

## SCREENING OF 110-R ROOT STOCK BASED TABLE VARIETIES OF GRAPE VINE (*VITIS VINIFERA* L.) AGAINST ANTHRACNOSE DISEASE CAUSED BY *ELSONOE AMPELINA* (DE BARY) SHER IN MANDSAUR DISTRICT OF MADHYA PRADESH

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**Abstract:** Grape is most important refreshing, commercial fruit crop and planted in temperate, subtropical and tropical agro-climatic condition. It is rich in sugar, vitamin, tannin and mineral like calcium, phosphorus and iron. 30 table varieties of grape viz Sharad Seedless, Krishna Seedless, Flame Seedless, A 18-3, Fantasy Seedless, Kishmish Moldowsky, Black Seedless, Kishmish Rozavis Red, Crimson Seedless, Ruby Seedless, Kishmish Chorni, Thompson Seedless, 2-A Clone, Superior Seedless, Manjri Naveen, Seedless Merbein, H-5, Sonaka, New Perlette, New Perlette, Sultanin-2, Pusa Seedless, Pusa Urvashi, Kishmish Rozavis White, Red Globe, Christmas Rose, Rizamat, Italia, Dilkhush, Muscat of Alexandria, Anabe-Shahi planted for table purpose in Horticulture research farm located at Krishi Nagar under RVSKVV, KNK College of Horticulture, Mandsaur M.P., India. Intensity of anthracnose disease caused by *Elsonoe ampelina* on grape was recorded by 0-4 scale of visual rating in natural epiphytotic condition. The disease appeared during the first week of July 2018 (SMW-27) with disease intensity of 10.10% with the maximum temperature (32.27 °C), minimum temperature (22.58 °C), humidity (75.42%), and rainfall (26.25mm). It reached its peak at the second week of September (MSW-37) with maximum disease intensity of 60.26% with the maximum temperature (29.07 °C), minimum temperature (23.68 °C), humidity (89.71%), and rainfall (2.5mm). The higher disease severity during warm and wet weather was found. The disease intensity ranged between 10.10 to 60.26 per cent and cumulative disease intensity increased from July to September (SMW-27 to SMW -37). After categorization for disease intensity Fantasy Seedless (15.77%), Sultanin-2 (20.45%), Kishmish Rozavis White (25.80%) and Anabe-Shahi (24.66%) were recorded as moderately susceptible varieties. Sharad Seedless (42.00%), Krishna Seedless (40.50%), A 18-3 (34.34%), Flame Seedless (28.62%) and eleven varieties were treated as Susceptible. Further, Superior Seedless (60.00%), 2-A Clone (52.54%) and Manjri Naveen (51.76%) were considered as highly susceptible.

**Keywords :** *Vitis vinifera*, *Elsonoe ampelina*, Anthracnose

### INTRODUCTION

Grape (*Vitis vinifera* L.) is one of most important commercial fruit crops, which is a good source of minerals like calcium, phosphorus, iron and vitamins such as B1 and B2 (Radha and Mathew, 2007). It is one of the most delicious, refreshing and nourishing fruit of the world and is classed as a protective food. In India commercially different varieties of grape are cultivated in the states of Maharashtra, Karnataka, Tamil Nadu, Punjab, Haryana, Uttar Pradesh and on some scale in Rajasthan and Madhya Pradesh. In India, it is cultivated in an area about 64.4 000 hectares and production is 1677.1000 tone. In Madhya Pradesh grape is largely cultivated in Ratlam, Mandsaur, Indore, Ujjain, and Guna districts.

Various pathogens like bacteria, virus, nematodes and fungi, attack in grape vine. Fungal diseases are most destructive than bacterial, viral and nematode diseases. A number of disease have recorded in India on grapes including Anthracnose (*Botryodiplodia palmarum*, *Elsonoe ampelina*), (Pathak, 1980). Anthracnose and powdery mildew (Mukherji and Bhasin, 1986) and downy mildew (Shahzad *et al.*, 2006) have been reported in Kashmir.

It is most important serious and destructive diseases after powdery and downy mildew and known as

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“Bird’s eye spot”. The annual loss due to anthracnose of grapes is estimated to be 15-30 per cent (Anonymous, 2006). The disease is most damaging in rainy season. The disease appears on all the green parts of grape like leaf, shoot, tendril, cane, fruits. The disease mostly affects new shoots and fruits of plants. Small, circular to irregular dark brown spots appear on leaves and central necrotic tissue often falls off leaving a shot-hole appearance. Small isolated light brown spots develop on shoots and tendrils. In severe cases this disease exhibits complete drying of leaves. On berries, bird’s eye spot symptoms appear having violet to grayish center and dark brown margins (Jamdar, 2007).

### MATERIALS AND METHODS

The present investigations were undertaken at Horticulture research farm located at Krishi Nagar under RVSKVV, KNK College of Horticulture, Mandsaur during *kharif* 2018. Observations were taken from last week of June to first week of September, 2018 under natural epiphytotic conditions on 30 table varieties of grape with rootstock of 110-R viz Sharad Seedless, Krishna Seedless, Flame Seedless, A 18-3, Fantasy Seedless, Kishmish Moldowsky, Black Seedless, Kishmish Rozavis Red, Crimson Seedless, Ruby Seedless,

Kishmish Chorni, Thompson Seedless, 2-A Clone, Superior Seedless, Manjri Naveen, Seedless Merbein, H-5, Sonaka, New Perlette, New Perlette, Sultanin-2, Pusa Seedless, Pusa Urvashi, Kishmish Rozavis White, Red Globe, Christmas Rose, Rizamat, Italia, Dilkhush, Muscat of Alexandria and Anabe-Shahi, were planted for table purpose. The symptoms of size, shape, colour of lesions on leaves,

shoots, tendrils and berries was recorded. The disease intensity was recorded by visual observations using 0-4 scale (table-1) with slight modifications. The table varieties were categorized as, tolerant (0.1-5.0%), moderately tolerant (5.1-10.0%), moderately susceptible (10.1-25.0%), susceptible (25.1-50.0%) and highly susceptible (50.1% and above) as suggested by Chatta (1992).

**Table 1.** Disease intensity parameter for anthracnose on grape

Category	Numerical value	Description
I	0	Healthy foliage or leaf spots in traces
II	1	Up to 10 per cent leaf area covered with anthracnose lesions
III	2	10.1-25 per cent leaf area covered with slight twig infection i.e. 1-3 cankers per twig
IV	3	25.1-50 per cent leaf area covered with heavy twig infection i.e. 4-10 cankers per twig
V	4	Above 50 per cent leaf area covered with very heavy twig infection i.e. above 10 cankers per twig and heavy berry infection

Per cent disease intensity (PDI) was recorded by using formula given by Wheeler (1969):

$$\text{PDI} = \frac{\text{Sum of numerical values}}{\text{Total units observed} \times \text{Maximum numerical value}} \times 100$$

**Table 2.** Categorization of table varieties of grapes against anthracnose disease.

Reaction category	Per cent disease index
Tolerant	0.1-5.0
Moderately tolerant	5.1-10.0
Moderately susceptible	10.1-25.0
Highly susceptible	50.1 and above

Chatta (1992).

## RESULT AND DISCUSSION

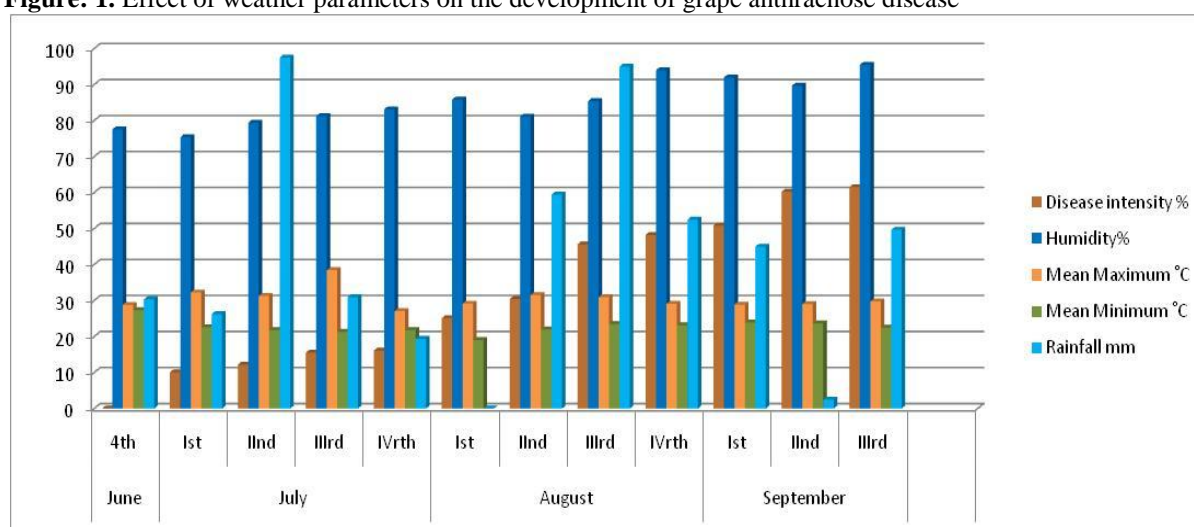
The anthracnose disease appeared in all the green parts of grape (Plate 1) but mostly affected new shoots and fruits. Small, numerous pin head like circular to irregular dark brown spots appeared on leaves in initial stage and later spread in overall surface of leaves and later central necrotic tissue fallen off leaving a shot-hole appearance. Small isolated and elongated light brown spots developed on shoots and tendrils and these spot slightly sunken and finally complete drying of leaves was observed. On berries, bird's eye spot symptoms appeared having violet to greyish centre and dark brown margins (Plate-1). The disease appeared during the first week of July 2018 (MSW-27) with disease intensity of 10.10% (table 4 and fig. 1) with the maximum temperature (32.27 °C), minimum temperature (22.58 °C), humidity (75.42%), and rainfall (26.25mm). It reached its peak at the second week of September (MSW-37) with maximum disease intensity of 60.26% with the maximum temperature (29.07 °C), minimum temperature (23.68 °C), humidity (89.71%), and rainfall (2.5mm). The higher disease severity during warm and wet weather found in present study, coincide with findings of

Suhag and Grover (1979). High humidity and precipitation in monsoon resulted in maximum development of anthracnose (Suhag and Kaushik, 1982). The abundant production of conidia, their spread and more development of anthracnose in the vineyards depends upon frequent rains (Brook, 1973, Suhag and Grover, 1973). The disease intensity ranged between 10.10 to 60.26 per cent (table 4) and cumulative disease intensity increased from July up to September (MSW27-37). After categorization for disease intensity (table 2,3) Fantasy Seedless (15.77%), Sultanin-2 (20.45%), Kishmish Rozavis White (25.80%) and Anabe-Shahi (24.66%) were recorded as moderately susceptible varieties. Sharad Seedless (42.00%), Krishna Seedless (40.50%), A 18-3 (34.34%), Flame Seedless (28.62%) and eleven varieties were treated as Susceptible. Further, Superior Seedless (60.00%), 2-A Clone (52.54%) and Manjri Naveen (51.76%) were considered as highly susceptible. These results are in partial agreement with the findings of Thind et al. (1997) who evaluated grape cultivars Perlette, and other seedless varieties of which Perlette and Beauty Seedless were most susceptible while in present study Perlette grape cultivars have been found to be susceptible to *S. ampelina*. These findings are further



<b>June 4<sup>th</sup></b>	24/6/2018- 30/6/2018	26	0	28.82	27.35	77.57	30.35
<b>July 1<sup>st</sup></b>	1/7/2018- 7/7/2018	27	10.10	32.27	22.58	75.42	26.25
<b>2<sup>nd</sup></b>	8/7/2018- 14/7/2018	28	12.22	31.28	21.82	79.42	97.5
<b>3<sup>rd</sup></b>	15/7/2018- 21/7/2018	29	15.51	38.48	21.34	81.28	31
<b>4<sup>th</sup></b>	22/7/2018- 28/7/2018/	30	16.11	27.1	21.8	83.14	19.4
<b>August 1<sup>st</sup></b>	29/7/2018- 4/8/2018	31	25.14	29.17	19.05	85.85	0
<b>2<sup>nd</sup></b>	5/8/2018- 11/8/2018	32	30.44	31.57	22.00	81.14	59.5
<b>3<sup>rd</sup></b>	12/8/2018- 18/8/2018	33	45.66	30.94	23.48	85.42	95.00
<b>4<sup>th</sup></b>	19/8/2018- 25/8/2018	34	48.23	29.1	23.17	94	52.5
<b>September 1<sup>st</sup></b>	26/8/2018- 1/9/2018	35	50.86	28.87	23.9	92	45.00
<b>2<sup>nd</sup></b>	2/9/2018- 8/9/2018	36	60.26	29.07	23.68	89.71	2.5
<b>3<sup>rd</sup></b>	9/9/2018- 15/9/2018	37	61.52	29.8	22.5	95.5	49.7

**Figure: 1.** Effect of weather parameters on the development of grape anthracnose disease



**Plate-1**



**Severely infected grapevine yard**



**Healthy grapevine yard**



**Young shoot infection**



**Leaf infection**



**Twig infection**



**Berries/bunch infection**

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