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SURVEY ON THE INCIDENCE OF BLACK MOLD DISEASE OF ONION (*ALLIUM CEPA*.L) IN FIELD, STORE HOUSE AND REGULATING MARKET OF BIJAPUR, KARNATAKA.

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Abstract
In the present study on survey of black mold disease of onion in field, store house and regulating market was carried out for the period from June-2017 to May-2018.Aiming at to gather the data on black mold disease incidence with weather conditions in selected location of Bijapur. The percentage of disease incidence varied in red onion bulbs from 9% to 19%, and in white bulbs is between 9.80% to 20.40% .In store house the incidence was 17% to 49.50% and in regulating market 16.60% to 37.41% was recorded. The disease incidence observed more on white colored onion bulbs than on colored bulbs, and disease incidence was more in store house compared to in field and regulating market .Black mold disease is caused by Aspergillus niger and is potential pathogen of onion, it leads to less market value.

***Key words: Aspergillus niger, black mold disease, Onion (Allium cepa.L), Store house, susceptible*.**

Introduction

Black mold disease caused by *Aspergillus niger* Van.Tiegh, (Barnet and Hunter, 1972) is the most common and serious disease of onion. The disease is prevalent in the region having temperature range between 30'c to 42'c. It causes post harvest blemishes and rotting of onion grown and stored in hot climate, where onion cultivation is in

Practice. The onion crops suffers from black mold disease (Thompson, 1972; Tiwari et al.1984., Gupta and Pandey, 1986 ; Rajasab and Vasant Rao,1992). The disease incidence was more severe during the months from August to November. The fungus infects the neck and basal end of the bulb. It causes slow shriveling of the affected scales assuming the brittle structure .It reduces the market value of the bulb (Venkatarayan and Delvi, 1951 ; Tiwari et.al,1984; Quadri et.al., 1982)

The pathogen *A. niger* is cosmopolitan in nature and it may carry with seeds, bulbs, soil and with various parts of the onion plants (Raper and Fennel. 1997). The pathogen is versatile, can survive in the temperature between 30'cto 42'c and high related humidity infects almost all stages of the onion bulb in field. Dry and cool environment seems to check the severity of black mold disease, onion stored in indoor environment shows more percent of disease incidence. (Gupta and Pande, 1986; Koycu and Ozer,1997; Warade et. al,1997).

Materials and Methods

Black mold disease incidence

1. **Onion field:**
   Field trips were under taken to selected onion fields located around the Bijapur city during Rabi season, to record the incidence of black mold diseased caused by Aspergillus niger. The selected onion fields are ,
   a) Toravi Field .I
   b) Tikota Field II
   c) Koulagi III
   The above fields are 10 K.M. away from the city, and have black soil with well irrigation facility. The formers used local and Pusa red varieties of onion for cultivation. Field visits are taken at the time of crop harvesting, plucked bulbs are separated from rest of the plant part and bulbs are
   Separated depends on sizes, gradation were done by labors in an open field. Graded onion bulbs are leave for 1-2 weeks under sun light.

While recording the data on the disease incidence of black mold in particular, in each field about 500 onion bulbs of both red and white were separately observed and number of bulbs showing black mold symptoms were separately counted. Field trips were under taken to each field during the harvesting stage of the crop .The percentage of the disease incidence was estimated with following formula.

$$\% \text{ of disease incidence} = \frac{\text{No.of onion bulbs showing black mold}}{\text{Total number of bulbs counted.}} \times 100$$

2. **Store house and regulating Market:**
   To record the disease incidence of black mold, periodical visits were under taken to storage house and regulating market area during the period of study .The study locations are in market area of Bijapur city. The onions were transported from the formers and stored for few weeks in store houses and are sold regularly through general market. In each selected store house and regulating market area, about 500 onion bulbs were closely observed and the number of bulbs showing black mold symptoms was separately counted. The percent of diseased bulbs are estimated using the above formula. The infected onion bulbs samples were collected and brought to the laboratory for further examinations and culture of *Aspergillus niger* and are stored for feature tests.

Results and Discussion

The incidence of black mold disease of onion cultivated crop fields, store house, and regulating market of Bijapur was recorded during the period from June.2017 to May.2018.The data on percentage of disease is given in Table-1

A) Field survey:
During the Rabi season,(October to March) ,three field trips were under taken to the onion fields nearby Bijapur city to record the incidence of black mold disease during their harvest. The percentage of bulbs infected by *A.niger* was determined following the method of counting, in the fields.

On the day of harvesting about 500 onion bulbs in each field of both red and white color were individually observed the bulbs showing black mold symptoms. The percentage of disease incidence in red bulbs varied from 9% to 19% and in white bulbs it is between 9.80% to 20.40%, thus the average disease incidence was 14.99% .

B) Storehouse and regulating market:
The incidence of black mold disease estimated in storehouse and regulating market located in Bijapur city for the period of 12 months (June.2017 to May.2018) .The percentage of disease incidence varied from 17 % to 49.50% in storehouse and 16.60 % to 37.40 % was recorded in regulating market. (Table-2).

The recorded data on weather (Table.3) shows influence on the severity of black mold disease in onion bulbs. The disease incidence which was observed maximum during the months from August to November 2017,when average rain fall (38’c to 146’c) relative humidity (69% to 74%) were maximum and temperature ranging from 30,c to 34,c Fig-1.,and these factors have positive relation . similar observations have made by in Inda and abroad (Rajasab.and Vasanth Rao., 1992 ; Quadri.,et.al. 1982)

Conclusion

All the infected bulbs, of both red and white color in Toravi field shows 12.20% to 15.80% during Kharif season where as 9.20% to 10.20% during the Rabi season similarly in onion field of Tikota ,the percent of infection was between 16.40% to 18.20% and 9.80% 19.40% .In Koulagi village onion field 19.40% to 20.40% and 14.20% to 14.60% of black mold disease was observed . The maximum incidence of black mold disease was recorded during Kharif season. Fig -2.The incidence of black mold infection was observed more on white colored onion bulbs than colored bulbs, indicates white colored onion bulbs are more susceptible to *A.niger*. The incidence of *A.niger* was more on the onions stored under indoor environment(33.58%), as compared to regulating market (21.80%),followed by bin an onion crop field is between 9.20% to 20.40% was observed . In India and elsewhere recorded the same trend in disease severity, (Gupta and Pande, 1986; Koycu and Ozer, 1997; Warade et. al, 1997; Anonymous. 1998 ; Rashika and Sahadeo. 2017).

The severity of black mold on onion leads to monitory loss to both grower and traders. Management of the disease is needed, may be by adopting seed dressing, field application, crop rotation, improved methods of storage and also use of resistant varieties, and may reduce the black mold disease incidence in onions.

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Fig.-2. Incidence of black mold disease in Storehouse

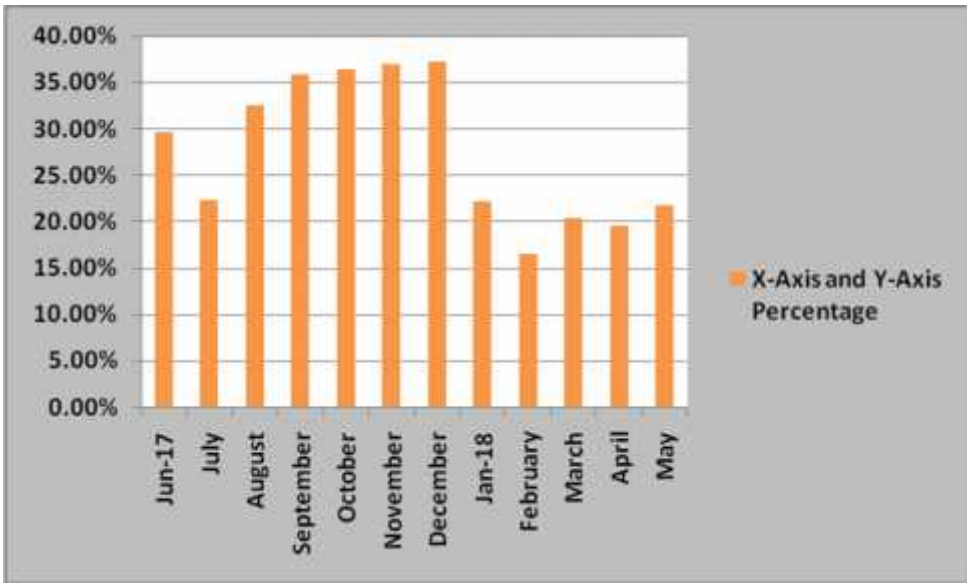

Fig. 1 .Incidence of black mold disease of onion in fields of Bijapur

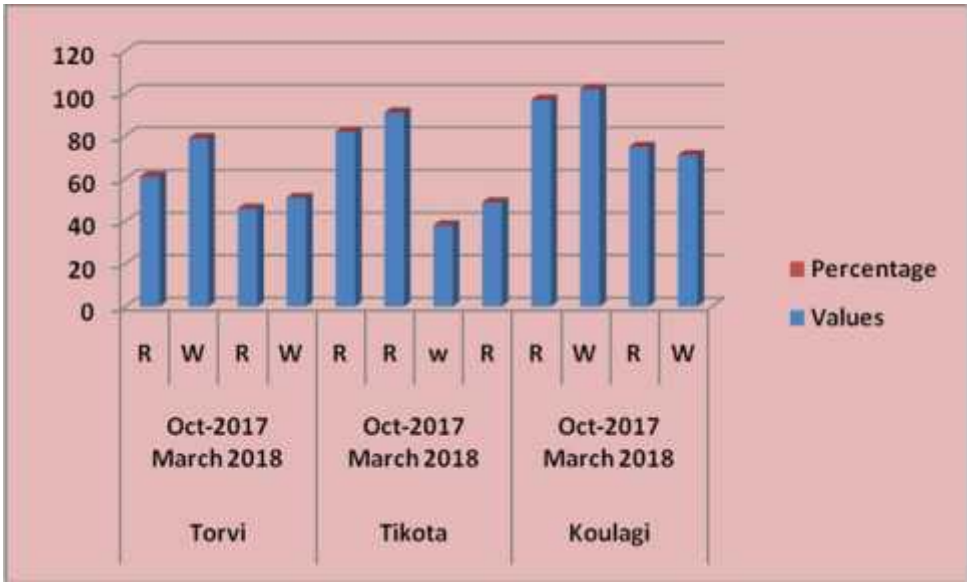

Fig.-3. Incidence of black mold disease in Storehouse

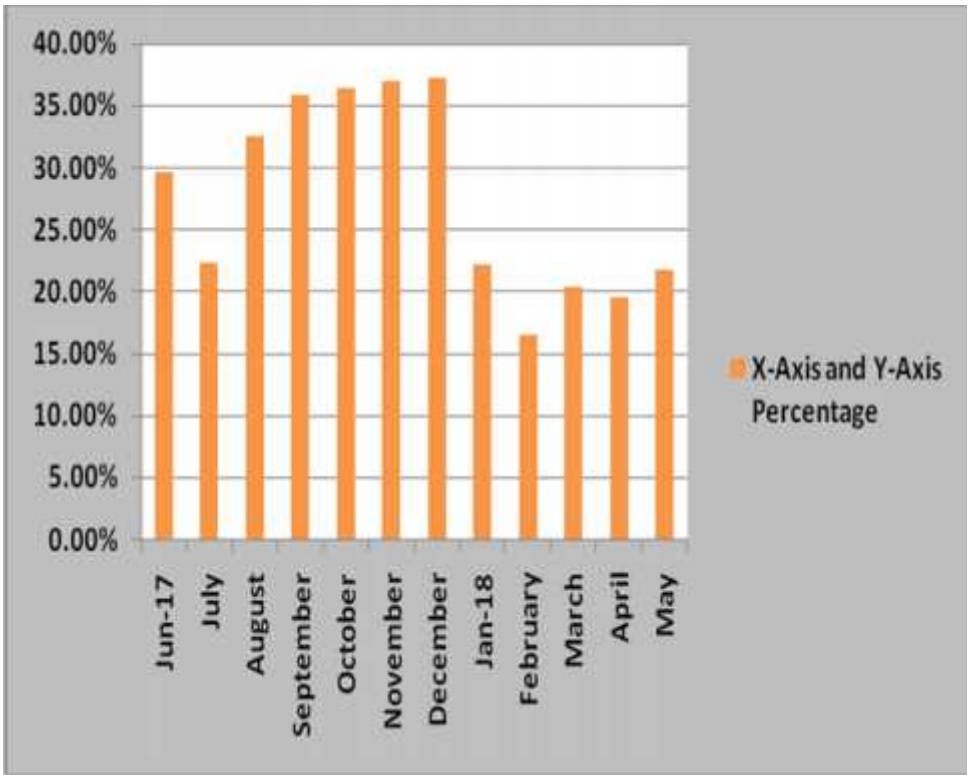

Fig. 1 .Incidence of Black mold disease in the onion crop fields of Bijapur .
(From Jun 2017 to May 2018. (Data is on observation of 500 onion bulbs on harvesting day).

Sl.No	Field Name	Month/Year	No of onion bulbs showing black mold disease		% Disease
1	Toravi	October 2017	R	61	12.20
			W	79	15.80
		March-2018	R	46	9.20
			W	51	10.20
2	Tikota	October 2017	R	82	16.40
			W	91	18.20
		March-2018	R	38	19.40
			W	49	9.80
3	Koulagi	October 2017	R	97	19.40
			W	102	20.40
		March-2018	R	75	14.60
			W	71	14.20

Average diseases incidence in onion fields = 14.99%

R - Red Onion

W - White Onion

Fig. 2. Incidence of Black mold disease in storehouse and regulating market of Bijapur.
From Jun 2017 to May 2018. (Data is on observation of 500 onion bulbs).

Month	Storehouse	% disease	Regulating Market	% disease
Jun-2017	142	28.40	138	27.60
Jul-2017	137	7.40	112	22.40
Aug-2017	213	42.60	163	32.60
Sep-2017	202	4.40	179	35.80
Oct-2017	211	42.40	182	36.40
Nov-2017	247	49.50	187	37.40
Dec-2017	192	38.40	190	37.20
Jan-2018	183	36.60	111	22.20
Feb-2018	86	17.20	83	16.60
Mar-2018	119	23.80	102	20.40
Apr-2018	161	32.20	98	19.60
May-2018	121	24.20	109	21.80
Mean	167.83	33.58	133.33	21.8

Average diseases incidence in storehouse and regulating market = 27.69%