez.	G	A	May-Aug.
	<i>Phragmite saustralis</i> (cav)Trin.exSte.	G	P	June-Aug.
	<i>Poa bulbosa</i> L.	G	P	June-Sept.
	<i>Poa pratensis</i> L.	G	P	April-July
	<i>Setaria viridis</i> (L.)P.Beauv.	G	A	June-Sept.
	<i>Sorghum halepense</i> (L.) Pers.	G	P	July-Dec.
DICOTS				

Amaranthaceae	<i>Amaranthus caudatus</i>	H	A	July-Nov.
Apiaceae	<i>Daucus carota</i> L.	H	B	July-Oct.
	<i>Eryngium billardieri</i> Delar	H	A	June-Aug.
	<i>Torilis nodosa</i>	H	A	May-Aug.
Asteraceae	<i>Achillea millefolium</i> L.	H	P	Aug-Oct.
	<i>Arctium lappa</i> L.	H	B	July-Sept.
	<i>Artemisia absinthium</i> L.	H	P	July-Sept.
	<i>Artemisia indica</i>	H	P	Aug-Oct.
	<i>Artemisia scoparia</i> Waldst. & Kit.	H	P	--
	<i>Bellis perennis</i> L.	H	P	May-June
	<i>Bidens chinensis</i> (L) Willd	H	A	Aug-Nov.
	<i>Carpesium cernuum</i> L.	H	P	July-Sept.
	<i>Carpesium abrotenoides</i> L.	H	P	Sept-Nov.
	<i>Carthamus lanatus</i> L.	H	A	--
	<i>Centaurea iberica</i> Trev.	H	A	July-Sept.
	<i>Cichorium intybus</i> L.	H	P	June-Aug.
	<i>Cirsium arvense</i> (L.) Scop.	H	P	--
	<i>Cotula anthemoides</i> L.	H	A	May-June
	<i>Crepis sancta</i> (L.) Babcock	H	A	Mar-April.
	<i>Cardnusedel bergii</i> Rech.f.	H	B	--
	<i>Erigeron canadensis</i> L.	H	A	July-Oct.
	<i>Galinsoga parviflora</i> Cav.	H	A	June-Aug.
	<i>Lactuca serriola</i> L.	H	A	--
	<i>Lactuca dissecta</i> Don.	H	A	--
	<i>Matricaria chamomilla</i> L.	H	A	--
	<i>Myriactiss</i> pp.	H	A	--
	<i>Senecio vulgaris</i> L.	H	A	June-Aug.
	<i>Sonchus oleraceus</i> L.	H	A	Sept-Nov.

	<i>Sonchus asper</i> (L.) Hill.	H	A	--
	<i>Taraxacum officinale</i> Webr.	H	P	May-June
	<i>Tragopogon kashmeriansis</i>	H	B	--
	<i>Tragopogon pratensis</i> L.	H	B	June-Sept.
	<i>Xanthium brassilicum</i> Velloze.	H	A	--
Boraginaceae	<i>Anchusa ovate</i>	H	A	April-June
	<i>Cynoglossum glochidiatum</i> Wall.	H	B	May-Aug.
	<i>Cynoglossum lanceolatum</i> Forsk.	H	P	Aug-Oct.
	<i>Lithospermum arvense</i> L.	H	A	April-June
	<i>Lycopsis arvensis</i> Aitch.	H	A	May-Aug.
	<i>Myosotis caespitose</i> Schultz.	H	P	June-Aug.
Brassicaceae	<i>Brassica</i> spp.	H	A	April-July
	<i>Capsella bursa-pastoris</i> L.	H	A	April-May
	<i>Coronopus didymus</i> (L.) Smith.	H	A	--
	<i>Descurainia Sophia</i> (L.) Webb.	H	A	Mar-June
	<i>Erophila vulgaris</i>	--	A	April-May
	<i>Eruca sativa</i> Mill.	H	A	April-July
Caryophyllaceae	<i>Cerastium glomeratum</i> Thnill.	H	A	April-June
	<i>Stellaria media</i> (L.) cyn.	H	A	Mar-July
Chenopodiaceae	<i>Chenopodium botrys</i> L.	H	A	July-Nov.
Cannabaceae	<i>Cannabis sativa</i> L.	H	A	May-Sept.
Convolvulaceae	<i>Convolvulus arvensis</i> L.	H	P	May-July
	<i>Cuscuta europaea</i> L.	P	A	Aug-Sept.
Euphorbiaceae	<i>Chrozophora oblique</i> (vahl)	H	A	July-Sept.
	<i>Euphorbia helioscopia</i> L.	H	A	May-Aug.
Fabaceae	<i>Astragalus lencocephalus</i> Grah.	H	A	May-July
	<i>Lathyrus aphaca</i> L.	H	A	April-May
	<i>Lespedeza elegans</i> Comb.	H	P	July-Sept.

	<i>Lotus corniculatus</i> L.	H	P	June-Sept.
	<i>Medicago sativa</i> L.	H	P	May-Aug.
	<i>Melilotus alba</i> Medik.	H	B	July-Sept.
	<i>Trifolium pratense</i> L.	H	P	May-Sept.
	<i>Trifolium repens</i> L.	H	P	May-July
	<i>Vicia sativa</i> L.	H	A	June-Aug
Fumariaceae	<i>Fumaria indica</i> Pugsley	H	A	April-June
	<i>Fumaria vaillantii</i> Loisel	H	A	April-June
Geraniaceae	<i>Geranium nepalensis</i> L.	H	A	May-Aug.
Hypericaceae	<i>Hypericum perforatum</i> L.	H	P	May-Aug.
Lamiaceae	<i>Calamintha umbrosa</i> (M. Bieb) Fisch	H	A	May-July
	<i>Lycopus europaeus</i> L.	H	P	June-Oct.
	<i>Marrubium vulgare</i> L.	H	P	July-Sept.
	<i>Mentha piperata</i>	H	P	July-Sept.
	<i>Origanum vulgare</i> L.	H	P	Sept-Oct.
	<i>Salvia moorcroftiana</i> Wallich.	H	P	May-Aug.
Malvaceae	<i>Hibiscus trionum</i> L.	H	A	June-Sept.
Onagraceae	<i>Epilobium hirsutum</i> L.	H	A	July-Sept.
Oxalidaceae	<i>Oxalis corniculata</i> L.	H	A	May-Aug.
Papaveraceae	<i>Papaver rhoeas</i> L.	H	A	May-Aug.
Papilionaceae	<i>Indigoferage radiana</i> Wall.	H	P	--
Plantaginaceae	<i>Plantago lanceolata</i> L.	H	P	July-Sept.
	<i>Plantago major</i> L.	H	P	July-Sept.
Polygonaceae	<i>Polygonum aviculare</i> L.	H	A	May-Oct.
	<i>Polygonum plebeium</i> R. brown	H	A	July-Aug.
	<i>Polygonum hydropiper</i> L.	H	A	--
	<i>Rumex napalensis</i>	H	P	June-Sept
Portulacaceae	<i>Portulaca oleracea</i> L.	H	A	June-Aug.



Primulaceae	<i>Anagallis arvensis</i> L.	H	A	Apr.-Aug.
Ranunculaceae	<i>Adonis aestivalis</i> L.	H	A	June-July
	<i>Ranunculus arvensis</i> L.	H	A	Apr.-June.
	<i>Ranunculus laetus</i> Wallich	H	P	June-Aug.
	<i>Ranunculus muricatus</i> L.	H	A	April-June
	<i>Ranunculus sceleratus</i> L.	H	P	June-Sept.
Rosaceae	<i>Potentilla reptans</i> L.	H	P	May-July
Rubiaceae	<i>Galium verum</i> L.	H	P	June-July
Scrophulariaceae	<i>Kickxia subsessilis</i> Pennell.	H	P	July-Sept.
	<i>Veronica biloba</i> L.	H	A	April-May
	<i>Veronica persica</i> Poir.	H	A	Mar-April
	<i>Veronica arvensis</i> L.	H	A	Mar-Oct.
	<i>Verbascum thapsus</i> L.	H	B	June-Aug.
Solanaceae	<i>Datura stramonium</i>	H	A	July-Oct.
Urticaceae	<i>Urtica dioica</i> L.	H	A	Aug-Nov.
Verbenaceae	<i>Verbena officinalis</i> L.	H	A	July-Oct.

H= Herb, G= Grass, S= Sedge, P= Parasitic, A= Annual, B= Biennial, P= Perennial



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