

Original Research Article

Evaluation of Safflower Genotypes for their Reaction to Safflower Aphid *Uroleucon compositae*

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ABSTRACT

Keywords

Carthamus tinctorius,
Resistance,
Uroleucon compositae,
Germplasm

An experiment was carried out during Rabi season 2016-17 at Oilseed Research Station, Latur. The present study was made to evaluate 16 safflower germplasm for their resistance against safflower aphids on the basis of aphid infestation index (A.I.I). The cultivars CO-1 was included as a susceptible infester check and A-1 as a resistance check. It was found that out of 15 safflower germplasm lines, two germplasm SF-1506, SAF-13-40 and Bhima were found resistant whereas, six accessions were found with susceptible reaction, while rest of safflower genotypes were found highly susceptible.

Introduction

Safflower (*Carthamus tinctorius* L.), is one of the efficient Oilseed crop grown under rainfed conditions. Traditionally safflower is cultivated mainly in the states of Maharashtra, Karnataka and Andhra Pradesh during Rabi season. India is in first place in terms of area and production with 1.5 lakh ha area and 1.13 lakh tones of production and average productivity of 638 kg/ha. There are numbers of safflower varieties under cultivation but still the area and production is decreasing day by day. Amongst the various factors responsible low production and productivity the crop damage due to insect pests is one of the major constraints causing substantial loss in yield (Singh *et al.*, 1999). Safflower aphid *Uroleucon compositae* is one of the most destructive pests infesting the crop

particularly from its elongation stage to flowering period (Akashe *et al.*, 1999). The losses to the extent of 20-60% with an average of 37% is reported by Singh and Singh, 2007. Use of resistance varieties is one of the important component to avoid losses and important part of integrated pest management in safflower.

Materials and Methods

The experiment was conducted during Rabi-2016 at Oilseed Research Station, Latur. The experiment was laid out in randomized block with 16 safflower entries with three replications. The crop was sown with spacing 45 x 10 cm of 3 m length. The cultivar CO-1 was included as a susceptible infester check and A-1 as a resistant check.

The CO-1 susceptible check was sown in a separate block as infestor row and was uprooted and uniformly spread across the screening block when the crop was around 40 days. The observation of aphid was recorded on 5 cm top twig per plant. Five plants were randomly selected from each entry before maturity of the crop drying due to aphid infestation and the aphid infestation index (AII) was calculated on the basis of the foliage drying grades. On the basis of AII the germplasm accessions were grouped into different category (Table-2). Further, the aphid infestation index was computed by using the formula.

$$A.I.I. = \frac{1 \times a + 2 \times b + 3 \times c + 4 \times d + 5 \times e}{a + b + c + d + e}$$

Where a, b, c, d, e are the actual number of plant falling in each of the 5 corresponding foliage drying grades i.e., 1 to 5.

Results and Discussion

The data presented in the table-3 revealed that, the aphid incidence was observed in the range of 23-90 aphid/5 cm twig. Lowest aphid incidence (14 aphid/ 5 cm twig) was

recorded on SF-1506 safflower entry. Whereas, the highest aphid population was observed on susceptible check (90 aphid/ 5 cm twig). The Aphid infestation index was calculated and entries were categorized as: Highly resistance- No entry was found highly resistant; Resistant- SF-1506 and SAF-13-40 and Bhima; Susceptible- SAF-1526, SSF-15-3, SF-1502, SF-1506 and SSF-714; Highly susceptible: CO-1, SSF-15-6, SSF-15-8, SAF-1511, SF-1566 and SF-1505. Research conducted by earlier researcher are in accordance to Ghuge *et al.*, (2007), Murumkar *et al.*, (2011), Mane *et al.*, (2012), Shahjahan *et al.*, (2013), Rayappa (2015) and Dambal and Patil (2016) who showed some safflower accessions resistant to safflower aphids.

Kadam and Thakur (2002) conducted experiment to determine the relative resistance of safflower cultivars against safflower aphid, *Uroleucon compositae* and reported that safflower cultivars GMU-1251, PI-306983, JLSF-213, JLSF-217, JLSF-291, A-1 and Bhima showed resistance to *Uroleucon compositae*, while Co-1 was highly susceptible. The entries of safflower i.e. SAF-13-40, SF-1506 and SAF-1511 were found resistant (Anonymous, 2016).

Table.1 Screening of safflower entries against aphid based upon foliage drying

Per cent foliage yellowing & drying	Damaging grade
0 to 20 %	1
21 to 40 %	2
41 to 60 %	3
61 to 80 %	4
Above 80 %	5

Table.2 Categorization of aphid infestation as per Aphid Infestation Index (A.I.I.)

Resistant category	A.I.I
Highly resistance	1.0
Resistance	1.1 to 2
Moderately resistance	2.1 to 3
Susceptible	3.1 to 4
Highly susceptible	4.1 to 5

Table.3 Reaction of safflower germplasm entries to aphid

Sr. No	No. of entries	Aphids/5 cm twig	A.I.I	Category of entry
1	A-1(C)	34	1.8	Resistant
2	CO-1(C)	90	4.8	Highly susceptible
3	Bhima	35	2.0	Resistant
4	SF-1506	23	2.0	Resistant
5	SSF-15-6	82	4.6	Highly susceptible
6	SAF-1526	57	3.4	Susceptible
7	SSF-15-8	70	4.2	Highly susceptible
8	SSF-15-3	74	4.0	Susceptible
9	SF-1502	77	4.0	Susceptible
10	SAF-1511	18	1.2	Highly Susceptible
11	SF-1566	77	4.4	Highly Susceptible
12	SF-1505	84	4.4	Highly Susceptible
13	SF-1506	57	3.4	Susceptible
14	SSF-714	55	3.4	Susceptible
15	SAF-13-40	29	2.0	Resistant
16	SSF-682	69	3.8	Susceptible

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