



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 3.4
IJAR 2014; 1(1): 229-231
www.allresearchjournal.com
Received: 26-10-2014
Accepted: 27-11-2014

Hilal A Bhat
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Nisar A Khan
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Sajad H Wani
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Rayees A Ahanger
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Khurshid Ahmad
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Arif H Bhat
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Nisar A Dar
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Javid I Mir
Biotechnology division, Central
Institute of Temperate Horticulture,
Old Air Field Rangreth, Srinagar,
Jammu & Kashmir, India

Mudasir Iqbal
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Correspondence
Hilal A Bhat
Sher-e-Kashmir University of
Agricultural Sciences and Technology,
Shalimar, Jammu & Kashmir, India

Screening of locally available cultivars of gerbera (*Gerbera jamesonii* H. Bolus ex J.D. Hook) for their susceptibility/tolerance against alternaria leaf blight under natural epiphytotic conditions

Hilal A Bhat, Nisar A Khan, Sajad H Wani, Rayees A Ahanger, Khurshid Ahmad, Arif H Bhat, Nisar A Dar, Javid I Mir and Mudasir Iqbal

Abstract

Alternaria leaf blight is one of the most important diseases of gerbera (*Gerbera jamesonii*) world wide. The disease is prevalent in all the flower growing areas of Kashmir valley. The pathogen associated with the disease was identified as [*Alternaria alternata* (Fr. Keissler)]. Out of twenty nine gerbera genotypes screened for disease reaction, 3 were categorized as moderately tolerant, 11 moderately susceptible, 11 susceptible, 4 highly susceptible and none was found tolerant.

Keywords: Alternaria, disease, gerbera, susceptible and tolerant

Introduction

Gerbera (*Gerbera jamesonii*) also known as Transvaal daisy, Barberton or African daisy, is the most popular florists flower with increasing commercial significance. The genus *Gerbera* was named in honour of a German naturalist Traughott Gerbera, who travelled in Russia in 1743 (Aswath, 1999) [4]. It is cultivated though out the world under wide range of climatic conditions mostly inhabit temperate and mountainous regions. *Gerbera*, a perennial herb, is native of South Africa and Asia (Kanwar and Kumar, 2008) [8]. It has a wide applicability in the floral industry as cut flower and potted plant (Anuradha *et al.*, 2001) [3]. *Gerbera* belongs to family Asteraceae and consists of about forty species. Out of the recorded species, only one species *Gerbera jamesonii* is under cultivation (Das and Singh, 1989) [7]. It is very popular in garden decoration and ideal for beds, borders, pots and rock gardens. Due to its beautiful colours, hardy, long keeping quality and ability to rehydrate after long transportation, gerbera ranks at 5th position among the top ten cut flowers of the world (Parthasarathy and Nagaraju, 1999) [12].

Gerbera is distributed in temperate Himalayas from Kashmir to Nepal with an altitude ranging from 1300 to 3200 m above mean sea level (Das and Singh, 1989) [7]. In India, gerbera is grown commercially for export as well as domestic market, its commercial production is centered in and around Pune and Bangalore from where cut flowers have been sold at Rs. 116.00 and 121.20 million during the auction of 2004 and 2005, respectively (Anonymous, 2006) [2]. In Jammu and Kashmir state gerbera is very popular perennial flower crop grown for cut flower production as well as garden decoration in public gardens, parks and home grounds. In spite of favorable environmental conditions for gerbera cultivation, the crop is affected by various fungal, bacterial and viral diseases. Among those *Alternaria* leaf blight (*Alternaria* spp.) is of serious nature reducing the plant vigour, flower quality and market value (Kulibaba, 1972) [10].

Materials and Methods

The present investigations were conducted in the Division of Plant Pathology, SKUAST-K, Shalimar Campus.

Field reaction of available germplasm against the disease

Twenty nine cultivars of gerbera obtained from the Floriculture Parks and Gardens Department of Jammu and Kashmir Govt. were transplanted in the farm of Tulip Garden, Cheshmashahi during the year 2009. Row to row and plant to plant distance was kept 35 x 25 cm. Each row having 30 plants represented each cultivar. Each row was replicated thrice. A single row of a susceptible cultivar "Cango" was also planted around the experimental plot. Cultural practices necessary for gerbera establishment were adopted and maintained till June.

These cultivars were scored for their reaction to the disease under natural epiphytotic conditions and the disease intensity was recorded in the third week of June. From each cultivar 30 plants were selected randomly and tagged. All the leaves of thirty plants from each cultivar were counted for the assessment of the disease. Disease severity was assessed by using 0 to 5 rating scale of (Plate 2). Six disease categories were made on the basis of per cent leaf area infected as per the following key.

S. No.	Category	Per cent disease intensity
1)	Tolerant (T)	0-5 % disease intensity
2)	Moderately tolerant (MT)	5.1-10 % disease intensity
3)	Moderately susceptible (MS)	10.5-25 % disease intensity
4)	Susceptible (S)	25.1-50 % disease intensity
5)	Highly susceptible (HS)	>50 % disease intensity

Results and Discussion

The present observations regarding the reaction of 29 cultivars of gerbera to *Alternaria alternata* (Alternaria leaf blight) revealed that test cultivars showed significantly varying response to the pathogen under natural epiphytotic conditions and none was found free from disease (Table 1). Test plants were maintained unsprayed and categorized into various reaction groups on the basis of mean per cent disease intensity. Mean disease intensity in test cultivars varied from 7.29 per cent in case of cv. Excellence to as high as 57.49 per cent in case of highly susceptible cv. Cango. On the basis of degree of variability in disease reaction, three cultivars were categorized as moderately tolerant (Excellence, Carambola & Hocuspocus), eleven as moderately susceptible (Optima, Dolcerita, Mavia dark yellow, Fusion, Regiko, Vencover, Sanavia, Miffi, Many, Monet & Okidoki), eleven as susceptible (Brasil, Doubleduch, Mavia yellow, Makary, Pany, South Pacific, Plum, Savannah, Belengence, Sunway & Dane) and four as highly susceptible (Explosion, Real, Montablance and Cango).

Category	Numerical value	Leaf area infected (%)
I	0	Disease free
II	1	0.1-10.0
III	2	10.1-25.0
IV	3	25.1-50.0
V	4	50.1-75.0
VI	5	>75

Per cent disease intensity (PDI) was calculated by using formula:

$$PDI = \frac{\sum (n \times v)}{N \times G} \times 100$$

Where,

Σ = Summation

N = Number of leaves in each category

V = Numerical value of each category

N = Total Number of leaves examined

G = Maximum numerical value

Per cent disease intensity of each cultivar thus calculated were used to categories and rank these cultivars by adopting the scale of Shahazad (2008)^[14] as follows:

Very little information is available regarding screening of gerbera germplasm with regard to *Alternaria* leaf blight. However, various workers have recorded varying degree of susceptibility/tolerance in various crops against *Alternaria* spp. causing leaf blight under field conditions. The present observations are in agreement with the findings of Cauanni *et al.* (1996)^[5], Sen and Pathania (1997)^[13], Chase (1998)^[6], Kopacki and Wangner (2003)^[9], Mirkova and Konstantinova (2003)^[11] and Anita *et al.* (2007)^[1] who had screened strawberry, chrysanthemum, vinca, garden mums, gerbera, tomato, French bean and sunflower germplasm/genotypes against *Alternaria alternata* and found almost similar results. It is evident from the present investigation on existing available germplasm that there exists a great scope for developing tolerant/ resistant cultivars with acceptable varietal characters. There seems to be a good deal of scope as is evident from foregoing studies, for the source of resistance against *Alternaria* leaf blight in the available germplasm for developing resistant varieties.

Table 1: Screening of various gerbera genotype against *Alternaria alternata* (leaf blight) under natural epiphytotic conditions

Genotype	Colour	Disease intensity (%)*	Reaction**
Excellence	Yellow	7.29 (16.65) ^a	MT
Carambola	Cream	8.15 (16.59) ^{ab}	MT
Hocuspocus	Red	9.09 (17.55) ^{bc}	MT
Optima	Red	10.13 (18.55) ^{cd}	MS
Dolcerita	Cream	13.73 (21.75) ^e	MS
Fusion	Yellow	15.76 (23.40) ^{ef}	MS
Mavia	Dark yellow	15.77 (23.42) ^{ef}	MS
Regiko	Red	18.97 (25.79) ^g	MS
Vencover	Pink	19.19 (25.98) ^{gh}	MS
Sanavia	Light red	22.86 (28.56) ⁱ	MS

Miffi	Pink	24.05 (29.32) ^{ij}	MS
Many	White	24.13 (29.42) ^{ij}	MS
Monet	Yellow	24.26 (29.51) ^{ij}	MS
Okidoki	Yellow	24.26 (29.51) ^{ij}	MS
Brasil	Pink	26.00 (30.56) ^j	S
Doubleduch	Yellow	29.21 (32.72) ^k	S
Mavia	Yellow	30.13 (33.29) ^{kl}	S
Makary	Yellow	30.79 (33.70) ^{kl}	S
Pany	Pink	30.81 (33.71) ^{kl}	S
Southpasific	Light yellow	32.24 (34.60) ^{lm}	S
Plum	Cream	32.91 (35.01) ^{lm}	S
Savannah	Red	34.65 (36.06) ^{mn}	S
Belengence	Pink	37.15 (37.56) ⁿ	S
Sunway	Orange	41.66 (40.20) ^o	S
Dane	Yellow	43.79 (41.43) ^{op}	S
Explosion	Red	50.16 (45.09) ^q	HS
Real	Orange	52.16 (46.17) ^q	HS
Montblance	White	54.58 (47.96) ^r	HS
Cango	Red	57.49 (49.31) ^s	HS
CD (p = 0.05)		1.78	

Conclusion

In light of the present investigations, it is concluded that *Alternaria* leaf blight is an economically important disease, prevalent in almost all gerbera growing areas of Kashmir valley and is a potential threat to gerbera cultivation. There is ample scope for identifying the source of resistance against *Alternaria* leaf blight in the available germplasm to develop resistant varieties.

Acknowledgement

We highly acknowledge SKUAST-K, Shalimar for providing all facilities to conduct this research.

References

- Anita K, Chakrabarty SK, Sunil N, Sivaraj, Prasad Rao RDVJ. Evaluation of sunflower germplasm against *Alternaria* blight and rust diseases. *Journal of Mycology and Plant Pathology*. 2007; 35:263-265.
- Anonymous. Production manual: Gerbera. Global Agritech (I) Pvt. Ltd., Mumbai, 2006, 21.
- Anuradha S, Gowda JVN, Sane A. Characterization of gerbera (*Gerbera jamesonii*) genotypes using morphological characters. *Plant Genetic Resources Newsletter*. 2001; 128:64-67.
- Aswath C. Gerbera cultivation and improvement. Proceedings of short course of hitech production of ornamental crops. Indian Institute of Horticultural Research. 1999, 53-54.
- Cauanni P, Montuschi C, Maltoni ML. *Alternaria* of strawberry: first results of tests for varietal resistance. *Revista di Frutticoltura e di Ortofloricoltura*. 1996; 58:47-50. [cf: Review of Plant Pathology 76: 4833].
- Chase AR. *Alternaria* leaf spots of vinca, dahlia, gerbera, hibiscus, geranium and their relation. In: *Compendium of Ornamental Foliage Plant Diseases*. (Ed. A.R. Chase), 1998, 16.
- Das P, Singh PKS. Gerbera. In: *Commercial Flowers*. (Eds. T.K. Bose and L.P. Yadav). Naya Prokash, Calcutta, 1989, 601-622.
- Kanwar JK, Kumar S. *In vitro* propagation of gerbera. *Horticultural Sciences*. 2008; 35:35-44.
- Kopacki M, Wangner A. Health's status of garden mums (*Dendranthema gardiflora* Tzvelev) in Lublin Region. *Sodininkyste-ir-Darzininkyste*. 2003; 22(3):83-90. [cf: Review of Plant Pathology. 57: 5001].
- Kulibaba IUF. Disease of gerbera grown under cover. *Glaviny Botanicheskii Sadim Byul*. 1972; 83:115-119. [cf: Mirkova and Konstantinova. *Journal of Phytopathology*. 2003; 151:323-328].
- Mirkova E, Konstantinova P. First report of *Alternaria* leaf spot in gerbera (*Gerbera jamesonii*). *Journal of Phytopathology*. 2003; 151:233-328.
- Parthasarathy VA, Nagaraju V. *In vitro* propagation in gerbera *Jamesonii bolus*. *Indian Journal of Horticulture*. 1999; 56:82-85.
- Sen SC, Pathania PN. Screening of chrysanthemum germplasms against *Septoria chrysanthemella* and *Alternaria* sp. *Journal of Applied Biology*. 1997; 9:73-76.
- Shahzad A. Performance of apple cultivars against *Alternaria* blotch under natural epiphytotic conditions in Kashmir. *Indian Journal of Plant Protection*. 2008; 36:152-153.