

“AEROMYCOLOGICAL SURVEY OF *FUSARIUM* SPS. CAUSING DAMPING OFF DISEASE OF ONION FROM NASHIK DISTRICT (M.S.)”

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Abstract: An Aeromycological survey was carried out over Onion field at Niphad, Dist. Nashik (M.S.) for two consecutive seasons i.e. Kharip and Rabbi seasons (from June 2012 to November 2012 and December 2012 to April 2013) by using continuous Tilak air Sampler. Seasonal concentration of *Fusarium* sps. was 9.56% and 9.49% to the total airspora for both the seasons respectively. Highest spore contribution 40.86% was recorded in the month of August 2012 and minimum spore contribution 5.59% was recorded in the month of April 2013. The highest spore was recorded during the period of investigation, when there was an average temperature and high relative humidity and very feeble rain showers. These weather parameters might have helped in the spore formation, liberation causing subsequent increase in conidial load in the air over onion crop field.

Key Words: Aeromycology, fungal spore, Tilak Air Sampler.

1. INTRODUCTION:

Nashik is a leading Onion producing district in Maharashtra. In Nashik District more than 100,000 hectares area is under onion production. There are three types of onion crop Rabi (sown in December-January, harvested after March; called summer onion), Kharip (sown in June-July, harvested after October), and late Kharip (sown in September, harvested after December). Onion is attacked by many fungal diseases, which can reduce the onion production in terms of quality and quantity. One of the major fungal diseases of Onion is caused by *Fusarium* sps.

Damping off disease is caused mainly by *Fusarium oxysporum* Link. fungus, this is very common in almost all onion-growing pockets. *Pythium* sp. has also been reported to cause damping off disease in some pockets. The disease is more prevalent in Northern and Eastern parts of the country during *kharif* season, causing 60-75% damage. Two types of symptoms were observed.

Pre-emergence damping off : The fungus kills the radical and plumule of seed before emergence from soil.

Post-emergence damping off : The pathogen attacks the collar region of seedlings on the surface of soil. The collar portion rots and ultimately the seedlings collapse and die.

In this aeromycological investigation analysis of Damping off disease caused by *Fusarium* Sps. in Nashik District is undertaken and also some remedial measures are suggested.

2. LITERATURE REVIEW:

The studies on the airspora of vegetable market are very few. Bapat (1991) recorded 0.44% contribution of this spore type to the total airspora at Aurangabad. Pardeshi (1995) reported 0.60% contribution to the total airspora over groundnut field at Jalgaon. Qudisia (1997) reported 0.48% contribution to the total air spora over vegetable field at Aurangabad. Deshmukh (2000) reported 16.70% contribution to the total air spora over sunflower field at Jalgaon. Patel (2002) also reported 2.86% and 3.38% contribution of these spores to the total airspora over vegetable field at Nashik. Arsule C.S. and Pande B.N. (2011) reported 1.73% and 1.11% contribution to the total airspora of this spore type over groundnut field at Newasa (M.S.). Ahire Y.R. (2012) reported 0.87% contribution to the total airspora of this spore type over vegetable and fruit market at Pune. Jagtap J.D. and Suryawanshi N.S. (2016) reported 5.45% and 4.50% contribution to the total airspora of this spore type over onion storage and field respectively at Nashik district (M.S.).

3. MATERIALS AND METHOD:

The aeromycological studies over onion field at saikheda Niphad, Dist. Nashik(M.S.) was carried out for two consecutive seasons i.e. Kharip and Rabbi seasons (from 15th June 2012 to 3rd November 2012 and 4th December 2012 to 14th April 2013) by using continuous Tilak's air Sampler, which provides the data of components of airspora. Tilak air sampler was installed at a constant height of 3-4 feet from ground level in the Onion field. After sampling slides were prepared and scanning of prepared slides was regularly done. The identification and description of spore types is essentially based on visual identifications by spore morphology, comparisons with reference slides. The slides were

scanned under Binocular research microscope. The fungal spores and other components were identified by referring published literature (Tilak, 1989) and reference slide prepared. The counting of spores was done by using ‘short transverse’ method of Hirst (1959). The total exposed area was scanned under the microscope with 10X-45 X eyepiece objective combinations.

4. RESULT AND DISCUSSION:

The *Fusarium* sps. that cause damping-off are usually common in an onion production field. These fungi generally survive for long periods in soil and may persist in plant debris or on roots of weeds. Damping-off tends to be most severe under conditions of high soil moisture and compaction. Moderate temperatures, especially when onion crops are grown in succession, favor this disease. In greenhouses, damping-off can be more common when improperly pasteurized soil or previously used seedling trays are used for planting. Water splash can move infested soil from diseased to healthy plants and spread this disease.

The conidia of *Fusarium* were recorded throughout the period of investigation. In microscopic observation it is found that Conidia was hyaline, principally of two kinds, macro-conidia and micro-conidia. Macro-conidia are delicate, multi-celled, slightly curved or bent at the pointed ends, 2 -7 septate, 19-29 X 3-5 µm. typically cone shaped. This spore type contributed 9.56% and 9.49% to the total airspora. Highest spore contribution 40.86% was recorded in the month of August 2012 and minimum spore contribution 2.17% was recorded in the month of June 2012.

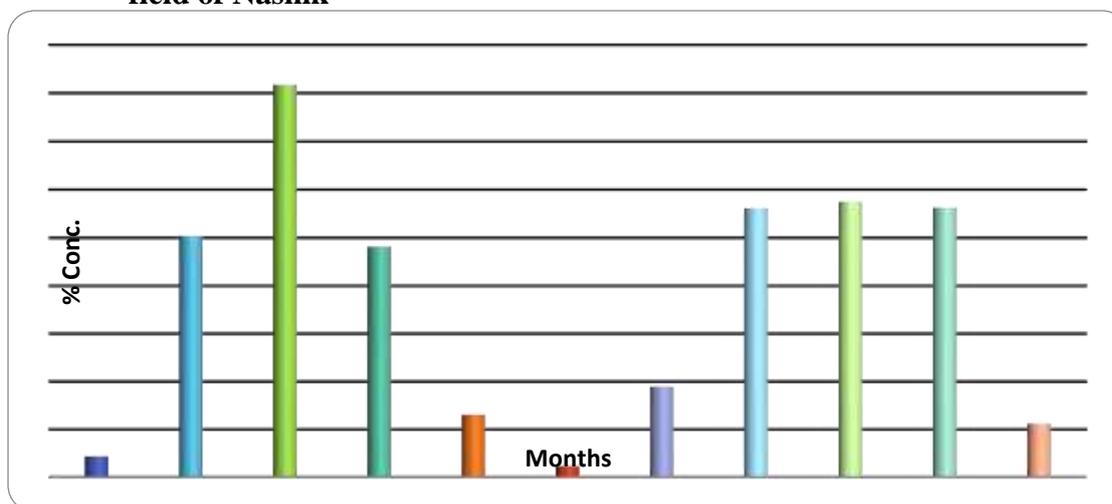
This spore type shows maximum dispersal during night period thus belong to ‘Night Spora’ group showing maximum number of spores at 4 hrs. Field symptoms usually do not appear until the soil has become warm. At first there is progressive yellowing and dying back from the tips of the leaves, the aerial part may die in 1-2 weeks. The optimum temperature for the growth of the pathogen is 24-27 °C. The growth is reduced at lower temperature and ceases at 9°C. At 36°C temperature the fungus is killed. High temperature and low level of soil water were found favourable for high incidence (Kodama, 1983). During the period of investigation the highest spore contribution 40.86% was recorded in the month of August 2012 and minimum spore contribution 2.17% was recorded in the month of June 2012.

5. ANALYSIS:

Table-1 Monthwise Concentration of *Fusarium* spores recorded in the Onion field of Nashik

Sr.No.	Season-I		Season-II	
	Month	% Conc.	Month	% Conc.
1	June	2.17	December	9.47
2	July	25.20	January	28.07
3	August	40.86	February	28.74
4	September	24.10	March	28.13
5	October	6.53	April	5.59
	November	1.15	-	-

Graph-1 Monthwise Concentration of *Fusarium* spores recorded in the Onion field of Nashik



6. CONCLUSION:

This study reveals that meteorological condition shows a pronounced effect on *fusarium* spores. Rainfall during growing season result in great increase in spore number but the spore soon loses their viability in the air. The observation and discussion would serve as a useful step forward in the treatment of damping off disease in Onion.

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