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Issues, Challenges and Remedies**

9th March 2024



*Conference Proceeding: Special Issue Editors*

**Dr. Manoj Bhagat, Dr. Pravin Chandak  
Dr. Sau. Aparna Patil, Dr. Sunil Chakave  
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## Discoloration Of Head In Sorghum Due To *Curvularia Lunata*

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### FULL PAPER

#### Introduction:

Sorghum is an important staple food crop of Vidarbha region; it is cultivated on very large area in Vidarbha region as a cereal as well as forage crop. Sorghum is rich in carbohydrate content, as it required less amount of irrigation and other artificial nutrients; it prove to be an good alternative for wheat and rice. At the time of flowering to physiological maturity when it get a higher moisture content in the field, various fungi start to attack and grow on the head of sorghum. Due to attack of such fungi on sorghum head, it gets infected. As compare to other pathogens associated with the head of sorghum *Curvularia* species shows their dominance. More than 19 different species of *Curvularia* were reported on infected head of sorghum (Girish et al, 2011). *C. clavata*, *C. cymbopogonis*, *C. eragrostidis*, *C. geniculata*, *C. inaequalis*, *C. intermedia*, *C. ischami*, *C. lunata*, *C. oryzae*, *C. ovoidea*, *C. pallescens*, *C. penniseti*, *C. robusta*, *C. senegalensis*, *C. siddiquii*, *C. sorghina*, *C. trifolii*, *C. tuberculata* and *C. verruculosa* were associated with the sorghum head. Out of which *Curvularia lunata* was most dominating. Along with the *Curvularia lunata*, genus like *Aspergillus*, *Fusarium*, *Cladosporium*, *Epicoccum*, *Alternaria*, *Phoma* and *Cylindricarpons* species also reported from grain mold complex of sorghum (Kebede et al, 2023).

Sorghum seeds infected from *Curvularia lunata* shows blackish mycelial mat present on the surface of seeds, which is loosely attached to the surface. Due to such blackish mat associated with seed surface it lead to discoloration of the seeds (Rastogi et al, 1990). This reduces the quality of seeds. Histopathological study reveals that *Curvularia lunata* infects the pericarp and aleurone layer of seeds. Due to the infection of *Curvularia lunata* to sorghum seeds reduces the germination percentage and also increases the grain mold severity (Prom et al, 2003). Seed germination was hampered



due to the infection of *Curvularia lunata*. Grain mold disease formation and its occurrence is totally depends on the differential developmental stages of sorghum plant. Wetness duration is also responsible for the attack of pathogens. Different pathogens attack on sorghum at various developmental stages. *Curvularia lunata* shows their first appearance at the stage of flowering and it shows their maximum incidence at the time of physiological maturity of sorghum (Navi et al, 2005). Sporulation in the *Curvularia lunata* and grain mold severity due to *Curvularia lunata* drastically get increased due to increase in the relative humidity and increase in the temperature (Tonapi et al, 2007). Temperature ranges from 25°C to 28°C increases the sporulation in *Curvularia lunata*.

### **Materials and Methods:-**

#### **Collection of samples:-**

Samples of sorghum head were collected from different localities of Buldana district of Maharashtra. Infected samples were collected from flowering to physiological maturity stage. Collected samples were packed in zip lock bags and bringing to laboratories for further analysis.

#### **Isolation of Pathogens:-**

Pathogens associated with the sorghum head was isolated by Agar plate method (APM) and standard blotter method (SBM).

#### **Standard Blotter paper method:-**

A pair of white blotter paper was taken and jointly soaked in sterile distilled water. Pair of soaked blotter paper were placed on sterile petri dishes, and make a chamber. 5 seeds in each plate were placed in aseptic conditions. Inoculated plates were allowed to incubate for 4-5 days at room temperature.

#### **Agar plate method:-**

Potato dextrose agar (PDA) medium were prepared and poured in sterilized petri plates, allowed to solidify. 5 seeds of infected head were inoculated on each plate and plates were incubated for 4-5 days at room temperature.

#### **Composition of PDA (Potato dextrose agar) medium:-**

Peeled potato – 100gm, Dextrose 20g, Agar 20 gm and distilled water 1000ml, pH 5.6. 100 gram of potato were taken and peeled; boiled until get soft and squeeze through muslin cloth. Then dextrose was added in it and final volume of solution was made up to 1000ml. In this solution agar was added, pH was adjusted to 5.6.

### Identification of Pathogens:-

Microscopic observations were taken by preparing microscopic slides for each isolates. Pathogens were identified with the help of standard literature and monographs.

### Experimental results:-

Head samples of sorghum were collected from tehsil of Buldana district. All the infected samples were subjected to visual analysis. On the basis of visual symptoms appeared on the surface of seeds, seeds were categorized in different grades. All such seeds were used for the isolation of pathogens. Isolation of pathogens was done by standard blotter method and agar plate method. Out of 80 samples collected from different localities of Buldana district, 73 samples were infected by the attack of *Curvularia lunata*. As compare to other pathogens associated with this moldy samples *Curvularia lunata* prove to be dominating. Similar type of results was reported by (Girish et al, 2011). They reported more than 19 different *Curvularia* species associated with infected sorghum head. Out of which *Curvularia lunata* were more dominating, having 39% of incidence as compare to other species.

**Table: - Incidence of *Curvularia lunata* on sorghum seeds at various developmental stages**

| Sr. No. | Name of Tehsil | Percent Incidence of <i>Curvularia lunata</i> |                        |
|---------|----------------|---|------------------------|
|         |                | Flowering stage                               | Physiological maturity |
| 1       | Motala         | 20%   | 86%                    |
| 2       | Buldana        | 23%   | 94%                    |
| 3       | Malkapur       | 20%   | 91.5%                  |
| 4       | Nandura        | 18%   | 92%                    |
| 5       | Jalgaon Jamod  | 24%   | 89%                    |
| 6       | Sangrapur      | 21%   | 93%                    |
| 7       | Chikhali       | 24%   | 85.5%                  |
| 8       | Shegaon        | 23%   | 92.5%                  |
| 9       | Khamgaon       | 20%   | 90.5%                  |

Samples collected at the time of flowering shows 22% incidence of *Curvularia lunata*. While samples collected at the time of physiological maturity shows 91.25 % of incidence of *Curvularia lunata*. Maximum incidence was recorded at the time of physiological maturity of plant. Samples collected from Jalgaon Jamod at the time of





flowering stage shows highest incidence of *Curvularia lunata* (24%). While sample collected from Buldana at the time of physiological maturity shows highest incidence of *Curvularia lunata* (94%). Similar type of reports was given by (Navi et al, 2005). They show the maximum incidence of *Curvularia lunata* were observed at the physiological maturity stage. Out of all the samples collected from different localities, seed samples having black net like structure associated with them have maximum incidence of *Curvularia lunata* as compare to other pathogens. Blackish discoloration of sorghum seeds due to the attack of *Curvularia lunata* were reported by (Rastogi et al, 1990). They reported a black coloured macelial net like structure were loosely attached with the sorghum seeds. At the time of physiological maturity of sorghum plant, whenever it get a higher moisture content, *Curvularia lunata* attack on such sorghum head and causes disease. Due to its accumulation at the time of physiological maturity to harvesting, it may secrete certain toxic metabolites in seeds. Which may be reduces the quality and quantity of sorghum seeds.

#### **Conclusions:-**

From the results and observations it is concluded that *Curvularia lunata* is a serious constraint of sorghum. It attack on sorghum and responsible for the loss in yield. From visual observations, it reduces the quality and vigor of sorghum. As sorghum grains contain blackish mat along with them it is not good for human consumption. Due to continuous accumulation of *Curvularia lunata* on sorghum grain may lead to the deposition of certain harmful toxic metabolites in sorghum grain. For this reason it is recommended that such infected sorghum seeds were not good for the dietary purposes.

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