

Weed flora infesting saffron (*Crocus sativus* L.) fields of Pampore, kashmir

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Abstract: Saffron production is limited by a number of factors, among which weed infestation is prime component as these compete for space, light, water and nutrient therefore, reducing qualitative and quantitative yields of crop. The survey was conducted during 2005-2009 in different saffron fields of Pampore, Kashmir in order to know about the weeds infesting these fields. During the survey 88 species of weeds were identified which were annual, biennial and perennial in nature.

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Key words:- Pampore, Saffron, Weeds, Identification.

Introduction

Saffron (*Crocus sativus* L.) is a bulbous perennial spice belonging to family Iridaceae and popularly known as golden condiment. The plant does not propagate by seeds; the underground portion, corms (also called bulbs), divide to produce new plants. Flowers emerge in autumn; the outstanding feature of the lilac to mauve colored flower is its three stigmas 25–30 mm long, which droop over the petals: that is what is collected as saffron.

The Valley of Kashmir is famous for its saffron fields world over, located on both sides of the national highway on the "Karewas" (elevated dry table lands of alluvial origin) of Pampore (alt. 1,700 ms), about 15 km southeast of Srinagar Kashmir India. The Karewas are reported to be of lacustrine origin of Pleistocene and Post Pleistocene. These soils are placed in the alsi soils (Shinde, et al, 1984) and their colour varies from brown to yellowish brown (Wani, 1994) besides being slightly alkaline in nature. The organic carbon, available nitrogen and phosphorous of these soils are low to medium to high (Ganai, 2001).

In Kashmir, farmers growing saffron face economic losses as the production per hectare is decreasing year by year mainly due drought, diseases and weed infestation. Being a perennial crop, saffron is infested by different kinds of annual, biennial and perennial weeds. The weeds compete with the crop for space, light, water and the nutrients. Being quick growing compared to the saffron crop, they cover the space and spread faster and suppress the crop. The problem of weeds in saffron is further aggravated because of the fact that the crop is grown in irregular furrows and there is enough inter-space between them to be covered by weeds. Saffron plants after emerging out of the soil in October remain in active growth and

vegetative phase upto April. There after fields are devoid of any vegetation till late September. The large period from May to September provide open space for weeds which get monopoly to spread over the entire fields without any resistance that would otherwise be encountered in presence of the crop. The saffron plant being short with narrow upright foliage with little lateral spread has a canopy that offers very little competition to the weeds facilitating them to cover the gaps easily and promptly.

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 Saffron fields in Pampore Kashmir as these fields are infested with many weed species, and their proper identification will lead management of these weeds easier, hence results higher production.

MATERIALS AND METHODS**(i) Study Area**

Pampore famous for its saffron fields is located on both sides of the national highway (No. 1A of India) on the "Karewas" (elevated dry table lands of alluvial origin) is at mean altitude of 1,650 ms), situated about 15 km southeast of Srinagar. The Karewas are reported to be of lacustrine origin of Pleistocene and Post Pleistocene.

(ii) Specimen Collection

Sites which were surveyed were Khrew, Shar, Ladhoo, Lethapora, Chandhara, Barsoo, Konibal, Dussoo, Meej, Chattlam, Lalpora, Gundbal, Andrusoo and Tulbagh. Plant specimens were collected during the period of July 2005 to June, 2009. The area was surveyed regularly twice in a

month. The specimens were dried, pressed and mounted on herbarium sheets.

(iii) Identification of Specimens

The collected specimens were identified with the help of floras like, *Wild Flowers of Kashmir* (Coventry, 1923); *Beautiful Flowers of Kashmir* (Blatter, 1928); *An Annotated Catalogue of the Vascular Plants of West Pakistan and Kashmir* (Stewart, 1972); *Forest Flora of Srinagar and Plants of Neighbourhood* (Singh and Kachroo, 1976); *Flora of Ladakh* (Kachroo et al, 1977); *Alpine Flora of Kashmir Himalaya* (Dhar and Kachroo, 1983); *Flowers of the Himalaya* (Polunin and Stainton, 1984); *Forest Flora of Pir Panjal Range* (Singh and Kachroo, 1994);

Flora of the Upper Liddar Valley of Kashmir Himalaya, I. (Sharma and Jamwal, 1998). Further specimens were also confirmed at KASH Herbarium, University of Kashmir.

Results

Weed identification and record keeping is essential in planning a successful control strategy. During the present study 88 species of weeds were identified infesting saffron fields of Pampore. These weeds mostly are herbs and are annual, biennial and perennial in nature. The complete list of identified species is given in Table I.

Table I: List of weeds infesting saffron fields of Pampore

S.No	Species	S.No	Species
1	<i>Aegilops tauschii</i> Cosson	45	<i>Kikxia subsessilis</i> Penell
2	<i>Adonis aestivalis</i> L.	46	<i>Koelpinia linearis</i> Pall.
3	<i>Allium ampeloorasum</i> L	47	<i>Lathyrus inconspicuis</i> L.
4	<i>Allium rubellum</i> M.Bieb.	48	<i>Lactuca dissecta</i> Don.
5	<i>Alyssum minimum</i> Willd.	49	<i>Lathyrus aphaca</i>
6	<i>Arenaria seripyllifolia</i> L.	50	<i>Lespedeza gerediana</i> R.Grah.
7	<i>Artemissia vestita</i> Wall.	51	<i>Lespedeza juncea</i> Pers.
8	<i>Astragalus camus</i>	52	<i>Lithospermum arvensis</i> L.
9	<i>Astragalus grahamianus</i> Royle	53	<i>Lophochola phleoides</i> (Vill) Reichb.
10	<i>Astragalus leucocephalus</i> R. Grah.	54	<i>Lotus corniculatus</i> L.
11	<i>Bothriochola pertusa</i> L.	55	<i>Lycopsis orientalis</i>
12	<i>Bromus japonicus</i> Thumb.	56	<i>Malcolmia africana</i> (L.) R.Br.
13	<i>Bromus scoparius</i> L.	57	<i>Marrubium vulgare</i> L.
14	<i>Carduus onopordioides</i> Fisch.ex Bieb.	58	<i>Medicago lupulina</i> L.
15	<i>Carthamus lanatus</i> L.	59	<i>Medicago minima</i> Lamk.
16	<i>Centaurea iberica</i> Trev.	60	<i>Medicago sativa</i> L.
17	<i>Ceratocephalus falcatus</i> (L.) Pers.	61	<i>Nepeta rophanorhiza</i> Benth.
18	<i>Chrozophora obliqua</i> A.Juss.	62	<i>Onopordum acanthium</i> L.
19	<i>Cichorium intybus</i> L.	63	<i>Papaver macrostomum</i> Boiss.et Huet
20	<i>Convolvulus arvensis</i> L.	64	<i>Peganum harmala</i> L.
21	<i>Cotoneaster racemiflora</i> (Desf.) C. Koch.	65	<i>Phleum paniculatum</i> Huds.
22	<i>Cousinia microcarpa</i> Boiss.	66	<i>Plantago lanceolata</i> L.
23	<i>Cynodon dactylon</i> L.	67	<i>Polygonum plebejum</i> R.Br.
24	<i>Cyperus rotundus</i> L	68	<i>Ranunculus arvensis</i> L.

25	<i>Eragrostis poaoides</i> Beauv.	69	<i>Salvia domentorum</i> Andr.
26	<i>Erigeron bonariensis</i> L.	70	<i>Salvia moorcroftiana</i> Wall.
27	<i>Erigeron canadensis</i> L.	71	<i>Scandix pecten-veneris</i> L.
28	<i>Erodium cicutarium</i> Leman	72	<i>Setaria viridis</i> (L.)P. Beauv.
29	<i>Eryngium Biebersteinianum</i> Nevski ex Bobrovin	73	<i>Silene conoidea</i> L.
30	<i>Euphorbia helioscopia</i> L.	74	<i>Taraxacum officinale</i> Wigg.
31	<i>Euphorbia hispida</i> Boiss.	75	<i>Thymus serpyllum</i> L.
32	<i>Fumaria indica</i> (Haussk.) Pugsly	76	<i>Tribulus terrestris</i> L.
33	<i>Galium asperifolium</i> Wall.	77	<i>Trifolium fragiferum</i> L.
34	<i>Galium tenuissimum</i> Bieb.	78	<i>Trifolium repens</i> L.
35	<i>Garhadiolus minutissimus</i> (Bge.) Kit.	79	<i>Tulipa lanata</i> Rgi.
36	<i>Heliotropium eichwaldi</i> Steud.	80	<i>Veronica persica</i> Poir
37	<i>Herniaria hirsuta</i> L.	81	<i>Vaccaria pyramidata</i> Medik.
38	<i>Holosteum umbellatum</i> L.	82	<i>Valerianella truncate</i> (Rch.) Betke
39	<i>Hordeum murinum</i> L.	83	<i>Verbascum thapsus</i> L.
40	<i>Hypocoum pendulum</i> L.	84	<i>Veronica arvensis</i> L.
41	<i>Iris clusiana var. stellata</i> Rgl.	85	<i>Veronica biloba</i> L.
42	<i>Iris decora</i> Wall.	86	<i>Veronica didyma</i> Tenore
43	<i>Iris ensata</i> Thumb.	87	<i>Vicia angustifolia</i> L.
44	<i>Iris nepalensis</i> Wall.	88	<i>Vulpia myuros</i> (L.) Gmel.

Discussion

Weeds are generally described as plants out of place, are a cause of concern in all cultivated crops, as such in saffron too. These are characterized by peculiar properties that enable them to thrive under adverse conditions. The weeds have been reported to cause reduction in yield to the tune of 15-85% (Gupta, 2005). Even complete crop failures have been reported due to weeds in some crops (Mukhopadhyay, 1992, Freisen and Kanwar, 1983). They also harbour pests and diseases producing agents and also serve as secondary host for them. Weeds compete with the crop for space, light, water and nutrients. Weed control thus becomes imperative for qualitative and quantitative improvement of saffron. This would be possible only after proper identification of weeds.

Weed identification and record keeping is essential in planning a successful control strategy. Each weed species has its own unique life cycle and competitive abilities. Knowing what type of weeds are in the field, and learning about their survival mechanisms enables the grower to select the most effective management strategy which would ultimately result in enhancement of his yield as there would be less competition in saffron for space light, water and

nutrients. So for eradication of weeds in saffron fields, proper identification of weeds is requisite.

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